2020 ROURKE BABY RECORD LITERATURE REVIEW

This annotated bibliography lists the literature which has been used to document the recommendations for selected items on the 2020 Rourke Baby Record (RBR). The references included in this review table are not exhaustive, and were selected by the authors for their relevance in supporting the 2020 RBR recommendations.

For our critical appraisal of the literature, prior to the 2014 RBR we used the former system of the Canadian Task Force on Preventive Health Care (CTFPHC) to determine the quality of the evidence in each publication reviewed (Table 1). We continued to use this system for the 2014 RBR, but also began transitioning to the new GRADE system, now endorsed by the CTFPHC (Table 2). For the 2017 and 2020 RBR, only the GRADE system was used. Both former CTFPHC and GRADE systems are described below.

Based on this grading guide, we then used the quality of the evidence to determine the strength of each RBR item recommendation, using the longstanding and clinician-friendly scheme of **Good,** *Fair,* and Inconclusive evidence/Consensus.

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Drs. Leslie Rourke, Denis Leduc, James Rourke

2020 ROURKE BABY RECORD LITERATURE REVIEW

Table of Contents

1.0 Well-child visit schedule

2.0 Growth
- 2.1 Growth Monitoring

3.0 Nutrition
- 3.1 Nutrition (General)
- 3.2 Breastfeeding
  - 3.2.1 Breastfeeding (General)
  - 3.2.2 Breastfeeding and SIDS
  - 3.2.3 Breastfeeding and Pacifiers
  - 3.2.4 Breastfeeding and Maternal Medications Resources
  - 3.2.5 Weaning of Breastfeeding
  - 3.2.6 Ankyloglossia (tongue-tie) and Breastfeeding
- 3.3 Vitamin D Supplementation
- 3.4 Formula Feeding
  - 3.4.1 Infant Formula
  - 3.4.2 Long-Chain Polyunsaturated Fatty Acids (LCPUFA) Supplementation of Infant Formula
  - 3.4.3 Soy-Based Formula
- 3.5 Introduction Of Solid and Allergenic Foods
- 3.6 Nutrition Concerns
  - 3.6.1 Nutritional Interventions For Colic
  - 3.6.2 Probiotics
  - 3.6.3 Reducing Bottle Use In Toddlers
  - 3.6.4 Avoid Juices/ Sweetened Liquids/Foods with high sugar or dietary sodium content

- 3.6.5 Vegetarian Diets
- 3.6.6 Fish Consumption

4.0 Education And Advice

- 4.1 Injury Prevention
  - 4.1.1 Injury Prevention Resources
  - 4.1.2 Injury Prevention (General)
  - 4.1.3 Motorized Vehicle Safety
  - 4.1.4 Bicycle Helmets
  - 4.1.5 Bath and Water Safety
  - 4.1.6 Choking
  - 4.1.7 Counsel On Pacifier Use
  - 4.1.8 Smoke Detectors / Burns Injuries
  - 4.1.9 Poisons: PCC# (Poison Control Centre number)
  - 4.1.10 Falls (Stairs, Furniture, Walkers, Charge Table, Trampoline Use)
  - 4.1.11 Safe Sleep Environment
  - 4.1.12 Positional Plagiocephaly
  - 4.1.13 Crib Safety
  - 4.1.14 Swaddling
  - 4.1.15 Firearm Safety/Removal/Storage

- 4.2 Behaviour and Family Issues
  - 4.2.1 Crying/Colic
  - 4.2.2 Healthy Sleep Habits
  - 4.2.3 Night Waking
  - 4.2.4 Discipline/Parenting Education Programs/Parenting Skills
  - 4.2.5 Family Healthy Active Living/Sedentary Behaviour/Screen Time
  - 4.2.6 High Risk Infants/Children/Parents/Caregivers/Families
    - 4.2.6.1 Maternal Depression
    - 4.2.6.2 Ethanol in Pregnancy/FASD
    - 4.2.6.3 Adoption/Foster Care
    - 4.2.6.4 Immigrants/Refugees
    - 4.2.6.5 Aboriginal Children
    - 4.2.6.6 Social Determinants of Health
    - 4.2.6.7 Prevention of Child Maltreatment and General

4.2.6.8 Other
4.2.7 Non Parental Child Care
4.2.8 Literacy/Encourage Reading
4.2.9 Toilet Learning

4.3 Environmental Health Issues
4.3.1 General Environmental Health Issues
4.3.2 Second-Hand Smoke Exposure
4.3.3 Sun Exposure/Sunscreen/Insect Repellents
4.3.4 Pesticide Use
4.3.5 Lead
4.3.6 Heavy Metals
4.3.7 Radon
4.3.8 Other Environmental Health Issues
4.3.8.1 Home
4.3.8.2 Home Product Safety
4.3.8.3 Outdoor Air
4.3.8.4 Indoor Air

4.4 Other Issues
4.4.1 Over-The-Counter (OTC) Cough/Cold Medication
4.4.2 Inquiry On Complementary/Alternative Medicine
4.4.3 Fever Advice/Thermometers
4.4.4 Footwear
4.4.5 Oral Health/Dental Care

5.0 Developmental Milestone Acquisition
5.1 Autism Spectrum Disorder (ASD)

6.0 Physical Examination
6.1 Jaundice
6.2 Blood pressure
6.3 Fontanelles

6.4 Vision Screening
6.5 Hearing Inquiry/Screening
6.6 Cleft lip/palate
6.7 Sleep Disordered Breathing/Snoring/Obstructive Sleep Apnea
6.8 Dental
6.9 Neck/Torticollis
6.10 Umbilicus
6.11 Screening for Developmental Dysplasia of the Hips
6.12 Muscle tone
6.13 Genitalia
6.14 Back exam/sacral dimple/anus

7.0 Investigations
7.1 Anemia Screening
7.2 Hemoglobinopathy Screening
7.3 Universal Newborn Hearing Screening (UNHS)
7.4 Tuberculosis

8.0 Immunization
8.1 Immunization General: recommendations and resources
8.2 Immunization Pain Reduction and Antipyretic Use
8.3 Evidence Against Relationship ASD and Vaccines
8.4 Meningococcal Vaccine Schedule
8.5 Rotavirus Vaccine
8.6 Varicella Vaccine Schedule
8.7 Hepatitis B, A or A/B Combined
8.8 Pneumococcal Vaccination
8.9 Measles, Mumps and Rubella, and MMR-Varicella (MMRV)
8.10 Influenza Vaccination

9.0 Levels and Grades of Evidence

LITERATURE REVIEW REFERENCE TABLE

1.0 WELL-CHILD VISIT SCHEDULE

Well-Child Visit Schedule References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Shakib J, Buchi K, Smith E, Korgenski K, Young P.C. Timing of Initial Well-Child Visit and Readmissions of Newborns. Pediatrics 2015;135 (3): 469-474. Available from: Pediatrics.	**Subjects:** Newborns discharged from hospital (estimated gestational age ≥34weeks) **Design:** Retrospective cohort **Method:** Data from healthcare system (Utah) that included 21 hospitals. Calculated frequency of well-child visits occurring within 3 days (if discharged ≤48hrs) and within 5 days (if discharged >48 hours) of birth. Multivariate logistic regression to determine association between hospital readmissions within 30 days and whether a WCV occurred or not, adjusted for year of delivery, EGA, whether the baby was the mother's firstborn, the length of stay (LOS) of the birth hospitalization, and the presence of jaundice or feeding problem in the well-baby nursery.	Of 79 720 newborns, 50 606 (63%) were discharged within 48 hours of birth. Of these, 7638 (15%) had a visit within 72 hours of discharge. Readmission rate for newborns who had a visit within the recommended time frame was 15.7 per 1000 compared with 18.4 for those with a later visit (odds ratio 0.85; 95% confidence interval 0.73–0.99) Limitations: population insured (not Medicaid); results demonstrate association, not causality. **Conclusion**: Few first well-child visits occurred within recommended time frame. Early visits were associated with a 15% reduction in the rate of readmissions.		B

2.0 GROWTH

2.1 GROWTH MONITORING

Growth Monitoring Recommendations	Strength of Recommendation
1. The growth of all term infants, both breastfed and non-breastfed, and preschoolers should be evaluated using the 2014 Canadian growth charts from the WHO Child Growth Standards (birth to 5 years) with measurement of recumbent length (birth to 2–3 years) or standing height (≥ 2 years), weight, head circumference (birth to 2 years), and calculation of BMI (2–5 years). **2. Corrected age should be used at least until 24 to 36 months of age for premature infants born at <37 weeks gestation.**	**Good** **Good**

Growth Monitoring Resources
1. Web links to the 2014 WHO Growth Charts for Canada: WHO Growth Charts for Canada with BMI Tables and BMI calculator(DC) 2. CPS Position Statements: Promoting optimal monitoring of child growth in Canada 3. Canadian Task Force for Preventive Health Care recommendations: Growth Monitoring (CTFPHC)

Growth Monitoring References

Reference	Methods	Outcomes	CTFPHC	GRADE
Furlong KR, Anderson LN, Kang H, Lebovic G, Parkin PC, Maguire JL, O'Connor JL, Birken CS, on behalf of the TARGet Kids! Collaboration. BMI-for-Age and Weight-for-	**Subjects:** Healthy children <2yo **Design:** cross-sectional **Method:** Children <2yo (n=1632) recruited from primary care practices in Toronto (Dec 2008-Oct 2014).	Correlation between weight-for-length and BMI-for-age was strong (r = 0.986, P < .0001) and Bland-Altman plots revealed good agreement (difference = −0.08, SD = 0.20, P = .91). Observations misclassified in 6.3%, most occurring near the percentile cutoffs. No differences by age and sex.		1B

Length in Children 0 to 2 Years. Pediatrics 2016;138(1): e20153809; DOI: 10.1542/peds.2015-3809. Available from: Pediatrics.	BMI-for-age z-scores compared to weight-for-length z-scores	**Conclusion:** Weight-for-length and BMI-for-age demonstrated high agreement with low misclassification. BMI-for-age may be an appropriate indicator of growth in the first 2 years of life and has the potential to be used from birth to adulthood. Additional investigation is needed to determine if BMI-for-age in children <2 years is associated with future health outcomes.		
Roy SM, Spivack JG, Faith MS, Chesi A, Mitchell JA, Kelly A, Grant SF, McCormack SE, Zemel BS. Infant BMI or Weight-for-Length and Obesity Risk in Early Childhood. Pediatrics 2016;137(5): e20153492. Available from: Pediatrics.	**Subjects:** Children 0-26months **Design:** Cohort **Methods:** Anthropometric data extracted from medical records for well-child visits for 73 949 full term infants taking part in Pediatric Care Netwrok Study at the Children's Hospital of Philadelphia. WHO weight-for-length and BMI z-scores calculated up to 24 months old	Agreement between WHO weight-for-length and BMI z-score increased from 0-6 months, remained high thereafter. Early infancy (at 2 months) anthropometric data associated with early childhood (2yo) obesity; stronger for high BMI than high weight-for-length (31% vs. 23% using obesity cutoff of 85th percentile; 47% vs. 29% using obesity cutoff of 97.7th percentile). **Conclusion:** Epidemiologic studies focused on assessing childhood obesity risk should consider using BMI in early infancy.		1B
Canadian Task Force on Preventive Health Care. Recommendations for growth monitoring, and prevention and management of overweight and obesity in children and youth in primary care. Canadian Medical Association Journal 2015;187(6): 411-421. Available from: CMAJ	**Subjects:** Children and adolescents up to 17 years **Design:** Guideline **Method:** Recommendations were led by workgroups of members of the task force in collaboration with the Public Health Agency of Canada and in consultation with a Pediatric Endocrinologist. The GRADE system was used to determine the quality of evidence and strength of recommendations. Recommendations underwent external review.	**Recommendations:** 1) For children and youth aged 17 years and younger, growth monitoring at all appropriate primary care visits using the World Health Organization Growth Charts for Canada 2) Primary care practitioners not routinely offer structured interventions aimed at preventing overweight and obesity in healthy-weight children and youth aged 17 years and younger. 3) For children and youth aged 2 to 17 years who are overweight or obese, we recommend that primary care practitioners offer or refer to formal, structured behavioural interventions aimed at healthy weight management.		1C 2C 2B 1C

		4) For children aged 2 to 11 years who are overweight or obese, we recommend that primary care practitioners not offer orlistat aimed at healthy weight management. 5) For youth aged 12 to 17 years who are overweight or obese, we recommend that primary care practitioners not routinely offer orlistat aimed at healthy weight management. 6) For children and youth who are overweight or obese, we recommend that primary care practitioners not routinely refer for surgical interventions.		2B 1C
World Health Organization. WHO growth charts adapted for Canada summary of changes. March 2014. Retrieved from: http://www.dietitians.ca/Downloads/Public/WHO-Growth-Charts-Summary-of-Change-March-2014.aspx	Subjects: Children and youth Methods: The original Collaborative Group which included representation from the Canadian Paediatric Society, College of Family Physicians of Canada, Community Health Nurses of Canada and Dietitians of Canada, expanded in January 2014 to include the Canadian Pediatric Endocrine Group. Together, the five groups addressed some design issues that had emerged since the growth charts were first put into practice in 2010. The growth charts were reissued in March 2014 and address the primary design issues.	Summary of changes: 1) Created colour charts (blue icon for Boys and pink for Girls) suitable for printing and faxing. 2) The 0.1 percentile cutoff was removed from all charts. The 99.9 percentile cutoff remains as a dashed curve on on appropriate charts (0-2 years Weight-for-length; 2-19 years BMI-for-age). 3) After 10 years old, monitoring of weight-for-age alone is not recommended (should assess BMI-for-age). However, to facilitate the practice of some physicians who want to continue to monitor weight-for-age beyond 10 years old, percentile curves were extended (dashed, not solid, as cautionary note, since WHO recommends BMI as the best measure of weight relative to height after age 10). 4) New web address added to all charts: http://www.whogrowthcharts.ca/ 5) BMI-for-age charts include note about availability of BMI tables and calculators as well as formula to calculate BMI.		
Rifas-Shiman SL, Gillman MW, Oken E, Kleinman K, Taveras EM. Similarity of	**Subjects:** Children <2yo **Design:** Retrospective cohort	Association between overweight (CDC and WHO) during 1-24 months and obesity at 5yo. At 1-24 months, 18.3-21.3% overweight (using CDC or WHO cutoffs) and at 5yo, 10.8%		B

the CDC and WHO Weight-for-Length Growth Charts in Predicting Risk of Obesity at Age 5 Years. Obesity 2012; 20(6)1261-1265. Abstract available from: Pubmed.	**Methods:** longitudinal dataset from a clinical surveillance database of 2,121,511 well-child visits by 312,857 children seen at multi-site group practice in Eastern Massachusettes 1980-2008. Total of 15,488 children analyzed (with length/height and weight measurements at 1,6,12,18,24 months and 5yo).	obese. Odd ratios (95% confidence interval (CI)) for associations of ever being overweight during 1–24 months with obesity at 5 years were 6.0 (5.4, 6.6; CDC weight-for-length), 6.3 (5.7, 7.0; WHO weight-for-length), and 6.0 (5.4, 6.7; WHO BMI), respectively. **Conclusion:** Ever being overweight in the first 2 years of life is a strong predictor of obesity at 5 years. CDC weight-for-length, WHO weight-forlength, and WHO BMI cutpoints for overweight in early childhood provided similar estimates of later obesity risk.		
R Williams, J Clinton; Canadian Paediatric Society, Early Years Task Force. **Getting it right at 18 months: In support of an enhanced well-baby visit.** Paediatr Child Health 2011;16(10):647-50. Available from CPS	**Subjects:** 18-month olds **Design:** Position Statement **Methods:** This statement demonstrates the need for measuring/monitoring key indicators of early childhood health and well-being. It offers specific recommendations to physicians, governments and organizations for a universally established and supported assessment of every Canadian child's developmental health at 18 months.	See Position Statement for specific recommendations.		
C Hertzman, J Clinton, A Lynk; Canadian Paediatric Society, Early Years Task Force. **Measuring in support of early childhood development.** Paediatr Child Health	**Subjects:** Young children **Design:** Position Statement **Methods:** The statement explores the objectives for collecting quality information about early child development, its determinants and long-term outcomes. It also	See Position Statement for specific recommendations.		

2011;16(10):655-7. Available from CPS	examines four approaches to collecting population-based, person-specific and longitudinal data, both in young children and later in life. A key outcome of monitoring development is timely intervention. Linking individual data to the home and community levels is a critical step, so that communities and governments can monitor and take actions that support early child development.			
Lawrence S, Cummings E, Chanoine JP, Metzger DL, Palmert M, Sharma A, Rodd C; On behalf of the Canadian Paediatric Endocrine Group. **Canadian Paediatric Endocrine Group extension to WHO growth charts: Why bother?** Paediatr Child Health. 2013;18(6):295-297. Available from: Paediatr Child Health	**Subjects:** Children **Design:** Commentary **Methods:** In response to concerns regarding the presentation of the 2010 WHO data, the CPEG generated complementary growth curves to enhance clarity, reduce potential errors in classification and enable users to better track short term changes, particularly for weight in older children.	The CPEG curves are based on the 2010 WHO Growth Charts for Canada. The CPEG growth curves "extend weight-for-age beyond 10 years of age, restore additional percentiles within the normal range, remove extreme percentiles and harmonize the choice of body mass index percentiles with adult definitions of overweight and obesity. All modifications followed strict WHO methodology and used core data from the United States National Center for Health Statistics. The curves retain the clean appearance of the 2010 Canadian curves and are available from the CPEG website (http://cpeggcep.net)."		
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants -**	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement from Health Canada, Canadian Paediatric Society, Dieticians	Based on a previous CPS statement (Promoting optimal monitoring of child growth in Canada: Using the new World Health Organization growth charts) and on the 2006 WHO growth charts, this statement recommends the use of the Growth Charts for Canada for optimal monitoring of infant growth. The working group also suggests that the assessment of	III A	1C

recommendations from birth to six months. 2012. Available from: http://hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php	of Canada, and Breastfeeding Committee for Canada.	infant growth requires several measurements, taken over time, such as: gestational age at birth (use of corrected age), growth trajectory (growth pattern), birth weight, any problems with lactation, any acute or chronic illness. **Recommendation:** Use the 2006 WHO growth charts to monitor infant growth.		
Valérie Marchand; Canadian Paediatric Society, Nutrition and Gastroenterology Committee. **The toddler who is falling off the growth chart.** Paediatr Child Health. 2012;17(8): 447. Available from: http://www.cps.ca/en/documents/position/toddler-falling-off-the-growth-chart	**Subjects:** Toddlers **Design:** Practice point **Methods:** This practice point was produced by the CPS Nutrition and Gastroenterology Committee and has been reviewed by the Community Paediatrics and the Drug Therapy and Hazardous Substances Committees of the CPS.	The expert committee issues several recommendations for health professionals regarding the monitoring of growth and evaluation of a child whose growth falters. The authors also discuss possible interventions when there is inadequate growth and no underlying disease. **Conclusion:** Following a child's growth is essential to detecting nutritional deficiencies or underlying disease. **Recommendation:** When a child's growth falters, a baseline workup and nutritional assessment should be performed.	III A	1C
D Secker, C Armistead, L Corby, M de Groh, V Marchand, LL Rourke, E Misskey, Canadian Paediatric Society/Société canadienne de pédiatrie, Adolescent Health Committee/Comité de la santé de l'adolescent**.** **Promoting optimal monitoring of child growth in Canada: Using the new World Health Organization growth charts - Executive**	Subjects: 0 to 5 years old **Subjects:** Children **Design:** Position statement **Methods:** The WHO Growth Study was initiated in 1997 to follow a cohort of children's who had been raised in six different countries (Brazil, Ghana, India, Norway, Oman and USA) under recommended nutritional and health practices. This position statement gives recommendations for	The WHO growth charts are now considered the gold standard for children's growth and are recommended to physicians to use during well-baby and well-child visits. The WHO also recommends using calibrated and well-maintained quality equipment to ensure the accuracy of measurements. According to this report, physicians should be trained to use the new growth charts and should understand the differences between the WHO and CDC growth charts to be prepared to explain them to parents and caregivers. A table of cut-off points for possible growth problems is included and can be seen on the CPS website.	III A	

Summary. Paediatrics and Child Health. 2010;15(2): 77- 83. Abstract available from: http://www.pulsus.com/journals/abstract.jsp?HCtype=Physician&sCurrPg=abstract&jnlKy=5&atlKy=9322&isuKy=897&isArt=t&	physicians on how to properly use the growth charts.			
WHO Multicentre Growth Reference Study Group. **WHO Child Growth Standards: Growth velocity based on weight, length and head circumference: Methods and development.** Geneva: World Health Organization. 2009;242 pages. Available from: WHO and http://www.who.int/childgrowth/mgrs/en/	**Subjects:** 0 to 5 years old **Design:** Population-based study (N=8,440) **Methods:** Growth charts based on internationally sampled children with optimal feeding and living conditions (including exclusive breastfeeding for the first 4 to 6 months). Study conducted from 1997-2003. Longitudinal follow-up from birth to 24 months and cross-sectional data from 18 to 71 months.	WHO velocity standards for weight are presented for 1-month increments from birth to 12 months and 2- to 6-month increments from birth to 24 months. An internationally-sampled cohort was prospectively followed to monitor growth patterns. Mothers and newborns visited at home 21 times; 882 of 1,743 (in the longitudinal sample) completely followed-up. This study reports that growth velocity must be interpreted by taking into account attained growth. One limitation to these methods is the community-based sampling strategy.	II-2 A	
Taveras EM, Rifas-Shiman SL, Belfort MB, Kleinman KP, Oken E, Gillman MW. Weight Status in the First 6 Months of Life and Obesity at 3 Years of Age. Pediatrics 2009; ;123:1177– 1183. Available from: Pediatrics.	**Subjects:** Children 0-3yo **Design:** Cohort **Methods:** 559 children in Project Viva (prospective, cohort study of pregnant women and their children). Multivariate regression analysis to determine independent effects of 1) birth weight-for-length z-score and 2) weight-for-length z-score at	Mean weights at birth, 6 months, and 3 years were 3.55, 8.15, and 15.67 kg, respectively. Corresponding lengths were 49.9, 66.9, and 97.4 cm. At 3 years, 48 children (9%) were obese. In multivariate regression analyses, each increment in 6-month weight-for-length *z* score was associated with higher BMI *z* scores, higher sums of subscapular and triceps skinfold thicknesses, and increased odds of obesity at age 3. The predicted obesity prevalence among children in the highest quartiles of both birth and 6-month weight-for-length *z* scores was 40%, compared with 1% for children in the lowest quartiles of both. Magnitude		B

	6 months on outcomes at 3yo (BMI z-score, sum of subscapular and triceps skinfold thicknesses, obesity (BMI ≥95th percentile).	of association with higher BMI z-scores at 3yo smaller for birth weight-for-length *z* scores compared to weight-for-length *z* scores at 6 months. **Conclusion:** More-rapid increases in weight for length in the first 6 months of life were associated with sharply increased risk of obesity at 3 years of age. Changes in weight status in infancy may influence risk of later obesity more than weight status at birth.		
De Onis M, Garza C, Onyango AW, Borghi E. **Comparison of the WHO child growth standards and the CDC 2000 growth charts.** The Journal of Nutrition. 2007; 137: 144-148. Abstract available from: PubMed	**Subjects:** 0 to 5 years old **Design:** Review **Methods**: Compared 2006 WHO growth standards to 2000 CDC growth standards. Prepared descriptive comparisons using a pooled sample of 226 healthy infants from 7 studies in North America and Northern Europe	Main difference in weight-for-age curves occurs during infancy. CDC sample seems to be generally heavier and WHO standards are taller. According to this review, CDC growth charts have been proven to be inadequate for monitoring the growth of breastfed infants. The review reports that the WHO standards are a better tool than the CDC 2000 growth charts for monitoring the growth of breastfed infants. The WHO standards were based on a prospective longitudinal study design while the CDC standards are based on data collected prospectively and by retrospective review of medical records.	II-3 A	
WHO Multicentre Centre Growth Reference Study Group. **Assessment of differences in linear growth among populations in the WHO Multicentre Growth Reference Study.** Acta Paediatr. 2006; S450(95): 56-65. Full text available from: http://www.who.int/childgrowth/standards/Difference_linear_growth.pdf	**Subjects:** 0 to 5 years old **Design:** Population-based study (N=8,440) **Methods:** Growth charts based on internationally sampled children (from Brazil, Ghana, India, Norway, Oman and the USA) with optimal feeding and living conditions (including exclusive breastfeeding for the first 4 to 6 months, no maternal smoking and environments supportive of unconstrained growth).	This study looked at differences in length and height among the populations included in the Multicentre Growth Reference Study (MGRS). There were a total of 8,440 children sampled across all sites; 1,743 in the longitudinal sample and 6,697 enrolled in the cross-sectional sample. Results showed that variance in growth was 20 times more likely the result of individual variation within a population versus country variation (70% vs. 3%, respectively, of total variance). Ghana and the USA were representative of the pooled average, while Oman and India tended to have lower values and Brazil and Norway had higher values.	II-2	

3.0 NUTRITION

3.1 NUTRITION GENERAL

Nutrition (General) Recommendations	Strength of Recommendation
1. Restriction of dietary fat during the first 2 years is not recommended since it may compromise the intake of energy and essential fatty acids, required for growth and development. After 2 years, a gradual transition begins from a high fat milk diet to a lower fat milk diet, as per Canada's Food Guide. 2. Promote family meals with independent/self-feeding while offering a variety of healthy foods. 3. Milk consumption range is consensus only & is provided as as approximate guide 4. Avoid all sweetened fruit drinks, sports drinks, energy drinks and soft drinks 5. Restrict Fruit juices consumption to a maximum of ½ cup (125mls) a day. 6. Limit the consumption of prepared food and beverage products that are high in sugar content 7. Limit/avoid consuming highly processed foods that are high in dietary sodium. 8. Avoid honey until 1 year of age to prevent botulism. 9. Promote family meals with independent/self-feeding while offering a variety of healthy foods.	

Nutrition Resources
1. Nutrition risk screening questionnaires: Nutri-eSTEP screening tool, available for both Toddlers (18-35 mos) and Preschoolers (3-5 years). 2. Nutrition for Healthy Term Infants 0-6 months 6-24 months CPS Practice Point 0-6 months Overview NHTI 0–6 months (CPS) 3. Dietitians of Canada 4. 2019 Nutrition Guidelines(ODPH)

Nutrition (General) References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
World Health Organization. Guideline: Sugar intake for adults and children. 2015. Available from: http://apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf?ua=1	**Subjects:** adults and children **Design:** evidence-informed guidelines **Methods:** procedures outlined in the WHO handbook for guideline development	Free sugars include monosaccharides and disaccharides added to foods and beverages by the manufacturer, cook or consumer, and sugars naturally present in honey, syrups, fruit juices and fruit juice concentrates. WHO recommends: 1) Reduced intake of free sugars throughout the lifecourse. 2) In both adults and children, reducing the intake of free sugars to less than 10% of total energy intake. 3)A further reduction of the intake of free sugars to below 5% of total energy intake.		1B 1B 2C

Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/index-eng.php	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	This statement provides health professionals with evidence-informed principles and recommendations on nutrition from 6 to 24 months old. The recommendations cover the following topics: general principles of feeding and nutrition, breastfeeding, breastmilk subsititutes, complementary feeding, snacks, and practical tips for parents and health professionals. Sample menus are provided.		
Persaud N, Maguire JL, Lebovic G, Carsley S, Khovratovich M, Randall Simpson JA, McCrindle BW, Parkin PC, Birken C; TARGet Kids! collaboration. **Association between serum cholesterol and eating behaviours during early childhood: a cross-sectional study.** CMAJ. 2013 Aug 6;185(11):E531-6. Abstract available from: PubMed	**Subjects:** Children aged 3-5 years and their parents **Design:** Cross-sectional study **Methods:** Children recruited from 7 primary care practices were assessed for eating behaviours and dietary intake by the NutriSTEP (Nutritional Screening Tool for Every Preschooler) questionnaire and serum levels of non-HDL were also measured.	Laboratory data and data from responses to the NutriSTEP questionnaire were available for 1,076 children out of a total of 1,856. The characteristics of participants and nonparticipants did not statistically differ. The eating behaviours subscore of the NutriSTEP tool was significantly associated with serum non-HDL cholesterol (p = 0.03); for each unit increase in the eating behaviours subscore suggesting greater nutritional risk, the authors saw an increase of 0.02 mmol/L (95% CI 0.002 to 0.05) in serum non-HDL cholesterol. The eating behaviour subscore was also associated with LDL cholesterol and apolipoprotein B, but not with HDL cholesterol or apolipoproteins A1.	III I	C

		Conclusion: The results suggest that preschool-aged children and eating behaviours may be potential targets for early interventions to promote cardiovascular health.		
Scharf RJ, Demmer RT, DeBoer MD. **Longitudinal evaluation of milk type consumed and weight status in preschoolers.** Arch Dis Child. 2013 May;98(5):335-40. Available from: PubMed	**Subjects:** Children aged 2 to 4 years **Design:** Longitudinal cohort study (*n* = 10,700) **Methods:** Authors examined body mass index (BMI) z score and overweight/obese status as a function of milk type intake.	The majority of children drank whole or 2% milk (87% at 2 years, 79.3% at 4 years). Across racial/ethnic and socio-economic status sub-groups, 1%/skim milk drinkers had higher BMI z-scores than 2%/whole milk drinkers. In multivariable analyses, increasing fat content in the type of milk consumed was inversely associated with BMI z score ($p<0.0001$). Compared to those drinking 2%/whole milk, 2- and 4-year-old children drinking 1%/skim milk had an increased adjusted odds of being overweight (age 2 OR 1.64, $p<0.0001$; age 4 OR 1.63, $p<0.0001$) or obese (age 2 OR 1.57, $p<0.01$; age 4 OR 1.64, $p<0.0001$). In longitudinal analysis, children drinking 1%/skim milk at both 2 and 4 years were more likely to become overweight/obese between these time points (adjusted OR 1.57, $p<0.05$). **Conclusion:** Consumption of 1%/skim milk is more common among overweight/obese preschoolers, potentially reflecting the choice of parents to give overweight/obese children low-fat milk to drink. Nevertheless, 1%/skim milk does not appear to restrain body weight gain between 2 and 4 years of age in this age range.	II-2	C
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from birth to six months.** 2012. Available from: http://hc-sc.gc.ca/fn-	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	This statement provides health professionals with evidence-informed principles and recommendations on infant nutrition in the first six months. The recommendations cover the following outcomes: growth, breastfeeding, supplemental vitamin D, first complementary foods, feeding changes and breast milk substitutes.		

an/nutrition/infant-nourisson/recom/index-eng.php				
Health Canada. **Eating Well with Canada's Food Guide.** Available from: Health Canada	**Subjects:** >2 years old **Design:** Online resource	The guide indicates that children aged >2 years old can obtain the nutrients and calories they need for healthy growth and development by following Canada's Food Guide.	III	
Watson-Jarvis K, McNeil D, Fenton TR, Campbell K. **Implementing the Nutrition Screening Tool for Every Preschooler (NutriSTEP®) in community health centres.** Can J Diet Pract Res. 2011 Summer;72(2):96-8. Abstract available from: PubMed	**Subjects:** Parents of children aged 3-5 years **Design:** Survey research, cross-sectional design **Methods:** Parents attending preschool immunization clinics were recruited. Parents, staff, and physicians were asked for their opinions on screening.	The 412 (34%) parent questionnaires completed indicated that parents found NutriSTEP easy to complete and helpful for identifying areas of nutrition concern. Staff estimated screening distribution took one to three minutes. Clerks and nurses expressed concern about additional workload and demands on parents. Managers believed NutriSTEP was easy to implement. Physicians considered nutrition screening of preschoolers important, and felt that health centres were the best location for screening. **Conclusion:** NutriSTEP was relatively easy to implement in two community health clinics. While staff expressed concern about increased workload, parents found it easy to complete and helpful.	III I	C
Watson-Jarvis K, Fenton TR, McNeil D, Campbell K. **Preschool nutrition risk in Calgary.** Can J Diet Pract Res. 2011 Spring;72(1):e101-6. Abstract available from: PubMed	**Subjects:** Parents of children aged 3-5 years **Design:** Survey research, cross-sectional design **Methods:** Study objectives were to identify the proportion of children at nutrition risk and to assess acceptance and impact of dietitian referrals. Parents attending preschool immunization clinics were	Out of 1,222 families who attended clinic visits, 412 completed a demographic questionnaire (34%) and 438 completed NutriSTEP (36%). Thirty children screened (7%) were at high risk. Almost 50% of parents reported adverse feeding environment behaviours. When using parental reports of daily frequency of a child's consumption as a proxy for daily servings, the majority of children fell short in most food groups. Ten of the 30 parents of high-risk children (33%) completed dietitian counselling. Most parents who were counselled (6 out of 10) reported making changes as a result of counselling and were satisfied with the service (5 out of 10).	III I	C

	asked to complete the NutriSTEP questionnaire and a parent questionnaire to gather demographics and perceptions of NutriSTEP. Follow-up counselling by a dietitian was offered for parents of high-risk children, and parents who attended completed a follow-up questionnaire.	**Conclusion:** NutriSTEP was an effective tool for identifying preschool children at nutritional risk. Few parents accepted referral to a pediatric dietitian, but most made changes to improve nutrition and lifestyle risk factors.		
Ontario Society of Nutrition Professionals in Public Health (OSNPPH). **Pediatric Nutrition Guidelines for Primary Health Care Providers**. Revised May 2011. Available from: http://www.osnpph.on.ca/resources/YORK-Pediatric_Nutrition_Guidelines_for_Primary_Health_Care_Providers-2011.pdf	**Subjects:** 0 to 6 years old **Design:** Pediatric nutrition guidelines **Methods:** Produced by the Ontario Society of Nutrition Professionals in Public Health (OSNPPH).	These guidelines provide various recommendations for feeding and nutrition for infants at certain age increments: birth to 6 months, 6 to 9 months, 9 to12 months, 12 to 18 months, 18 to 24 months, 2 to 3 years, and 3 to 6 years. They also report approximate amounts of fluid consumption as referenced in the Rourke Baby Record. They primarily used references from Health Canada and the Dieticians of Canada.	III	
Huh SY, Rifas-Shiman SL, Rich-Edwards JW, Taveras EM, Gillman MW. **Prospective association between milk intake and adiposity in preschool-aged children.** J Am Diet Assoc. 2010 Apr;110(4):563-70. Available from: PubMed	**Subjects:** Children aged 2-3 years. **Design:** Longitudinal cohort study (*n* = 852) **Methods:** The authors assessed milk and dairy intake at age 2 years with food frequency questionnaires completed by mothers. Our primary outcomes were body mass index (BMI; calculated as kg/m^2), z score and	At age 2 years, mean milk intake was 2.6 (standard deviation 1.2) servings per day. Higher intake of whole milk at age 2, but not reduced-fat milk, was associated with a slightly lower BMI z score (-0.09 unit per daily serving [95% confidence interval: -0.16 to -0.01]) at age 3 years; when restricted to children with a normal BMI (5th to <85th percentile) at age 2 years, the association was null (-0.05 unit per daily serving [95% confidence interval: -0.13 to 0.02]). Intake of milk at age 2 years, whether full- or reduced-fat, was not associated with risk of incident overweight at age 3 years. Neither total milk nor total dairy intake at age 2 years was associated with BMI z score or incident overweight at age 3 years.	II-2 C	C

	overweight at age 3 years, defined as BMI for age and sex >or=85th percentile. They used linear and logistic regression models, adjusting for maternal BMI and education, paternal BMI, and child age, sex, race/ethnicity, intake of energy, nondairy beverages, television viewing, and BMI z score at age 2 years.	**Conclusion:** Neither consuming more dairy products, nor switching from whole milk to reduced-fat milk at age 2 years, appears likely to prevent overweight in early childhood.		
Randall Simpson JA, Keller HH, Rysdale LA, Beyers JE. **Nutrition Screening Tool for Every Preschooler (NutriSTEP): validation and test-retest reliability of a parent-administered questionnaire assessing nutrition risk of preschoolers.** Eur J Clin Nutr. 2008 Jun;62(6):770-80. Abstract available from: PubMed	**Subjects:** Children aged 3-5 years and their parents **Design:** Validation study, test-retest reliability **Methods:** Participants were recruited from community programs (e.g., child-care centers) in both rural and urban settings. Parents of 269 preschoolers completed the NutriSTEP questionnaire. Authors selected a nutritional assessment (based on medical and nutritional history, 3 days of dietary recall and anthropometric measurements) completed by a trained dietitian as the criterion validation (gold standard). Receiver operating characteristic (ROC) curve were used to establish validity. The test-retest reliability study occurred 2-4 weeks after	Validation: Scores on NutriSTEP and the RD rating were correlated (r = 0.48, P = 0.01). Area under the ROC curve for the high risk rating (by dietitian, score 8+) and the moderate risk rating (score 5+) were 81.5 and 73.8%, respectively. A moderate risk cut point of >20 and high risk cut point of >25 were identified for the NutriSTEP scores. Reliability: The NutriSTEP score was reliable between administrations (ICC = 0.89, F = 16.7, P < 0.001). Most items on the questionnaire had adequate (kappa>0.5) or excellent (kappa>0.75) agreement. **Conclusion:** The NutriSTEP questionnaire is both valid and reliable for determining nutritional risk in preschoolers.		

	initial completion of the NutriSTEP questionnaire. Parents of 140 preschoolers completed NutriSTEP on two occasions. Intraclass correlation (ICC) and kappa were used to assess reliability.			
O'Connor TM[1], Yang SJ, Nicklas TA. **Beverage intake among preschool children and its effect on weight status.** Pediatrics. 2006 Oct;118(4):e1010-8. Available from: Pediatrics	**Subjects:** Children aged 2 to 5 years **Design:** National Health and Nutrition Examination Survey 1999-2002 (*n* = 1,552) **Methods:** Descriptive statistics and group comparisons of beverage intake and overweight classification.	After removal of subjects with missing data, a total of 1160 children were analyzed, 579 (49.9%) were male. White children represented 35%, black children represented 28.3%, and Hispanic children represented 36.7% of the sample. Twenty-four percent of the children were overweight or at risk for overweight (BMI ≥85%), and 10.7% were overweight (BMI ≥95%). Eighty-three percent of children drank milk, 48% drank 100% fruit juice, 44% drank fruit drink, and 39% drank soda. Whole milk was consumed by 46.5% of the children, and 3.1% and 5.5% of the children consumed skim milk and 1% milk, respectively. Preschool children consumed a mean total beverage volume of 26.93 oz/day, which included 12.32 oz of milk, 4.70 oz of 100% fruit juice, 4.98 oz of fruit drinks, and 3.25 oz of soda. Weight status of the child had no association with the amount of total beverages, milk, 100% fruit juice, fruit drink, or soda consumed. **Conclusion:** Weight status had no association with total milk consumed after adjustment for age, gender, ethnicity, income, energy intake, and physical activity. There was no clinically significant association between the type of milk (percentage of fat) consumed and weight status.	III	C

3.2 BREASTFEEDING

3.2.1 BREASTFEEDING GENERAL

Breastfeeding Recommendations	Strength of Recommendation
1. Exclusive breastfeeding is recommended for the first six months of life for healthy term infants. Introduction of solids should be led by the infant's signs of readiness – a few weeks before to just after 6 months. **2.** Breastfeeding is the optimal food for infants, and breastfeeding with (with complimentary foods) may continue for up to two years and beyond unless contraindicated. **3. Breastfeeding may reduce gastrointestinal and respiratory infections and helps to protect against SIDS.** **4.** Maternal support, both antepartum and postpartum, increases breastfeeding and prolongs its duration. Early and frequent mother-infant contact, rooming in, and banning handouts of free infant formula increase breastfeeding rates.	**Good** Consensus **Good** Consensus

Breastfeeding Resources
1. - Breastmilk storage: 2019 Nutrition Guidelines (ODPH) page 8

Breastfeeding References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
US Preventive Services Task Force, Bibbins-Domingo K[1], Grossman DC[2], Curry SJ[3], Davidson KW[4], Epling JW Jr[5], García FA[6], Kemper AR[7], Krist AH[8], Kurth AE[9], Landefeld CS[10], Mangione CM[11], Phillips WR[12], Phipps MG[13], Pignone MP[14]. **Primary Care Interventions**	**Subjects:** infants and children **Design:** Review **Methods:** Updated review of the 2008 US Preventive Services Task Force recommendation on primary care interventions to promote breastfeeding.	The USPSTF reviewed the evidence on the effectiveness of interventions to support breastfeeding on breastfeeding initiation, duration, and exclusivity. The USPSTF also briefly reviewed the literature on the effects of these interventions on child and maternal health outcomes. The USPSTF found adequate evidence that interventions to support breastfeeding, including professional support, peer support, and formal education, change behavior and that the harms of these interventions are no greater than small.		

to Support Breastfeeding: US Preventive Services Task Force Recommendation Statement. JAMA. 2016 Oct 25;316(16):1688-1693. doi: 10.1001/jama.2016.14697.		The USPSTF concludes with moderate certainty that interventions to support breastfeeding have a moderate net benefit. **Conclusion and Recommendation:** The USPSTF recommends providing interventions during pregnancy and after birth to support breastfeeding. (B recommendation = The USPSTF recommends the service. There is high certainty that the net benefit is moderate, or there is moderate certainty that the net benefit is moderate to substantial).		
Smith HA, Becker GE. Early additional food and fluids for healthy breastfed full-term infants. Cochrane Database Systematic Review 2014. DOI: 10.1002/14651858.CD006462.pub4 Abstract available from: Cochrane Library	**Subjects:** Full-term breastfed infants up to the age of six months or the mothers of these infants **Design:** Systematic Review **Methods:** Performed literature search within the Cochrane Pregnancy and Childbirth Group Trial's Register for randomized or quasi-randomized controlled trials including searches in CENTRAL, MEDLINE, and Embase. The original version of this review (March, 2014) 22 potentially relevant trials were identified and six trials were included in the review that met inclusion criteria. In this update, 11 potentially relevant trials were identified and two fulfilled the inclusion criteria. This review includes a total of eight	The trials that provided outcome data compared exclusively breastfed infants with breastfed infants who were allowed additional nutrients in the form of artificial milk, glucose water or solid foods. **Conclusion:** The review found no evidence of benefit to newborn infants and possible negative effects on the duration of breastfeeding from the brief use of additional water or glucose water. For infants at four to six months, the review found no evidence of benefit from additional foods nor any risks related to morbidity or weight change. The review found no evidence for disagreement with the recommendation of international health associations that exclusive breastfeeding should be recommended for healthy infants for the first six months.		

	trials in which a total of 984 breastfeeding infants or their mothers were randomized.			
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/index-eng.php	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	- Breastfeeding exclusively for the first six months, and continued for up to two years or longer with appropriate complementary feeding - is important for the nutrition, immunologic protection, growth, and development of infants and toddlers. - Clinicians should recommend a daily vitamin D supplement of 10 µg (400 IU) for infants and young children who are breastfed or receiving breastmilk. - Individually counsel those families who have made a fully informed choice not to breastfeed on the use of breastmilk substitutes.		
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from birth to six months.** 2012. Available from: http://hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	Based on the systematic review by Kramer and Kakuma (2002) and works by the WHO on infant feeding, this group recommends exclusive breastfeeding to six months of age. They report that exclusive breastfeeding is associated with continued protection for the infant against gastrointestinal infections and illness as well as respiratory tract infections. The authors also cite conclusions by Kramer & Kakuma (2002), namely that the breastfeeding mother also benefits from exclusively breastfeeding her infant to six months, that her weight loss is more rapid after birth and that there may be a delayed return of menses. **Recommendations:** 1) Breastfeeding is the normal and unequalled method of feeding infants. 2) Implement the policies and practices of the Baby-Friendly Initiative (BFI) for hospitals and community health services.	I A	1A

Horta, B. L., & Victora, C. G. Long-term effects of breastfeeding-a systematic review. 2013. Retrieved from: http://apps.who.int/iris/bitstream/10665/79198/1/9789241505307_eng.pdf	**Subjects:** Infants **Design:** Systematic Review **Methods:** An updated review of the 2007 systematic review and meta-analysis. observational and randomized studies from 2006 to September 2011, published in English, French, Spanish or Portuguese that evaluated the associations between breastfeeding and the following outcomes: blood pressure; total cholesterol; overweight/obesity; type-2 diabetes; and performance in intelligence tests were searched. Searched Medline, reference lists of the articles identified, and perused the Web of Science Citation Index for manuscripts citing the identified articles.	An additional 60 studies were published in the five years following the 2007 review. **Conclusion:** Total cholesterol-there was no effect in the overall meta-analyses. Breastfeeding does not seem to protect against total cholesterol levels. Blood pressure-The pooled estimate from the high-quality studies indicates a small reduction of less than 1 mmHg in systolic pressure among breastfed subjects, and no significant protection in terms of diastolic pressure. The protective effect of breastfeeding, if any, is too small to be of public health significance. Diabetes-There was substantial protection in the pooled analyses, with a 34% reduction, but few studies are available and their results were considerably heterogeneous. Further studies are needed on this outcome. Overweight-obesity-In the pooled analyses of all studies, breastfeeding was associated with a 24% reduction in overweight and/or obesity, but the reduction was only 12% in the high-quality studies. Breastfeeding may provide some protection against overweight or obesity, but residual confounding cannot be ruled out. Intelligence tests-Breastfeeding was associated with an increase in 3.5 points in normalized test scores in the pooled analyses of all studies, and 2.2 points when only the high-quality studies are included. There is strong evidence of a causal effect of breastfeeding on IQ, although the magnitude of this effect seems to be modest.		
Horta, B. L., & Victora, C. G. Short-term effects of breastfeeding: A systematic review on the benefits of breastfeeding on diarrhoea and pneumonia mortality. 2013.	**Subjects:** Infants **Design:** Systematic Review **Methods:** Two independent literature searches were carried out—MEDLINE (1966 to December 2011) and Scientific Citation Index	15 studies were identified that provided 18 estimates on the effect of breastfeeding on diarrhea morbidity among children < 5 years. Breastfeeding was protective against the incidence of diarrhea, with a greater reduction in diarrhea observed with more intense breastfeeding practices compared to less intense (pooled relative risk [RR] 0.69; 95% CI 0.58 to 0.82), and in infants aged ≤ 6 months vs. >6 months (pooled RR 0.37; 95% CI 0.27 to 50 vs. pooled RR		

Retrieved from: http://apps.who.int/iris/bitstrea m/10665/95585/1/9789241506 120_eng.pdf	databases. Observational and randomized studies were searched, published in English, French, Spanish or Portuguese that evaluated the associations between breastfeeding and diarrhea or respiratory infections outcomes in children younger than 5 years of age.	0.46; 95% CI 0.28 to 0.78, respectively). Breastfeeding also decreased severity of diarrhea; hospitalization and mortality were 72% and 77% lower among breastfed infants, respectively. 18 studies were identified that provided 22 estimates on the effect of breastfeeding on any respiratory infection outcome for any subgroup of under-five children, and 16 studies that restricted the analysis to infants aged ≤ 6 months. There was a protective effect of breastfeeding against the prevalence or incidence of lower respiratory tract infection (pooled RR 0.68; 95% CI 0.70 to 0.77). Breastfeeding also reduced the risk of hospitalization (pooled RR 0.43; 95% CI 0.33 to 0.55) and mortality (pooled RR: 0.30; 95% CI 0.16 to 0.56). **Conclusion:** The available evidence suggests that breastfeeding reduces the risk of diarrhea and respiratory infection. All effects were statistically significant, and for most outcomes the magnitude of the effects were large. Protection was observed both in low income and high income countries.		
Kramer MS, Kakuma R. **Optimal duration of exclusive breastfeeding.** Cochrane Database of Systematic Reviews 2012, Issue 8. Art. No.: CD003517. Abstract available from: PubMed	**Subjects:** Infants **Design:** Systematic review **Methods:** Performed searches in many databases (MEDLINE, CINAHL, HealthSTAR, BIOSIS, CAB Abstracts, EMBASE-Medicine, etc.). Total citations retrieved 2,668. The updated literature review in June 2011 yielded 3,425 additional unique citations.	Twenty-three studies met the inclusion criteria, including one additional study and a follow-up from the June 2011 search: 11 from developing countries (2 internally-controlled trials from Honduras) and 12 from developed countries (all observational studies). The review showed that infants breastfed exclusively for six months have a reduced risk of gastrointestinal infection and respiratory infection and no observable deficits in growth; exclusive breastfeeding for six months does not seem to confer any long-term (at least to early school age) protection against obesity or allergic disease, nor any benefits in cognitive ability or behaviour, compared with exclusive breastfeeding for three to four months with continued partial breastfeeding to six months. **Conclusion:** Breastfeeding reduces gastrointestinal and respiratory infection.	I A	1A

		Recommendation: Exclusive breastfeeding is recommended for the first six months of life in both developed and developing countries.		
American Academy of Pediatrics. **Breastfeeding and the use of human milk.** Pediatrics. 2005; 115: 496-506. Revised March 2012. Abstract available from: PubMed	**Subjects:** Infants **Design:** Policy statement (review article) **Methods:** Review of the evidence from the literature to make evidence-based recommendations for infant feeding practices.	This policy statement reported that breastfeeding is the optimal method of infant feeding. Out of 15 recommendations by the AAP, the use of human breast milk and breastfeeding are the most important means of infant feeding and achieving good nutrition. This report also recommends that supplements of any kind should not be given to the baby until after 6 months of age. Evidence is based on other policy statements from the American Academy of Pediatrics, American Dietetic Association and a study by Gartner (1994). The revised policy statement (2012) is based on an update of the 2007 report prepared by the Evidence-based Practice Centers of the Agency for Healthcare Research and Quality (AHRQ) titled *Breastfeeding and Maternal and Infant Health Outcomes in Developed Countries*. The authors also make several recommendations on breastfeeding management for the healthy term infant. **Recommendations:** Exclusive breastfeeding for about 6 months followed by continued breastfeeding as complementary foods are introduced, with continuation of breastfeeding for 1 year or longer as mutually desired by mother and infant.	III A	1B

3.2.2 BREASTFEEDING AND SIDS

Breastfeeding and SIDS Recommendations	Strength of Recommendation
1. Breastfeeding helps protect against SIDS	**Good**

Breastfeeding and SIDS References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Alm, B., Wennergren, G., Möllborg, P., & Lagercrantz, H. (2016). Breastfeeding and dummy use have a protective effect on sudden infant death syndrome. *Acta Paediatrica*, *105*(1), 31-38. Available from: *Acta Paediatrica*.	**Subjects:** Infants **Design:** Literature Review **Methods:** Literature searches were carried out between spring 2012 and spring 2013, and this identified 4343 abstracts. 260 abstracts were reviewed on breastfeeding and SIDS, and 35 were considered relevant to the research question. When it came to dummy use and SIDS, 112 articles were reviewed, and 27 were considered relevant. For breastfeeding and dummy use, 301 abstracts were reviewed, and 59 were relevant. Studies showing effect measures were included. There were 20 concerning breastfeeding	Breastfeeding and SIDS: Ten of the 17 observational studies reviewed found that breastfeeding was reported to have provided a protective effect on SIDS. No protective effects were found in the other seven studies. All three meta-analyses showed that breastfeeding had a protective effect on SIDS. Dummies and SIDS: 11 observational studies consistently showed a risk reduction of about 50% if the infant used a dummy. Two meta-analyses gave approximately the same odds ratio of about 0.5. Dummies and Breastfeeding: A negative correlation between the use of a dummy and successful breastfeeding was found in all 14 studies published between 1999 and 2012. A meta-analysis that covered many of these studies did not alter the finding of a strong negative association. However, four of five randomised controlled studies did not find that a dummy reduced the duration of breastfeeding, while one found an increased risk of earlier weaning. A meta-analysis conducted on RCTs concluded that using a dummy did not affect the chance of exclusive breastfeeding at three months. **Conclusion:** Both breastfeeding and dummy use have a risk-reducing effect on SIDS. The most recent studies available at the time of this review showed that dummy use might not be as harmful to breastfeeding as previously believed.		

	and SIDS, 13 concerning dummy use and SIDS and 21 concerning dummy and breastfeeding.			
Task Force On Sudden Infant Death Syndrome. **SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment.** Pediatrics. 2011;128:1030–1039. Abstract available from: Pediatrics	**Subjects**: Infants **Design:** Technical report and policy statement **Methods:** Literature searches since 2005 using PubMed on topics related to SIDS. Based on the technical report, Task Force members determined the strength of evidence for each recommendation using the U.S. Preventive Services Task Force (USPSTF) grade system. The graded recommendations are listed in the policy statement. The rationale supporting the recommendations can be found in the Technical Report.	Since the last AAP statement published in 2005, the recommendations are expanded from being only SIDS-focused to focusing on a safe sleep environment that can reduce the risk of all sleep-related infant deaths including SIDS. This 2011 AAP policy statement includes 18 recommendations (12 Level A recommendations, 3 Level B recommendations and 3 Level C recommendations) for parents and healthcare providers but also for public health policy makers and researchers. The recommendations described in this policy statement include supine positioning, use of a firm sleep surface, breastfeeding, room-sharing without bed-sharing, routine immunizations, consideration of using a pacifier, and avoidance of soft bedding, overheating, and exposure to tobacco smoke, alcohol, and illicit drugs. **Recommendation (regarding breastfeeding and SIDS):** Breastfeeding is recommended.	II-2, II-3, III A, B, C	1B, C

3.2.3 BREASTFEEDING AND PACIFIERS

Breastfeeding and Pacifiers Recommendations	**Strength of Recommendation**
1. Counsel on safe and appropriate use *2. Pacifier use may decrease risk of SIDS and should not be discouraged in the 1st year of life after breastfeeding is well established, but should be restricted in children with chronic/recurrent otitis media.*	*Fair* Consensus

Breastfeeding and Pacifiers Resources
1. Recommendations for Pacifier use (CPS)

Breastfeeding and Pacifiers References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Alm, B., Wennergren, G., Möllborg, P., & Lagercrantz, H. (2016). **Breastfeeding and dummy use have a protective effect on sudden infant death syndrome.** *Acta Paediatrica*, *105*(1), 31-38. Available from: *Acta Paediatrica*.	**Subjects:** Infants **Design:** Literature Review **Methods:** Literature searches were carried out between spring 2012 and spring 2013, and this identified 4343 abstracts. 260 abstracts were reviewed on breastfeeding and SIDS, and 35 were considered relevant to the research question. When it came to dummy use and SIDS, 112 articles were reviewed, and 27 were considered relevant. For breastfeeding and dummy use, 301 abstracts were reviewed, and 59 were relevant. Studies showing effect measures were	Breastfeeding and SIDS: Ten of the 17 observational studies reviewed found that breastfeeding was reported to have provided a protective effect on SIDS. No protective effects were found in the other seven studies. All three meta-analyses showed that breastfeeding had a protective effect on SIDS. Dummies and SIDS: 11 observational studies consistently showed a risk reduction of about 50% if the infant used a dummy. Two meta-analyses gave approximately the same odds ratio of about 0.5. Dummies and Breastfeeding: A negative correlation between the use of a dummy and successful breastfeeding was found in all 14 studies published between 1999 and 2012. A meta-analysis that covered many of these studies did not alter the finding of a strong negative association. However, four of five randomised controlled studies did not find that a dummy reduced the duration of breastfeeding, while one found an increased risk of earlier weaning. A meta-analysis conducted on RCTs concluded that using a dummy did not affect the chance of exclusive breastfeeding at three months. **Conclusion:** Both breastfeeding and dummy use have a risk-reducing effect on SIDS. The most recent studies available at the		

	included. There were 20 concerning breastfeeding and SIDS, 13 concerning dummy use and SIDS and 21 concerning dummy and breastfeeding.	time of this review showed that dummy use might not be as harmful to breastfeeding as previously believed.		
Kair LR, Kenron D, Etheredge K, Jaffe AC, Phillipi CA. **Pacifier restriction and exclusive breastfeeding**. Pediatrics. 2013 Apr;131(4):e1101-7. Abstract available from: PubMed	**Subjects:** infants **Design**: retrospective cohort Authors retrospectively compared exclusive breastfeeding, breastfeeding plus supplemental formula feeding, and exclusive formula feeding rates for 2,249 infants admitted to the mother-baby unit (MBU) at a university teaching hospital during the 5 months before and 8 months after restriction of routine pacifier distribution. Formula supplementation, if not medically indicated, was discouraged per standard practice, but access to formula was not restricted.	Of the 2,249 infants, 79% were exclusively breastfed from July through November 2010, when pacifiers were routinely distributed. During the 8-month period after pacifier restriction, this proportion decreased significantly to 68% (P < .001). A corresponding increase from 18% to 28% was observed in the number of breastfed infants receiving supplemental formula feeds in the same period (P < .001). During the study period, the proportion of exclusively formula-fed infants increased from 1.8% to 3.4% (P < .05). **Conclusion:** Restricting pacifier distribution during the newborn hospitalization without also restricting access to formula is associated with decreased exclusive breastfeeding, increased supplemental formula feeding, and increased exclusive formula feeding.	II-2	B
Jaafar SH, Jahanfar S, Angolkar M,Ho JJ. **Effect of restricted pacifier use in breastfeeding term infants for increasing duration of**	**Subjects:** Infants **Design:** Systematic review **Methods:** Performed a literature review using the Cochrane Pregnancy and	**Main results** We found three trials (involving 1915 babies) for inclusion in the review, but have included only two trials (involving 1302 healthy full-term breastfeeding infants) in the analysis. Meta-analysis of the two combined studies showed that pacifier use in healthy breastfeeding	I C	2B

breastfeeding. Cochrane Database of Systematic Reviews 2016, Issue 8. Abstract available from: The Cochrane Library	Childbirth Group's Trials Register for randomised and quasi-randomised controlled trials comparing unrestricted versus restricted pacifier use in healthy full-term newborns who have initiated breastfeeding regardless of whether they were born at home or in the hospital.	infants had no significant effect on the proportion of infants exclusively breastfed at three months (risk ratio (RR) 1.01; 95% confidence interval (CI) 0.96 to 1.07, two studies, 1228 infants), and at four months of age (RR 1.01; 95% CI 0.94 to 1.09, one study, 970 infants, moderate-quality evidence), and also had no effect on the proportion of infants partially breastfed at three months (RR 1.00; 95% CI 0.98 to 1.02, two studies, 1228 infants), and at four months of age (RR 0.99; 95% CI 0.97 to 1.02, one study, 970 infants). None of the included trials reported data on the other primary outcomes, i.e. duration of partial or exclusive breastfeeding, or secondary outcomes: breastfeeding difficulties (mastitis, cracked nipples, breast engorgement); infant's health (dental malocclusion, otitis media, oral candidiasis; sudden infant death syndrome (SIDS)); maternal satisfaction and level of confidence in parenting. One study reported that avoidance of pacifiers had no effect on cry/fuss behavior at ages four, six, or nine weeks and also reported no effect on the risk of weaning before age three months, however the data were incomplete and so could not be included for analysis. **Conclusions** Pacifier use in healthy term breastfeeding infants, started from birth or after lactation is established, did not significantly affect the prevalence or duration of exclusive and partial breastfeeding up to four months of age. Evidence to assess the short-term breastfeeding difficulties faced by mothers and long-term effect of pacifiers on infants' health is lacking.		

Alejandro G. Jenik, MD, Nestor E. Vain, MD, Adriana N. Gorestein, MD, and Noemı´ E. Jacobi, MD, for the Pacifier and Breastfeeding Trial Group. **Does the Recommendation to Use a Pacifier Influence the Prevalence of Breastfeeding?** *J* Pediatrics 2009; 155: 350-354.	**Subjects:** Newborn infants **Design:** Multi-centre randomized non-inferiority controlled trial **Methods:** Mothers highly motivated to breastfeed and newborns at 15 days old randomized to offer vs. not to offer pacifiers.	Primary outcome, exclusive breastfeeding at 3 months, was 85.8% and 86.2% in the "offer" and "not to offer" pacifier groups, respectively, which satisfied the pre-specified non-inferiority requirement of -7%. No significant differences between the two groups were observed for secondary outcomes (frequency of exclusive breastfeeding, any breastfeeding at different ages or duration of breastfeeding).The authors concluded that offering a pacifier is appropriate in populations similar to this study.	I A	
Buccini, G. et al. Pacifier Use and Interruption of exclusive breastfeeding: Systematic Review and Meta-Analysis. Maternal and Child Nutrition. 2016. 13. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/27863027	**Subjects:** Infants **Design:** Systematic Review and Meta Analysis **Methods:** A search of CINAHL, Scopus, Web of Science, LILACS and Medline; from inception through 30 December 2014 without restriction of language yielded 1,866 publications (PROSPERO protocol CRD42014014527). Predetermined inclusion/exclusion criteria peer reviewed yielded 46 studies: two clinical trials, 20 longitudinal, and 24 cross-sectional studies. Meta-analysis was performed and meta-regression explored heterogeneity across studies.	The pooled effect of the association between pacifier use and EBF interruption was 2.48 OR (95% CI = 2.16-2.85). Heterogeneity was explained by the study design (40.2%), followed by differences in the measurement and categorization of pacifier use, the methodological quality of the studies and the socio-economic context. Two RCT's with very limited external validity found a null association, but 44 observational studies, including 20 prospective cohort studies, did find a consistent association between pacifier use and risk of EBF interruption (OR = 2.28; 95% CI = 1.78-2.93). Our findings support the current WHO recommendation on pacifier use as it focuses on the risk of poor breastfeeding outcomes as a result of pacifier use. Future studies that take into account the risks and benefits of pacifier use are needed to clarify this recommendhigh ation.		

O'Connor NR, Tanabe KO, Siadaty MS, Hauck FR. **Pacifiers and Breastfeeding. A Systematic Review.** Arch Pediatr Adolesc. 2009; 163: 378-382. Abstract available from: PubMed	**Subjects:** Mother-infant pairs **Design:** Systematic review **Methods:** Performed a literature review using the databases MEDLINE, CINAHL, the Cochrane Library, EMBASE, POPLINE and bibliographies of identified articles.	Twenty-nine studies met the inclusion criteria: 4 RCTs, 20 cohort and 5 cross-sectional studies. Due to significant heterogeneity in the studies no meta-analysis could be performed. The RCTs showed no difference in weaning between using pacifiers and controls. However, observational studies have shown a strong association. Potential limitations in both these study designs might contribute to the mixed results. For example in one RCT, there might have been a problem with compliance.	I A	
Kramer MS, Barr RG, Dagenais S, Yang H, Jones P, Ciofani L, Jané F. **Pacifier use, early weaning and cry/fuss counselling: A randomized controlled trial.** JAMA. 2001; 286: 322-326. Abstract available from: PubMed	**Subjects:** Healthy term breastfed infants and mothers **Design:** Double blinded Randomized Controlled Trial **Methods:** Participants (N=281) were randomized to 1 of 2 counselling interventions. Each group was counselled by a trained research nurse. The experimental group was different than control as they were counselled to avoid pacifier use and given alternative methods to calm a crying baby.	Early weaning (i.e., within the first 3 months) was compared between groups. Detailed behaviour logs for each infant were maintained describing the frequency and duration of crying and pacifier use at 4, 6, and 9 weeks. Analysis based on random allocation showed no effect between experimental or control groups for either early weaning or cry/fuss behaviour (OR=1.0, 95% CI: 0.6-1.7). When random allocation was ignored a strong observational association was found (RR=1.9). Follow-up was completed by 91.8% of participants. Data strongly suggest that pacifier use is a marker of breastfeeding difficulties or reduced motivation to breastfeed rather than a cause of early weaning.	I A	

Paduraru, L., et al. **Influence of refrigeration or freezing on human milk macronutrients and energy content in early lactation: Results from a tertiary centre survey.** Pediatrics & Child Heatlh. 2018. 24(4): 250-257 Retrieved From: https://academic.oup.com/pch/article/24/4/250/5261253	**Subjects**: mothers of preterm and term infants **Design:** prospective cohort study **Methods:** We analyzed the composition of fresh milk, refrigerated at +4°C and frozen at −20°C, expressed by mothers of 60 preterm and 30 term infants from a level III maternity, in colostrum, transitional, and mature milk.	**Conclusions** Protein content in fresh milk varies between term and preterm mothers in an inconsistent manner, influenced by multiple factors and conditions, mainly the mother's BMI, age, financial status, and the infant's gender. Fresh milk is the best option if available. Refrigeration for up to 72 hours is preferable to freezing for longer than 2 weeks, as our data showed that by freezing the protein content decreased more than by refrigeration. In the absence of milk bank access, in common settings, short-term refrigeration is preferable to long-term freezing.		
Eglash, A., Simon, L., & the ABM, **ABM Clinical Protocol #8: Human Milk Storage Information for Home Use for Full-Term Infants, Revised 2017.** 2017. **12(7):390-395** Available at: https://abm.memberclicks.net/assets/DOCUMENTS/PROTOCOLS/8-human-milk-storage-protocol-english.pdf	**Subjects:** Mothers **Design:** Protocol	**See Protocol for specific recommendations**		

3.2.4 BREASTFEEDING AND MATERNAL MEDICATIONS RESOURCES

Breastfeeding and Maternal Medications Resources
1. United States National Library of Medicine's Drugs and Lactation Database (LactMed)

Breastfeeding and Maternal Medications References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Sachs, H. C., Frattarelli, D. A., Galinkin, J. L., Green, T. P., Johnson, T., Neville, K., ... & Van den Anker, J. (2013). The transfer of drugs and therapeutics into human breast milk: An update on selected topics. *Pediatrics*, *132*(3), e796-e809. Retrieved from: http://pediatrics.aappublications.org/content/pediatrics/132/3/e796.full.pdf	**Subjects:** Breastfeeding mothers and infants **Design:** AAP Clinical Report Statement **Methods:** Update of selected topics concerning the excretion of medications into breastmilk and their effect on infants.	This statement reviews proposed changes in US Food and Drug Administration (FDA) labeling that are designed to provide useful information to the physician and to outline general considerations for individual risk/benefit counseling. An update is provided regarding the use of psychotropic therapies, drugs to treat substance abuse, narcotics, galactagogues, and herbal products, as well as immunization of breastfeeding women. **Conclusion:** The benefits of breastfeeding outweigh the risk of exposure to most therapeutic agents via human milk. Although most drugs and therapeutic agents do not pose a risk to the mother or nursing infant, careful consideration of the individual risk/benefit ratio is necessary for certain agents. Excellent resources are available for the pediatrician, including product labeling and the peer-reviewed database, LactMed.		

3.2.5 WEANING OF BREASTFEEDING

Weaning of Breastfeeding Recommendations	**Strength of Recommendation**
1. Advise slow, progressive, natural weaning whenever possible.	Consensus
Weaning of Breastfeeding Resources	**Strength of Recommendation**
1. Weaning from the breast (CPS)	

Weaning of Breastfeeding References

Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Barbara Grueger; Canadian Paediatric Society, Community Paediatrics Committee. **Weaning from the breast.** Paediatrics & Child Health. 2013;18(4):210. Reaffirmed February 1, 2016. Available from: http://www.cps.ca/documents/position/weaning-from-the-breast#ref15	**Subjects:** Healthy term infants **Design:** Policy statement **Methods:** A review of the literature was performed using MEDLINE (1966 to 2012), the Cochrane database and relevant websites, including those of the WHO, the Canadian Paediatric Society, Health Canada and the American Academy of Pediatrics.	This document replaces a previous Canadian Paediatric Society position statement on weaning published in 2004. This statement addresses issues affecting the weaning process and the different ways weaning can occur. It includes suggestions that physicians can offer to breastfeeding women about weaning and nutritional alternatives and for problems associated with weaning. This statement focuses on healthy term infants and its recommendations may not be appropriate for infants with special circumstances (eg, prematurity, chronic illness, failure to thrive). **Recommendations:** • Support exclusive breastfeeding, with vitamin D supplementation, for the first six months of life. • Encourage continued breastfeeding for up to two years and beyond while providing appropriate nutritional guidance. • Advise mothers to introduce iron-fortified foods in the form of meat, fish or iron-fortified cereals as first foods, to avoid iron deficiency. • Advise slow, progressive, natural weaning whenever possible.	III A	1C

		• Inform and support breastfeeding mothers while ensuring adequate nutrition for their babies, regardless of the timing of weaning.		

3.2.6 ANKYLOGLOSSIA (TONGUE-TIE) AND BREASTFEEDING

Ankyloglossia (tongue-tie) and Breastfeeding Recommendations	Strength of Recommendation
1 Inspect tongue mobility for ankyloglossia if breastfeeding problems 2. Frenotomy is not universally recommended for ankyloglossia.	Consensus Consensus

Ankyloglossia (tongue-tie) and Breastfeeding Resources	
1. Ankyloglossia and breastfeeding (CPS)	

Ankyloglossia (tongue-tie) and Breastfeeding References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Community Paediatrics Committee, Canadian Pediatric Society. **Ankyloglossia and breastfeeding.** Paediatrics & Child Health. 2015;20(4):209-13 Available from: CPS Reaffirmed Feb 1 2018	**Subjects:** Breastfeeding infants **Design:** Position statement **Methods:** Reviewed the literature for evidence of the association between ankyloglossia and breastfeeding difficulties.	According to this review, the incidence of ankyloglossia ranges from 4 - 10% in the newborn population. Evidence suggests that despite newborn or infant ankyloglossia, most babies are able to breastfeed without too much difficulty. In most cases, surgical intervention is usually not warranted. If surgical intervention is deemed necessary, frenotomy should be performed by a clinician experienced with the procedure. **Conclusion:** Ankyloglossia is relatively common in the newborn population. Frenotomy cannot be recommended for all infants with ankyloglossia. However if it is deemed necessary, a frenotomy should be performed by a clinician experienced with the procedure, using appropriate analgesia.	III	1C

		Recommendations: Clear criteria are needed for the diagnosis of ankyloglossia, along with specific attention to characteristics of infants for whom frenotomy would be of value to improve feeding. Thorough intraoral examination, including inspection of the tongue and its function, should be performed in newborns, particularly when there are feeding difficulties.		
Buryk M, Bloom D, Shope T. **Efficacy of neonatal release of ankyloglossia: a randomized trial.** Pediatrics. 2011 Aug;128(2):280-8. Abstract available from: PubMed	**Subjects**: Neonates who had difficulty breastfeeding and significant ankyloglossia (using Hazelbaker Assessment Tool for Lingual Frenulum Function). Other inclusion criterion was maternal nipple pain. **Design:** RCT **Methods:** Neonates assigned to either frenotomy (n=30) or sham (n=28) and followed over 12 months. Breastfeeding was assessed by a preintervention and postintervention nipple-pain scale and the Infant Breastfeeding Assessment Tool.	Fifty-eight of 3,025 normal newborns (1.9%) met enrolment criteria and were enrolled over a 12-month period from December 2007 to December 2008. The mean age of patients at enrolment was 6 days (SD: 6.9 [range 1–35 days]). There were no statistically significant differences between groups at baseline. Both the frenotomy and sham groups demonstrated significant decreases on the nipple pain scale scores after the intervention but frenotomy group improved significantly more than sham group ($P<0.001$), yielding an effect size of 0.38. In addition, frenotomy group compared with the sham group ($P = .029$) improved breastfeeding competence as measured by reliable questionnaire, yielding an effect size of 0.31. **Conclusion:** When frenotomy is performed for clinically significant ankyloglossia, there is a clear and immediate improvement in reported maternal nipple pain and infant breastfeeding scores. **Recommendation:** There is compelling evidence to seek frenotomy when indicated.	I-1	1A

3.3 VITAMIN D SUPPLEMENTATION

Vitamin D Supplementation Recommendations	Strength of Recommendation
1. Routine Vitamin D supplementation of 400 IU/day (800 IU/day in high risk infants) is recommended for infants/children for as long as they are breastfed.	**Good**
2. Breastfeeding mothers should consume a standard multivitamin/mineral supplement that contains vitamin D(400 IU/day).	Consensus

Vitamin D Supplementation Resources	
1. <u>Vitamin D supplementation (CPS)</u>	

Vitamin D Supplementation References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Darmawikarta D, Chen Y, Lebovic G, Birken C, Parkin PC, Maguire JL. Total Duration of Breastfeeding, Vitamin D Supplementation, and Serum Levels of 25-Hydroxyvitamin D. Am J Public Health 2016;106:714–719. Abstract available from: Pubmed.	**Subjects:** healthy children 1-5yo **Design:** cross-sectional study Sept 2011-Aug 2013 **Methods:** Multiple linear regression models to determine association between total breastfeeding duration and serum 25-hydroxyvitamin D (25-OHD), and whether vitamin D influences the association.	The interaction between vitamin D supplementation, duration of breastfeeding, and median serum 25-OHD was statistically significant (P= .04). Among 2508 children, each 1-month increase in total breastfeeding duration was associated with a 0.12 ng/mL lower median serum 25-OHD (95% confidence interval [CI] = –0.21 ng/mL, –0.02 ng/mL) among children who were not supplemented. The odds of serum 25-OHD < 20 ng/ml increased by 6% (odds ratio [OR] = 1.06; 95% CI = 1.03, 1.10) for every 1-month increase in total breastfeeding duration among nonsupplemented children. **Conclusion:** Breastfed children who were not supplemented, particularly those breastfed more than 1 year, appear to have lower vitamin D status. Vitamin D supplementation may mitigate this risk. These findings support recommendations for supplementation during breastfeeding of any duration.		C
Hollis, B. W., Wagner, C. L., Howard, C. R., Ebeling, M., Shary, J. R., Smith, P. G., ... & Hulsey, T. C. Maternal	**Subjects:** Exclusively lactating mother-infant pairs	Of the 334 mother-infant pairs in 400 IU and 6400 IU groups at enrollment, 216 (64.7%) were still breastfeeding at visit 1; 148 (44.3%) continued full breastfeeding to 4 months and 95 (28.4%) to 7 months. Vitamin D deficiency in breastfeeding infants was greatly		1B

versus infant vitamin D supplementation during lactation: A randomized controlled trial. Pediatrics 2015;136(4), 625-634. Available from: Pediatrics	**Design:** Randomized, double-blind, comparative effectiveness trial **Methods:** 3 doses of vitamin D supplementation were given to exclusively breastfeeding mothers and their singleton infants receiving no other form of nutrition other than human milk within 4-6 weeks postpartum. Mothers were randomized to 1 of 3 vitamin D supplementation regimens: Group 1: 400 IU vitamin D3 per day (0 IU vitamin D3: placebo and 1 prenatal vitamincontaining 400 IU vitamin D3); Group 2: 2400 IU (2000 vitamin D3 per day and 1 prenatal containing 400 IU vitamin D3); and Group 3: 6400 IU vitamin D3 per day (6000 IU vitamin D3 and 1 prenatal vitamin containing 400 IU vitamin D3). Breastfeeding infants also were given 1 drop per day of a liquid suspension vitamin D supplement as follows: those infants in Group 1 received 400 IU vitamin D3 as previously described, and infants in Groups 2 and 3	affected by race. Compared with 400 IU vitamin D3 per day, 6400 IU/day safely and significantly increased maternal vitamin D and 25(OH)D from baseline (P< .0001). Compared with breastfeeding infant 25(OH)D in the 400 IU group receiving supplement, infants in the 6400 IU group whose mothers only received supplement did not differ. When compared with infants receiving a daily oral vitamin D supplement of 400 IU/day, infants whose mothers were taking 6400 IU vitamin D daily (as their sole source of vitamin D) achieved equivalent vitamin D status. **Conclusion:** Maternal vitamin D supplementation with 6400 IU/day safely supplies breast milk with adequate vitamin D to satisfy her nursing infant's requirement and offers an alternate strategy to direct infant supplementation.		

	received a placebo emulsion containing 0 IU vitamin D3 for the 6-month study period.			
Canadian Paediatric Society. Vitamin D supplementation: **Recommendations for Canadian mothers and infants.** Paediatrics & Child Health. 2007; 12(7): 683-89. Reaffirmed 2013 Jan 30. Available from: http://www.cps.ca/documents/position/vitamin-d	**Subjects:** Infants **Design:** Position statement (review) **Methods:** Reviewed the literature for studies looking at vitamin D deficiency and rickets. Also reviewed intervention studies.	The focus of research has shifted from rickets exclusively to the prevention of associated childhood and adult diseases. Vitamin D deficiency is very common, therefore according to this review, supplementation for mothers and infants, especially those in high risk groups such as Inuit and First Nations is recommended. Studies reviewed were mainly case-control and cohort study designs (no randomized controlled trials due to ethical implausibility.)	II-1, II-2, II-3, III A, B	
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/index-eng.php	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	Recommend a daily vitamin D supplement of 10 µg (400 IU) for infants and young children who are breastfed or receiving breastmilk.		1B
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants -**	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement of Health Canada, Canadian Paediatric Society,	The Infant Feeding Working Group recommends a daily vitamin D supplement for breastfed infants. This recommendation is largely based on the new report by the Institute of Medicine (IOM, 2011) on vitamin D and calcium. According to the Infant feeding Working Group and the IOM report: 1) the level of adequate intake for vitamin D for infants is 10 µg (400 IU) per day, 2) for infants under	III A	1B

recommendations from birth to six months. 2012. Available from: http://hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php	Dieticians of Canada, and Breastfeeding Committee for Canada.	six months of age, vitamin D intake should not exceed 25 µg (1000 IU) per day, 3) 1000 IU/day is the highest average daily intake level likely to pose no risk of adverse health effects, and 4) there are no known health benefits associated with intakes above 10 µg (400 IU) per day. **Recommendation:** Daily vitamin D supplement of 10 µg (400 IU) for breastfed infants.		
Ross AC[1], Manson JE, Abrams SA, Aloia JF, Brannon PM, Clinton SK, Durazo-Arvizu RA, Gallagher JC, Gallo RL, Jones G, Kovacs CS, Mayne ST, Rosen CJ,Shapses SA. **The 2011 Dietary Reference Intakes for Calcium and Vitamin D: what dietetics practitioners need to know.** J Am Diet Assoc. 2011 Apr;111(4):524-7. Available from: PubMed	**Subjects:** All age groups **Design:** Systematic Review **Methods:** The Institute of Medicine Committee to Review Dietary Reference Intakes for Calcium and Vitamin D comprehensively reviewed the evidence for both skeletal and nonskeletal health outcomes.	For vitamin D (assuming minimal sun exposure), the Estimated Average Requirement (i.e. that meets the needs of 50% of the healthy population (the median)) is 400 IU/day for ages older than 1 year and the Recommended Daily Allowance (i.e. that meets the needs of 97.5% of the healthy population) is 600 IU/day for ages 1 to 70 years, corresponding to serum 25-hydroxyvitamin D (25OHD) levels of 16 ng/mL (40 nmol/L) for EARs and 20 ng/mL (50 nmol/L) or more for RDAs. The Tolerable Upper Intake Level for vitamin D ranges from 1,000 to 4,000 IU daily, based on hypercalcemia adjusted for uncertainty resulting from emerging risk relationships. **Conclusion:** Due to the lack of data for infants, the Institute of Medicine was unable to set a requirement per se for vitamin D for infants 0-1 years of age. Instead, they presented an Adequate Intake (AI) of 400 IU per day as a best guess by experts.		
Ward LM[1], Gaboury I, Ladhani M, Zlotkin S. **Vitamin D-deficiency rickets among children in Canada.** CMAJ. 2007 Jul 17;177(2):161-6. Available from: CMAJ	**Subjects:** Pediatricians **Design:** Longitudinal study **Methods:** A total of 2325 Canadian pediatricians were surveyed monthly from July 1, 2002, to June 30, 2004, through the Canadian Paediatric Surveillance Program to determine the incidence,	There were 104 confirmed cases of vitamin D- deficiency rickets during the study period. The overall annual incidence rate was 2.9 cases per 100,000. The incidence rates were highest among children residing in the north (Yukon Territory, Northwest Territories and Nunavut). The mean age at diagnosis was 1.4 years (standard deviation [SD] 0.9, min-max 2 weeks-6.3 years). Sixty-eight children (65%) had lived in urban areas most of their lives, and 57 (55%) of the cases were identified in Ontario. Ninety-two (89%) of the children had intermediate or darker skin. Ninety-eight (94%) had been breast-fed, and 3 children (2.9%) had been fed	III C	C

	geographic distribution and clinical profiles of confirmed cases of vitamin D-deficiency rickets. Authors calculated incidence rates based on the number of confirmed cases over the product of the length of the study period (2 years) and the estimates of the population by age group.	standard infant formula. None of the breast-fed infants had received vitamin D supplementation according to current guidelines (400 IU/d). Maternal risk factors included limited sun exposure and a lack of vitamin D from diet or supplements during pregnancy and lactation. The majority of children showed clinically important morbidity at diagnosis, including hypocalcemic seizures (20 cases, 19%). **Conclusion:** Vitamin D-deficiency rickets is persistent in Canada, particularly among children who reside in the north and among infants with darker skin who are breast-fed without appropriate vitamin D supplementation. Since there were no reported cases of breast-fed children having received regular vitamin D (400 IU/d) from birth who developed rickets, the current guidelines for rickets prevention can be effective but are not being consistently implemented. The exception appears to be infants, including those fed standard infant formula, born to mothers with a profound vitamin D deficiency, in which case the current guidelines may not be adequate to rescue infants from the vitamin D-deficient state.		
Taylor SN, Wagner CL, Hollis BW. **Vitamin D supplementation during lactation to support infant and mother**. Journal of the American College of Nutrition. 2008; 27(6): 690-701. Abstract available from: PubMed	**Subjects:** Mothers and infants **Design:** Review **Methods**: Reviewed the literature for studies and position statements looking at vitamin D deficiency and rickets in infants and mothers. Key words: human milk, lactation, infant, rickets, vitamin D.	Many populations all over the world suffer from vitamin D deficiency. There was contrasting evidence about the benefits and harms of vitamin D supplementation; however it is now known to be very beneficial. This review reports that vitamin D supplementation for mothers and infants is recommended, especially for high risk groups (i.e., dark pigmented skin, Northern latitudes, whole-body covering). The authors report that there is some evidence that supports giving breastfeeding mothers higher doses to eliminate direct supplementation to infants.	II-1, II-2, II-3, III A	

3.4 FORMULA FEEDING

3.4.1 INFANT FORMULA

Infant Formula Recommendations	Strength of Recommendation
1. Formulas generally contain iron: 0.4mg-1.3mg/100ml. 2. Discourage the use of homemade infant formulas 3. Soy-based formula is not recommended for use in cow milk protein allergy or in preterm infants, and may interfere with absorption of T4 replacement therapy in infants with congenital hypothyroidism.	Consensus

Infant Formula Resources
1. For formula composition and algorithm regarding use: Alberta Health Services Compendium and Summary Sheet 2. Infant Formula: What you need to know (Best Start) 3. Preparation Video and Tips Sheet (Best start) 4. Soy-based formulas (AAP)

Infant Formula References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	For an older infant who is not breastfed or receiving breastmilk, recommend commercial infant formula until nine to 12 months.		

an/nutrition/infant-nourisson/index-eng.php				

Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from birth to six months.** 2012. Available from: http://hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	**Recommendations:** 1) Recommend cow milk-based, commercial infant formula for an infant who is not exclusively fed breastmilk. 2) Soy-based infant formula is indicated only for those infants who have galactosemia or who cannot consume dairy-based products for cultural or religious reasons. 3) Recommend infant formulas for special medical purposes only when you detect or suspect that the formula-fed infant has the indicated condition. 4) Discourage the use of home-made, evaporated milk formula; cow milk, goat milk, soy beverage, rice beverage or any other beverages should not be given to young infants. 5) Advise on proper preparation and storage to reduce the risk of bacteria-related illness. 6) Warn of the risk of choking if infants are left alone while feeding. 7) Explain the dangers of 'propping' a bottle.	III A	
Martinez JA, Ballew MP**. Infant Formulas.** Pediatrics in Review. 2011;32(5):179-189. Available from: Peds in Review	**Subjects:** Infants **Design:** Narrative review **Methods:** This review describes the macronutrient content of infant (preterm and term) formulas, identifies appropriate clinical applications of infant formulas that have altered nutrient content, discusses components added to infant formulas (e.g., probiotics), and delineates standards for composition, performance and safety criteria for commercial infant formulas.	**Conclusion:** 1) Based on strong research evidence, formulas supplemented with DHA (between 0.3% and 0.5% of total fatty acids) and at least equal amounts of ARA are beneficial for visual and neurological development. 2) Based on strong research evidence, formulas supplemented with probiotics reduce the incidence of clinical eczema in high-risk infants (parent or sibling who has atopy). 3) Based on strong research evidence, formulas supplemented with probiotics reduce the incidence of NEC and all-cause mortality in VLBW infants. 4) Based on some research evidence, formulas supplemented with prebiotics or probiotics decrease the risk of infections during infancy. 5) Based on strong research evidence, partially or extensively hydrolyzed formulas are effective in preventing or delaying development of atopic dermatitis in high-risk infants.		

		6) Based on strong research evidence, thickened formulas reduce the number of episodes of vomiting, regurgitation, and signs of GERD such as irritability and crying.		
Skorka, A., Piescik-Lech, M. ,Kolodziej, M., Szajewska, H. **Infant formulae supplemented with prebiotics: Are they better than unsupplemented formulae? An updated systematic review.** British Journal of Nutrition. 2018; 119(7): 810-825	**Subjects:** Participants had to be healthy term infants **Design:** Systematic Review **Methods:** the Committee on Nutrition of the European Society for Paediatric Gastroenterology, Hepatology and Nutrition systematically reviewed published evidence related to the safety and health effects of the administration of formulae supplemented with pro- and/or prebiotics compared with unsupplemented formulae. We updated evidence on the effects of the administration of prebiotic-supplemented infant formulae (IF) compared with unsupplemented IF. Five databases were searched up to March 2017 for randomised controlled trials. In all, forty-one publications were identified, including twenty-five new publications	**Conclusion**: In line with the 2011 ESPGHAN document, the available scientific data suggest that the administration of currently evaluated prebiotic-supplemented formulae to healthy infants does not raise safety concerns with regard to growth and adverse effects. Some favourable clinical effects are possible, primarily stool softening, which may be beneficial in some infants. Currently, there is no existing robust evidence to recommend the routine use of prebiotic-supplemented formulae. The latter conclusion may reflect the small amount of data on specific prebiotics and outcomes, rather than a genuine lack of an effect. The efficacy and safety should be considered for each prebiotic(s)-supplemented formula		

Vandenplas, Y., Latiff, A. H. A. Fleischer, D. M., Gutierrez-Castrellon, P., Miqdady, M. S. Smith, P. K., von Berg, A. Greenhawt, M. J. **Partially hydrolyzed formula in non-exclusively breastfed infants: A systematic review and expert consensus.** Nutrition. 2019; 57; 268-274	**Subjects:** Infants **Design:** Systematic Review and Expert Consensus **Methods:** A systematic review and Delphi Consensus Panel(consisting of eight international pediatric allergists aand gastroenterologists) was conducted to evaluate evidence supporting growth, tolerability and effectiveness of pHF in on-exclusively breastfed infants.	**Conclusion:** The literature review noted, and the expert panel agreed that pHFs derived from different source proteins should not be considered equivalent. Infants fed pHF-W grow within normal range. However use of pHF in populations at risk has not been associated with any preventative or protective benefit, given that demonstration of such benefit related to particular pHF products (versus intact CMP formula in infants for the first 4 to 6 mo of life who are not exclusively breastfed) has only been studied and demonstrated (in some cases inconsistently) in populations at risk for the development of allergic disease. It is not possible to make a conclusion about cost-effectiveness given the huge variation in cost of pHF-W compared with starter formula with intact protein. Thus future studies are necessary to address whether such use in populations not at risk has any similar benefit. There was a strong unanimous consensus that the use of pHF products in the population not at risk would be safe given no risks or known hazards of this practice were identified and this consensus is potentially aligned with possible caregiver preference to try these products as available market options.		
Boyle, R. J., Ierodiakonou, D. Khan, T., Chivinge, J.,Robinson, Z. Geoghegan, N., Jarrold, K. Afxentiou, T., Reeves, T. Cunha, S., Trivella, M., Garcia-Larsen, V., Leonardi-Bee, J. **Hydrolysed formula and risk of allergic or autoimmune disease: systematic review and meta-analysis.** BMJ. 2016; 352: i974	**Subjects:** Infants **Design:** Systematic review and meta-analysis **Methods:** This review is reported in accordance with PRISMA guidance. The review is one of a series of systematic reviews commissioned by the UK Food Standards Agency to inform UK guidelines on infant feeding, under the title "review of scientific published literature on infant feeding and development of atopic and autoimmune disease." The protocols for the systematic reviews were registered with the International Prospective Register of	**Conclusion:** Our analyses suggest that current recommendations to use hydrolysed formula in place of standard cows' milk formula to prevent allergy in infants at high risk should be revised. We found no consistent evidence to support the current recommendations and found evidence of publication bias, methodological biases, and conflict of interest in those studies reporting allergic outcomes. We suggest that any future trials on hydrolysed formula should be prospectively registered, independently funded, and include adequate oversight to ensure that they do not negatively impact on breastfeeding in study participants.		

	Systematic Reviews (PROSPERO CRD42013003802 "milk feeding"; CRD42013004239 "timing of allergenic food introduction"; CRD42013004252 "maternal and infant diet") on 5 August 2013, before titles were screened or studies selected from the search results. This review of hydrolysed formula is part of CRD42013004252 "maternaland infant diet." As part of this project we also searched for other systematic reviews covering the same topic published since 1 January 2011 with a revised AMSTAR score ≥32.11 No such reviews were identified for hydrolysed formula.			
Osborn, D. A., Sinn, J. K., Jones, L. J. **Infant formulas containing hydrolysed protein for prevention of allergic disease.** Cochrane Database of Systematic Reviews 2018; 10	**Subjects:** Infants **Design:** Systematic Review **Methods:** We searched the Cochrane Central Register of Controlled Trials (CENTRA 2017, Issue 11), MEDLINE (1948 to 3 November 2017) and Embase (1974 to 3 November 2017). We also searched clinical trails databases, conference proceedings, and the reference lists of retrieved articles and previous reviews for randomised controlled trials and quasi-randomised trials.	**Conclusion**: We found no substantial evidence to support short-term of prolonged feeding with a hydrolysed formula compared with a cow's milk formula for prevention of allergic disease in infants unable to be exclusively breastfed.		

Wilkinson, T.A, Scott, E.K., Carroll A.E., **Mixed Message on Formula Mixing.** Pediatrics Perspectives. 2019; 143(6) Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/31118220	**Subjects:** Infants **Design:** Perspective paper **Methods:** This paper summarizes various organizations guidelines for formula feeding	**Agency or Organization/Recommendation** **WHO5** Boil water to a rolling boil and cool to no less 70°C (158°F) for no more than 30 min, add powdered formula, and immediately cool to feeding temperature. **CDC** Warm water to at least 70°C (158°F) and then add formula powder, followed by cooling. The recommendation includes particular mention of infants ,3 mo old, premature infants, or those with a compromised immune system. **FDA** Boil water for 1 min and let it cool or follow the manufacturer's label. **AAP** If one is concerned or uncertain about the safety of tap water, boil the water for 1 min, let it cool to room temperature (75°F) for no more than 30 min, and add powder. Formula cans Boil water for 1 min, let it cool to room temperature (75°F), and add powder.		

3.4.2 LONG-CHAIN POYUNSATURATED FATTY ACIDS (LCPUFA) SUPPLEMENTATION OF INFANT FORMULA

Long-chain polyunsaturated fatty acids (LCPUFA) Supplementation of Infant Formula References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Qawasmi A, Landeros-Weisenberger A, Bloch MH. **Meta-analysis of LCPUFA Supplementation of Infant Formula and Visual Acuity.** Pediatrics. Published online December 17, 2012. Abstract available from: Pediatrics	**Subjects**: 0 to 1 year old **Design:** Systematic review and meta-analysis **Methods:** Systematic review and meta-analysis of randomized studies of the effect of LCPUFA supplemented (versus unsupplemented) infant formula on visual acuity. Authors searched PubMed, PsychInfo and Scopus databases for RCTs and meta-analyses available since 1965 until 2011. Study quality was evaluated by using Jadad scale.	Seven studies on pre-term infants and nine on term infants were included in the meta-analysis (N=1,949). Of the these studies, 10 studies (N=852) showed a small significantly favourable effect of LCPUFAs on infant visual resolution acuity at 2, 4 and 12 months and on visual acuity (using behavioural methods) at 2 months. The other studies reported non-significant effects. The authors noted significant heterogeneity between studies at time points where a significant positive effect was observed (I^2 ranged from 69% to 92%). Authors also discuss the potential sources of heterogeneity in details and conclude that there is significant benefit of LCPUFA supplementation to infant formula on infant visual acuity during the first year of life. **Conclusion:** LCPUFA supplementation of infant formulas confers a significant benefit on infants' visual acuity up to 12 months of age.	I C	2B
Qawasmi A, Landeros-Weisenberger A, Leckman JF, and Bloch MH. **Meta-analysis of Long-Chain Polyunsaturated Fatty Acid Supplementation of Formula and Infant Cognition.** Pediatrics 2012;129;1141. Available from: Pediatrics.	**Subjects:** 0 to 1 year old **Design:** systematic review and meta-analysis **Methods**: Systematic review and meta-analysis of randomized studies of the effect of LCPUFA supplemented (versus unsupplemented) infant formula on cognitive outcomes (using the Bayley Scales of Infant	Authors identified 12 trials (N=1,802) of which two reported a significant benefit of supplementation with LCPUFAs on cognition, one showed a positive benefit of supplementation on some but not all subscales of the BSID, and nine showed no effect of supplementation on cognition. The meta-analysis demonstrated no significant effect of LCPUFA supplementation of formula on infant cognition. There was a modest non-significant heterogeneity between the trials (I^2=38%). **Conclusion:** No significant association exists between LCPUFA supplementation of infant formula and cognitive development at ~1 year of age.	I A	2A

	Development (BSID)). Authors searched PubMed, PsychInfo and Scopus databases for RCTs and meta-analyses available since 1965 until 2011. Study quality was evaluated by using the Jadad scale.			
Jasani b, Simmer K, Patole SK. Rao SC. **Long Chain Polyunsaturated Fatty Acid Supplementation in Infants Born at Term.** Cochrane Database of Systematic Reviews. 2017	**Subjects:** Full term Infants **Design:** Systematic Review **Methods:** Two review authors independently searched the Cochrane Central Register of Controlled Trials (CENTRAL; Deember 2016), MEDLINE(Ovid, 1966 to December 2016), Embase (Ovid, 1980 to December 2016) the Cumulative Index to Nursing and Allied Health Literature (CINAHL; 1980 to December 2016) and abstracts of the Pediatric Academics Societies (2000 to 2016). We applied no language restrictions.	**Conclusion:** Most of the included RCTs reported no beneficial effects of harms of LCPUFA supplementation on neurodevelopmental outcomes of formula fed full term infants and no consistent beneficial effects on visual acuity. Routine supplementation of full term infant milk formula with LCPUFA cannot be recommended at this time.		

3.4.3 SOY-BASED FORMULA

Soy-based Formula Recommendations	Strength of Recommendation
1. Soy-based formula is not recommended for use in cow milk protein allergy or in preterm infants, and may interfere with absorption of T4 replacement therapy in infants with congenital hypothyroidism	Consensus

Soy-based formula Recommendations				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from birth to six months.** 2012. Available from: http://hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/recom/index-eng.php	**Subjects:** 0 to 6 months **Design:** Nutrition guidelines during infancy **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	**Recommendations:** 1) Cow milk-based infant formula is recommended for an infant who is not exclusively fed breastmilk. 2) Soy-based infant formula is indicated only for infants who have galactosemia or who cannot consume dairy-based products for cultural or religious reasons. 3) The Canadian Paediatric Society recommends the use of an infant formula based on extensively hydrolyzed protein for the formula-fed infant with a cow milk protein allergy (CPS, 2009). 4) When a diagnosis of non-IgE-mediated cow milk protein allergy can be ruled out, the use of soy-based infant formula may be considered (CPS, 2009).	III A	1C
Andres A et al. **Developmental Status of 1-Year-Old Infants Fed Breast Milk, Cow's Milk Formula, or Soy Formula.** Pediatrics. 2012;129(6):1134 -1140. Abstract available from: PubMed	**Subjects:** Infants 1 to 12 months old **Design:** Prospective cohort (N= 391) **Methods:** Infants were recruited at 1-2 months and were either breast fed (BF) or formula fed (soy (SF) or milk (MF)). Follow-up visits	Healthy infants enrolled in BF, SF or MF were assessed for development at each study visit. No differences were found between formula-fed infants (MF versus SF). BF infants scored slightly higher on some development measures than formula-fed infants. **Conclusion:** Infants fed soy protein–based formula scored within normal limits on standardized developmental testing and did not differ from infants fed cow's milk–based formula.	II-2 A	B

	were scheduled at 3, 6, 9 and 12 months. All examiners were blinded to feeding group unless BF infants were fed during the testing period.			
Canadian Paediatric Society. **Concerns for the use of soy-based formulas in infant nutrition.** Paediatrics & Child Health. 2009; 14(2): 109-113. Abstract available from: PubMed	**Subjects:** Infants and mothers **Design:** Practice point **Methods:** Review of clinical and observational studies.	Other studies have been done showing potential harmful effects of soy-based formulas because of the presence of phytoestrogens. According to this statement, mothers' personal preference could be the main reason for use of soy-based formulas. This practice point reports that soy-based formula is not recommended for infants and that the recommendation for soy-based formula for infants with cow's milk protein allergy (CMPA) or living a vegan lifestyle is no longer valid. One main limitation of studies on CMPA and soy-based formulas is failing to distinguish between IgE- and non-IgE- mediated CMPAs.	III B	
Badger TM Gilchrist JM, Pivik RT, Andres A, Shankar K, Chen JR, Ronis MJ. **The health implications of soy infant formula.** American Journal of Clinical Nutrition. 2009; 89(Suppl): 1668S-72S. Available from: PubMed	**Subjects:** 0 to 6 months old **Design:** Prospective longitudinal study **Methods:** Arkansas Children's Nutrition Center currently conducting a study comparing growth, development and health of breastfed children with formula-fed children.	After 5 years of the study, all children are growing within the normal limits and no adverse effects have been seen. Many countries have recommended reduced use of soy formulas. According to this study, concerns about soy formulas are not supported by convincing data. Most of the evidence against soy formulas is based on RCTs using animal models and cannot be generalized to humans. The follow-up time of this study is adequate to determine any early developmental problems but not longer-term effects.	II-2 B	
Bhatia J, Greer F. American Academy of Pediatrics Committee on Nutrition. **Use of soy protein-based formulas in infant feeding.** Pediatrics. 2008; 121: 1062-	**Subjects:** Infants and mothers **Design:** Review **Methods:** Reviewed literature on soy-based formulas for infants. Recommendations are	According to this review, soy-based formulas do not have adverse effects for normal term infants. However, the review reports that there is no added benefit over cow's milk (unless the infant has CMPA) and that soy-based formulas should not be used for preterm babies. There is no evidence to support that soy-based formulas prevent atopic diseases or colic. This review reports that	III B	

1068. Abstract available from: PubMed	based on a few randomized controlled trials, controlled clinical trials, observational studies and review articles.	soy-based formula should only be used in infants with galactosemia or when a vegetarian diet is preferred.		
Osborn DA, Sinn JKH. **Soy formula for prevention of allergy and food intolerance in infants (Review)**. Cochrane Database of Systematic Reviews. 2006, Issue 4 Art No.:CD003741. Abstract available at: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003741.pub4/abstract	**Subjects:** 0 to 6 months old **Design:** Meta-analysis **Methods:** Used the standard search strategy of the Cochrane Neonatal review group. Selected studies that compared the use of adapted soy formula to human milk, an adapted cow's milk or a hydrolyzed protein formula.	Only 3 randomized and quasi-randomized studies met the inclusion criteria. According to this meta-analysis, the use of soy formula cannot be recommended for the prevention of allergy or food intolerance in infants at high risk of these conditions. Ten to 14% of infants with CMPA allergy are also allergic to soy protein.	I A	

3.5 INTRODUCTION OF SOLID AND ALLERGENIC FOODS

Introduction of Solid and Allergenic Foods Recommendations	Strength of Recommendation
1. A few weeks to just after 6 months, guided by infant's readiness, start iron containing foods to avoid iron deficiency. **2.** A Variety of soft texture foods, ranging from purees to finger foods can be introduced. **3.** For all infants, including those at high risk for allergies, allergenic foods (especially eggs and peanut products) can be introduced with other solids around 6 months, but not before 4 months, as guided by the infant's signs of readiness. Once allergenic solids are introduced, they should be fed a few times a week to maintain tolerance.	

Introduction of Solid and Allergenic Foods Resources
1. Timing of introduction (CPS) 2. Allergycheck.ca 3. Food Allergy Canada

Introduction of Solid and Allergenic Foods References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Abrams E, Rourke L, Leduc D, Li P. Evolution of the Rourke Baby Record as evidence mounts about food allergy prevention: Review and practical tips. *Canadian Family Physician* 2020; 66:314-316. http://www.cfp.ca/content/66/5/314		Abstract: In recent years, there has been a flourish of knowledge related to the timing of early allergenic food introduction, with one randomized controlled trial demonstrating a dramatic reduction in peanut allergy with early peanut introduction, and several randomized controlled trials examining the benefit of early egg introduction. The Rourke Baby Record, a clinical tool for preventive health visits in early childhood, along with other international guidelines, have drastically changed their recommendations in keeping with the available evidence base. The most current 2017 version of the Rourke Baby Record recommends, with "good" evidence, not to delay the introduction of allergenic foods. A few weeks before or at around 6 months, but not before 4 months of		

		age, solid foods should be introduced. Once a few complementary foods are tolerated, allergenic solids can be given in an age appropriate manner. The current article presents the most recent guidelines, resources and practical tips for primary care providers and parents on the introduction of allergenic foods. Ongoing controversies, which are the subject of existing trials, include the identification of infants who are most at risk for food allergies and who should be targeted screening interventions, as well as defining the optimal timing and frequency of allergenic food introduction. Future Rourke Baby Record updates will continue to appraise the latest literature to provide primary care providers guidance on unresolved controversies.		
Chan E, Cummings C, CPS Sections of Community Paediatrics and Allergy. Dietary exposure and allergy prevention in high risk infants. Paediatr Child Health 2013;18(10):545-9. Available from Pediatr Child health. Reaffirmed Feb 2016	Position statement	**Recommendations**: from CPS and the Canadian Society of Allergy and Clinical Immunology to prevent allergy in infants who have a first-degree relative with an allergic condition, and are, therefore, considered to be high risk. • Do not restrict maternal diet during pregnancy or lactation. There is no evidence that avoiding milk, egg, peanut or other potential allergens during pregnancy helps to prevent allergy, while the risks of maternal undernutrition and potential harm to the infant may be significant. • Breastfeed exclusively for the first six months of life. Whether breastfeeding prevents allergy as well as providing optimal infant nutrition and other manifest benefits is not known. The total duration of breastfeeding (at least six months) may be more protective than exclusive breastfeeding for six months.	II-2B II-2B	

		• Choose a hydrolyzed cow's milk-based formula, if necessary. For mothers who cannot or choose not to breastfeed, there is limited evidence that hydrolyzed cow's milk formula has a preventive effect against atopic dermatitis compared with intact cow's milk formula. Extensively hydrolyzed casein formula is likely to be more effective than partially hydrolyzed whey formula in preventing atopic dermatitis. Amino acid-based formula has not been studied for allergy prevention, and there is no role for soy formula in allergy prevention. It is unclear whether any infant formula has a protective effect for allergic conditions other than atopic dermatitis. • Do not delay the introduction of any specific solid food beyond six months of age. Later introduction of peanut, fish or egg does not prevent, and may even increase, the risk of developing food allergy. • More research is needed on the early introduction of specific foods to prevent allergy. Inducing tolerance by introducing solid foods at four to six months of age is currently under investigation and cannot be recommended at this time. The benefits of this approach need to be confirmed in a rigorous prospective trial. • Current research on immunological responses appears to suggest that the regular ingestion of newly introduced foods (eg, several times per week and with a soft mashed consistency to prevent choking) is important to maintain tolerance. However, routine skin or specific IgE blood testing before a first ingestion is discouraged due to the high risk of potentially confusing false-positive results.	IB II-2B II-2B II-2B	
Ierodiakonou D, Garcia-Larsen V, Logan A. Timing of Allergenic Food Introduction to the Infant Diet and Risk of Allergic or Autoimmune Disease A	**Subjects:** infants and children **Design:** systematic review and meta-analysis **Methods:** To determine whether the timing of	Main outcomes and measures were wheeze, eczema, allergic rhinitis, food allergy, allergic sensitization, type 1 diabetes mellitus, celiac disease, inflammatory bowel disease, autoimmune thyroid disease, and juvenile rheumatoid arthritis. Final review included 146 studies.		B

Systematic Review and Meta-analysis. *JAMA.* 2016;316(11):1181-1192.	allergenic food introduction during infancy influences risk of allergic or autoimmune disease. Searched MEDLINE, EMBASE, Web of Science, CENTRAL, and LILACS databases between January 1946 and March 2016. Included interventional trials and observational studies. Used GRADE to assess certainty of evidence.	- Early egg introduction at 4 to 6 months was associated with reduced egg allergy (risk ratio [RR], 0.56; 95% CI, 0.36-0.87; I^2 = 36%; *P* = .009). Absolute risk reduction for a population with 5.4% incidence of egg allergy was 24 cases (95% CI, 7-35 cases) per 1000 population. - Early peanut introduction at 4 to 11 months was associated with reduced peanut allergy (RR, 0.29; 95% CI, 0.11-0.74; I^2 = 66%; *P* = .009). Absolute risk reduction for a population with 2.5% incidence of peanut allergy was 18 cases (95% CI, 6-22 cases) per 1000 population. - Timing of egg or peanut introduction was not associated with risk of allergy to other foods. - Early fish introduction was associated with reduced allergic sensitization and rhinitis. - Timing of gluten introduction was not associated with celiac disease risk, and timing of allergenic food introduction was not associated with other outcomes.		B B C A
Perkin, M. R., Logan, K., Tseng, A., Raji, B., Ayis, S., Peacock, J., ... & Flohr, C. Randomized Trial of Introduction of Allergenic Foods in Breast-Fed Infants. *New England Journal of Medicine* 2016; 374:1733-1743. Available from: NEJM.	**Subjects:** Infants **Design:** Randomized controlled trial **Methods:** 1303 exclusively breast-fed infants who were 3 months of age were randomly assigned to the early introduction of six allergenic foods (peanut, cooked egg, cow's milk, sesame, whitefish, and wheat; early-introduction group) or to the current practice recommended in the United Kingdom of exclusive breast-feeding to approximately 6 months of age (standard introduction	In the intention-to-treat analysis, food allergy to one or more of the six intervention foods developed in 7.1% of the participants in the standard-introduction group (42 of 595 participants) and in 5.6% of those in the early-introduction group (32 of 567) (P = 0.32). In the per-protocol analysis, the prevalence of any food allergy was significantly lower in the early-introduction group than in the standard introduction group (2.4% vs. 7.3%, P = 0.01), as was the prevalence of peanut allergy (0% vs. 2.5%, P = 0.003) and egg allergy (1.4% vs. 5.5%, P = 0.009); there were no significant effects with respect to milk, sesame, fish, or wheat. The consumption of 2 g per week of peanut or egg-white protein was associated with a significantly lower prevalence of these respective allergies than was less consumption. **Conclusion:** This trial failed to show the efficacy of early introduction of allergenic foods as compared with standard introduction of those foods in an intention-to-treat analysis. Further analysis suggests that the possibility of preventing food		B

	group). The primary outcome was food allergy to one or more of the six foods between 1 year and 3 years of age.	allergy by means of the early introduction of multiple allergenic foods in normal breast-fed infants may depend on adherence and dose.		
Du Toit, G., Sayre, P. H., Roberts, G., Sever, M. L., Lawson, K., Bahnson, H. T., ... & Basting, M. Effect of avoidance on peanut allergy after early peanut consumption. *New England Journal of Medicine* 2016; 374:1435-1443. Available from: NEJM.	**Subjects:** Infants **Design:** Randomized control trial (follow-up to LEAP study) **Methods:** At the end of the primary trial, all participants were instructed to avoid peanuts for 12 months. 550 participants had complete primary outcome data. The primary outcome was the percentage of participants with peanut allergies at the end of the 12-month period, when participants were 72 months of age. Allergy was determined by means of an oral peanut challenge at 72 months of age.	Peanut allergy at 72 months was significantly more prevalent among participants in the peanut-avoidance group than among those in the peanut-consumption group (18.6% [52 of 280 participants] vs. 4.8% [13 of 270], P<0.001). Three new cases of allergy developed in each group, but after 12 months of avoidance there was no significant increase in the prevalence of allergy among participants in the consumption group (3.6% [10 of 274 participants] at 60 months and 4.8% [13 of 270] at 72 months, P = 0.25). Fewer participants in the peanut-consumption group than in the peanut-avoidance group had high levels of Ara h2 (a component of peanut protein)–specific IgE and peanut-specific IgE; in addition, participants in the peanut-consumption group continued to have a higher level of peanut-specific IgG4 and a higher peanut-specific IgG4:IgE ratio. **Conclusion:** Intermittent low-dose consumption of peanut during the follow-up study after either prolonged consumption or avoidance during the primary trial did not result in new-onset peanut allergy. The LEAP trial and the LEAP-On study together showed that the early introduction of peanut induced unresponsiveness to peanut that persisted after 12 months of avoidance. The effectiveness and safety of this prevention strategy was maintained in children who avoided peanut altogether or who consumed peanut in lesser amounts after 60 months of age. It remains to be seen whether the effects of peanut consumption in early life are maintained if peanuts are consumed ad libitum over the course of many years.		A

Du Toit, G., Roberts, G., Sayre, P. H., Bahnson, H. T., Radulovic, S., Santos, A. F., ... & Lack, G. Randomized trial of peanut consumption in infants at risk for peanut allergy. New England Journal of Medicine 2015;372(9):803-813. Available from: NEJM.	**Subjects:** Infants **Design:** Randomized, open-label, controlled trial (Learning Early about Peanut Allergy; LEAP) **Methods:** 640 infants with severe eczema, egg allergy, or both were randomly assigned to consume or avoid peanuts until 60 months of age. Participants, who were at least 4 months but younger than 11 months of age at randomization, were assigned to separate study cohorts on the basis of preexisting sensitivity to peanut extract, which was determined with the use of a skin-prick test — one consisting of participants with no measurable wheal after testing and the other consisting of those with a wheal measuring 1 to 4 mm in diameter. The primary outcome, which was assessed independently in each cohort, was the proportion of participants with peanut allergy at 60 months of age.	Among the 530 infants in the intention-to-treat population who initially had negative results on the skin-prick test, the prevalence of peanut allergy at 60 months of age was 13.7% in the avoidance group and 1.9% in the consumption group (P<0.001). Among the 98 participants in the intention-to-treat population who initially had positive test results, the prevalence of peanut allergy was 35.3% in the avoidance group and 10.6% in the consumption group (P = 0.004). There was no significant between-group difference in the incidence of serious adverse events. Increases in levels of peanut-specific IgG4 antibody occurred predominantly in the consumption group; a greater percentage of participants in the avoidance group had elevated titers of peanut-specific IgE antibody. A larger wheal on the skin-prick test and a lower ratio of peanut-specific IgG4:IgE were associated with peanut allergy. **Conclusion:** Early, sustained consumption of peanut products was associated with a substantial and significant decrease in the development of peanut allergy in high-risk infants. Conversely, peanut avoidance was associated with a greater frequency of clinical peanut allergy than was peanut consumption, which raises questions about the usefulness of deliberate avoidance of peanuts as a strategy to prevent allergy.		A

Fleischer, D. M., Sicherer, S., Greenhawt, M., Campbell, D., Chan, E., Muraro, A., ... & Rosenwasser, L. Consensus communication on early peanut introduction and the prevention of peanut allergy in high-risk infants. Pediatrics 2015;136(3): 600-604. Available from: Pediatrics.	**Subjects:** Infants **Design:** Update of existing guidelines regarding early peanut introduction **Methods:** Highlighting emerging evidence from the LEAP trial as interim guidance based on consensus among many reputable organizations. More formal guidelines regarding early-life, complementary feeding practices and the risk of allergy development will follow in the next year from the National Institute of Allergy and Infectious Diseases (NIAID)–sponsored Working Group and the European Academy of Allergy and Clinical Immunology (EAACI)	For details on findings and outcomes, please refer to the LEAP trial article. **Conclusion:** There are potential benefits of supporting early, rather than delayed, peanut introduction during the period of complementary food introduction in infants. The LEAP data provide Level 1 evidence that the practice of early peanut introduction is safe and effective in selected high risk infants. **Recommendations:** 1) Health care providers should recommend introducing peanut-containing products into the diets of ''high-risk'' infants early on in life (between 4 and 11 months of age) in countries where peanut allergy is prevalent because delaying the introduction of peanut can be associated with an increased risk of peanut allergy. 2) Infants with early-onset atopic disease, such as severe eczema, or egg allergy in the first 4 to 6 months of life might benefit from evaluation by an allergist or physician trained in management of allergic diseases in this age group to diagnose any food allergy and assist in implementing these suggestions regarding the appropriateness of early peanut introduction.		1A 1B
Abrams, E. M., & Becker, A. B. Food introduction and allergy prevention in infants. CMAJ 2015; 187(17): 1297-1301. Available from: CMAJ.	**Subjects: Infants** **Design:** Review **Methods:** Used Canadian and American national guidelines to inform this review. Reviewed published systematic reviews, articles through MEDLINE from 1990 to present, conference abstracts, and reference lists from seminal	Most of the recommendations in this review focus on the infant who is at risk for atopy. **Conclusion:** It has been well documented that avoidance of allergenic foods is not preventive of food allergy. Early introduction of allergenic foods, specifically peanut, is protective against the development of food allergy. Current guidelines do not support maternal avoidance diets during pregnancy or lactation. The Canadian Paediatric Society guideline on dietary exposures concludes that it is not yet known whether breastfeeding protects against allergy.		

	articles. 38 articles were included.	**Recommendations:** New foods should be introduced at a rate of no more than one new food every three to five days in an age-appropriate. Start with typical complementary foods (grains, yellow or orange vegetables, fruit) and introduce one of the highly allergenic foods once a few complementary foods have been well tolerated. The highly allergenic foods should be given at home (i.e., not at daycare), and reactions can occur with first known ingestion. If there is no reaction, it is recommended that the food in question be gradually increased in amount over a few days' duration. Regular ingestion of tolerated foods is important for maintenance of tolerance. Once a highly allergenic food is tolerated, it should be consumed regularly. One exception to the advice to no longer delay introducing allergenic foods is for infants with older siblings with peanut allergy. In such circumstances, evaluation by a certified allergist before peanut introduction in the younger sibling is recommended. Any infant with a documented reaction to a food should undergo assessment by an allergist before the food is introduced again.		
Przyrembel H. **Timing of introduction of complementary food: short- and long-term health consequences.** Ann Nutr Metab. 2012; 60(suppl):8-20. Available from: PubMed	**Subjects:** infants and children **Design:** review **Methods:** Reviewed the literature for studies on the health effects of age at which complementary food has been introduced regardless of breastfeeding or formula feeding. Authors define complementary as any food, solid or (semi-) liquid, besides breast milk or its substitutes, i.e. infant (or follow-on) formula.	The author reviewed the evidence on timing of infant feeding and health outcomes such as weight gain, obesity, nutritional inadequacy, development, infection, type 1 and 2 diabetes, coronary heart disease and allergy. The author of this review concludes that there is little evidence on the strength of the relationship between the timing of the introduction of complementary food and the risk of disorders in later life. The author found some evidence of an association between early (12-15 weeks) introduction of complementary foods and increased weight gain/obesity and the risk for atopic eczema later in life. Studies included also suggested that the late introduction of complementary foods (>26 weeks) increased the risk of wheat allergy and was associated with an increase in the presence of diabetes-associated antibodies.	III D	1B 2B

		Conclusion: Delaying the introduction of complementary food beyond the age of 26 weeks is associated with the risk of nutritional insufficiency, particularly in low-income populations. **Recommendation:** Advise against the introduction of complementary food before the age of 12 weeks.		
Jonsdottir OH et al. **Timing of the introduction of complementary foods in infancy: a randomized controlled trial.** Pediatrics. 2012; 130(6):1038-45. Abstract available from: PubMed	**Subjects:** Infant-mother pairs **Design:** Randomized controlled trial (N=119) **Methods:** Infants were randomly assigned to receive complementary foods from age 4 months in addition to breast milk or continue being exclusively breastfed.	One hundred infants completed the trial (84% participation rate). The results regarding growth showed no significant differences between the two groups. Infants in complementary feeding group had higher mean serum ferritin levels at 6 months (P = .02), which remained significant when adjusted for baseline characteristics. No difference was seen between groups in iron deficiency anemia, iron deficiency, or iron depletion. **Conclusion:** In a high-income country, feeding complementary foods in addition to breast milk to infants from 4 months of age has a small and positive effect on iron status at 6 months.	I **B**	1A
Nwaru BI et al. **Timing of infant feeding in relation to childhood asthma and allergic diseases.** J Allergy Clin Immunol. 2012; article in press.Abstract available from: PubMed	**Subjects:** 0 to 5 years old **Design:** multicentre prospective population-based birth cohort (N=3,791) **Methods:** From 1994, consecutive infants born with susceptibility to type 1 diabetes were recruited from 3 university hospitals. At the age of 5 years, 3,781 (93% of those invited) took part in the study. The diet of the child was assessed by means of age-specific dietary questionnaires at the ages of 3, 6, and 12	End points included asthma, allergic rhinitis, atopic eczema, and atopy (sensitization to allergens). Authors found that longer duration of total breast-feeding, rather than its exclusivity, was protective against the development of nonatopic but not atopic asthma. Further, the results of this study suggest that early introduction of cereals, fish, and egg in infancy (respective to the timing of introduction of each food) might confer protection against the development of asthma, allergic rhinitis, and atopic sensitization by the age of 5 years. **Conclusion:** 1) Total duration of breastfeeding, rather than its exclusivity, might be the more important determinant of the occurrence of asthma in childhood. 2) Introduction of wheat, rye, oats, and barley cereals at 5.5 months or less; fish at 9 months or less; and egg at 11 months or	II B	2B 2B 1B

	months and a follow-up ‘‘age at introduction of new foods-form’’ for recording the age at introduction of complementary foods. The exposures of interest were duration of exclusive and total breast-feeding and age at introduction of cow’s milk; roots (potatoes, carrot, and turnip); fruits and berries; wheat, rye, oats, and barley; meat; fish; egg; and other cereals (maize, rice, millet, and buckwheat).	less might decrease the risk of asthma, allergic rhinitis, and atopic sensitization in childhood. 3) Emerging evidence does not support current recommendations on breastfeeding and introduction of complementary foods for the prevention of childhood asthma and allergies.		
Chuang CH et al. **Infant feeding practices and physician diagnosed atopic dermatitis: a prospective cohort study in Taiwan.** Pediatric Allergy and Immunology . 2011; 22: 43–49. 2012. Abstract available from: PubMed	**Subjects:** 0 to 18 months **Design:** national (multicentre) prospective population-based birth cohort (n=18,773) **Methods:** Based on a systematic representative sample of newborns. Variables related to infant nutrition were collected, including breastfeeding and solid food through interview questionnaires at 6 and 18 months of age. Solids feeding was defined as the infant receiving any solid food (e.g. fruit mash, porridge, or dairy products),	After adjustment for potential confounders, results suggested that the increased duration of breastfeeding seemed to increase the risk of children with AD at 18 months. No significant effect was found for the different timings of solid food introduction on the risk of AD. **Conclusion:** Longer duration of breastfeeding (not necessarily exclusive) and a delayed introduction of solids beyond 6 months did not prevent the AD by age 18 months when reverse causality was considered.	II-2 D	2B

	and data on the start and kinds of feeding were collected. The main outcome measure was parent reported physician's diagnosis of AD within 6 and 18 months. All potential confounders including reverse causality were accounted for.			
Huh SY, Rifas-Shiman SL, Taveras EM, Oken E, Gillman MW. **Timing of Solid Food Introduction and Risk of Obesity in Preschool-Aged Children.** Pediatrics. 2011;127;e544. Available from: Pediatrics	**Subjects:** Infants **Design:** Prospective birth cohort (N=847) **Methods:** The authors examined the association between the timing of solid food introduction (<4, 4-5, ≥6 mo) and obesity at 3 years of age.	The outcome of interest was obesity at 3 years of age defined as ≥95th percentile. The authors found that among infants who were never breastfed or who stopped breastfeeding before 4 months, there was a six-fold increase in the odds of obesity at 3 years if complementary foods were introduced before the age of 4 months compared to between 4 and 5 months of age. According to the authors, this finding is independent of rapid early growth. **Conclusion:** For infants breastfed for at least four months, the timing of solid food introduction had no significant effects on obesity.	II-2 B	B
Chafen JJ, Newberry SJ, Riedl MA, et al. **Diagnosing and Managing Common Food Allergies: A Systematic Review.** JAMA. 2010; 303(18): 1848-1856.Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/20460624	**Subjects:** 0 to 5 years old **Design:** Systematic Review **Methods:** Electronic database searches of PubMed, Cochrane Databases from January 1988 to September 2009. Included studies were assessed using the AMSTAR criteria, QUADAS criteria and Jadad criteria depending on study design. Systematic reviews and	Seventy-two studies were included in the systematic review. Studies looked at specific foods such as cow's milk, hen's egg, peanut, tree-nut, shellfish and fish. In the diagnostic studies, there was no statistical difference between skin prick tests and serum food-specific tests. There are not many studies that look at elimination diets and insufficient evidence to recommend the use of immunotherapy. There is some evidence for use of hydrolyzed formulas to prevent cow's milk allergy. However, standardized definitions of "hydrolyzed formula" and "high-risk" do not exist. Overall, "the evidence for the prevalence and management of food allergy is greatly limited by a lack of uniformity for criteria for making a diagnosis."	II	

	RCTs looking at management and prevention of food allergies were selected as well as diagnostic tests that used food challenge as a criterion standard.			
Greer FR, Sicherer S, Burks AW and the Committee on Nutrition and Section on Allergy and Immunology**. Effects of Early Nutritional Interventions on the Development of Atopic Disease in Infants and Children: The role of maternal dietary restriction, breastfeeding, timing of introduction of complementary foods and hydrolyzed formulas.** Pediatrics. 2008; 121:183-191. Abstract available from: PubMed	**Subjects:** Mothers and infants **Design:** Clinical report/Review **Methods:** This statement replaces the AAP statement on hypoallergenic formulas (2000). This clinical report reviews nutritional and dietary options for mothers during pregnancy, lactation and the first year of life for infants Specifically, it reviews the Cochrane Review (above) and other trials to assess nutritional options during pregnancy, lactation and the first year of infancy and any potential relation to the development of atopic disease. Many of the reviewed studies focus on high-risk children.	According to this report, there is insufficient evidence to support a protective effect of delaying certain solid foods (e.g. eggs, milk, nuts) after the infant has reached the age of 6 months. The reviewers at AAP conclude that the only documented benefits of nutritional intervention that might prevent or delay atopic disease are for high-risk children (described as infants with at least 1 first-degree relative (parent or sibling) with allergic disease.) Extensively hydrolyzed formulas may be more effective than partially hydrolyzed formulas in the prevention of atopic disease (modest evidence). The statement also notes that there is lack of evidence that antigen avoidance during pregnancy and lactation have a preventative effect on atopic disease. However, there is evidence that exclusive breastfeeding for at least 4 months may help prevent or delay the occurrence of atopic dermatitis, cow milk allergy and wheezing in early childhood. They report that soy formula is not recommended for the purpose of allergy prevention. Many studies had limitations that compromised their conclusions (e.g. no concealment of allocation for RCTs). The power to detect differences was small in many studies.	I, II-1, II-2, II-3	

Burgess, J. A., Dharmage, S. C. Allen, K., Koplin, J., Garcia-Larsen, V. Boyle, R., Waidyatillake, N. Lodge, C. J. **Age at introduction to complementary solid food and food allergy and sensitization: a systematic review and meta-analysis.** Clinical & Experimental Allergy. 2019; 12	**Subjects:** Infants **Design:** Systematic Review and Meta-Analysis **Methods:** Two authors selected papers according to inclusion criteria, identifying 16 cohort studies, 1 case-control study and 8 randomized controlled Trials (RCTs). Pooled effects across studies were estimated using random-effects meta-analysis.	**Conclusion:** We conclude that this review of cohort studies provides evidence that the current recommendations for the optimal timing of introduction of complementary solid foods do not carry an increased risk of food allergy. Although we found some evidence for reduced risk of food sensitization for infants introduced to solids before compared to after 4 months of age, this should not be taken as suggesting that current guidelines on age at introduction of solids should change. The evidence was garnered from a small number of studies with important limitations, and it is not clear that the estimated reduced risk of food sensitization would necessarily influence food allergy in the older child. Further studies are needed to clarify this.		
Abrams, E., Hildebrand, K. Blair, B., Chan, E. S. **Timing of introduction of allergenic solids for infants at high risk.** Paediatrics & Child Health. 2019; 24(1); 56-57 Available at **https://www.cps.ca/en/documents/position/allergenic-solids**	**Subjects:** Infants **Design:** Practice Point	Food allergy affects an estimated 2 to 10% of the population, with evidence of increasing prevalence over time. Preventing food allergy has become an important public health goal. Health Canada currently recommends breastfeeding infants exclusively until they are 6 months old, while acknowledging that in individual practice, signs of infant readiness may guide the introduction of complementary foods a few weeks earlier. There is emerging evidence that early food introduction, between 4 and 6 months of age, may have a role in preventing food allergy, particularly for egg and peanut, in high-risk infants. For infants at high risk for allergic disease, it is now recommended that commonly allergenic solids be introduced at around 6 months of age, but not before 4 months of age, and guided by the infant's developmental readiness for food. Continued breastfeeding should be encouraged and supported because of its many health benefits.		

Natsume, O., Kabashima, S. Nakazato, J., Yamamoto-Hanada, K. Narita, M., Kondo, M., Saito, M. Kishino, A., Takimoto, T. Inoue, E., Tang, J., Kido, H. Wong, G. W., Matsumoto, K. Saito, H., Ohya, Y., Petit Study Team. **Two-step egg introduction for prevention of egg allergy in high-risk infants with eczema (PETIT): a randomised, double-blind, placebo-controlled trial.** Lancet	**Subjects:** infants 4–5 months **Design:** a randomised, double-blind, placebo-controlled trial **Methods:** In this randomised, double-blind, placebo-controlled trial, we enrolled infants 4–5 months of age with eczema from two centres in Japan. Exclusion criteria were being born before 37 weeks of gestational age, experience of ingestion of hen's eggs or egg products, history of immediate allergic reaction to hen's eggs, history of non-immediate allergic reaction to a particular type of food, and complications of any severe disease. Infants were randomly assigned (block size of four; stratified by institution and sex) to early introduction of egg or placebo (1:1). Participants in the egg group consumed orally 50 mg of heated egg powder per day from 6 months to 9 months of age and 250 mg per day thereafter until 12 months of age. We aggressively treated participants' eczema at entry and maintained control without exacerbations throughout the intervention period. Participants and physicians were masked to assignment, and allocation	**Conclusion:** In this trial, we found that hen's egg could be introduced to high-risk infants with atopic dermatitis with use of a two-step approach without immediate allergic reaction, even for participants who had IgE sensitisation to hen's egg before starting the intervention. In a previous RCT,13 a high proportion (31%) of infants had allergic reactions to pasteurised raw egg powder. In our trial, no participants had an allergic reaction to the heated egg powder. Such a difference might be due to the higher allergenicity of raw than heated egg powder. Use of a lower starting dose than in that trial might also contribute to the safety of our approach. In the LEAP study,12 six (13%) of 47 infants who were skin prick test positive reacted to baseline peanut challenge. Infants who were already sensitised to egg before introduction might have developed an allergic reaction if they were given a high dose of heated or raw egg powder at the start. These fi ndings suggest that our two-step approach starting from low dose introduction might be a safer method than that used in the LEAP study, which more naturally mirrors real life rather than screening high-risk infants with skin prick test or serum food-specific IgE concentration or a challenge test before introduction.		

	was concealed. The primary outcome was the proportion of participants with hen's egg allergy confirmed by open oral food challenges at 12 months of age, assessed blindly by standardised methods, in all randomly allocated participants who received the intervention. This trial is registered with the University Hospital Medical Information Network Clinical Trials Registry, number UMIN000008673			
Wei-Liang Tan, J., Valerio, C. Barnes, E. H., Turner, P. J. Van Asperen, P. A., Kakakios, A. M. Campbell, D. E., Beating Egg Allergy Trial Study Group, **A randomized trial of egg introduction from 4 months of age in infants at risk for egg allergy,** J Allergy Clin Immunol. 2017. 139(5): 11621-1628 e*=8	**Subjects:** Infants **Design:** Randomized Controlled Trial **Methods:** We conducted a randomized controlled trial in infants with at least 1 first-degree relative with allergic disease. Infants with a skin prick test (SPT) response to egg white (EW) of less than 2 mm were randomized at age 4 months to receive whole-egg powder of placebo(rice powder) until 8 months of age, with all other dietary egg excluded. Diets were liberalized at 8 months in both groups. The primary outcome was an EW SPT response of 3 mm or greater at age 12 months.	**Conclusion:** We have demonstrated that introduction of egg into the diets of infants at risk of egg allergy from 4 to 6 months of age was associated with a reduction in egg sensitization on skin testing and induction of a significant IgG4 response to egg and the major egg protein components ovalbumin and ovomucoid at 12 months of age. This suggests a tolerogenic effect for those infants who were able to tolerate egg introduction without having an allergic reaction.		

Palmer, Debra J., Sullivan, Thomas R., Gold, Michael S., Prescott, Susan L., Makrides, Maria., **Randomized controlled trial of early regular egg intake to prevent egg allergy.** Journal of Allergy & Clinical Immunology. 2017. 139(5) 1600-1607 e 2. Retrieved From: https://www.sciencedirect.com/science/article/pii/S009167491630793X	**Subjects:** Infants aged 4-6 months **Design:** Randomized Controlled Trial **Methods:** Subjects were randomly allocated to receive daily pasteurized raw whole egg powder (n=407) or a color matched rice powder (n=413) to age 10 months. All infants followed an egg free diet and cooked egg was introduced to both groups at age 10 months. The primary outcome was IgE-mediated egg allergy defined by a positive pasteurized raw egg challenge and egg sensitization at age 12 mos.	**Conclusion:** We found no evidence that regular egg intake from age 4 to 6.5 months substantially alters the risk of egg allergy by age 1 year in infants who are at hereditary risk of allergenic disease and had no eczema symptoms at study entry. There is no need for the routine testing of infants without eczema in the community to determine egg sensitization status before the introduction of egg and egg-containing foods when solids are introduced. Future research aimed at food allergt prevention should focus on strategies to reduce the development of eczema and elevated food allergen-specific Th2 cytokine responses in early life before the introduction of solid foods		
Abrams, E. M., Singer, A. G., Soller, L. Chan, E. S. **Knowledge gaps and barriers to early peanut introduction among allergists, pediatricians, and family physicians.** J Allergy Clin Immunol Pract. 2019. 7(2); 681-684	**Subjects: Infants** **Design:** **Methods:** A 17 question survey evaluating the approach to an infant at risk of PA was sent to the Canadian Pediatric Society, the Canadian Society of Allergy and Clinical Immunology, and a wide sample of Canadian family physicians (FPs). Frequencies, percentages and 95% Cis were calculated for all questions. Logistic regression was performed to determine provider characteristics predictive of referral patterns for preemptive screening, early solid food introduction, and breast feeding and	**Clinical Implications:** • There is wide variability among practitioners in the definition of an infant at high risk of peanut allergy. • The minority of generalists and allergists recommend that infants with severe eczema and/or egg allergy have pre-emptive evaluation prior to peanut introduction. • There is a willingness by generalists and allergists to recommend introduction of allergenic solids prior to 6 months of age. • There is wide discrepancy in counselling on ongoing peanut exposure after introduction in infancy.		

	frequency of peanut ingestion. Statistical analyses were performed using Stata SE version 12.			

3.6 NUTRITION CONCERNS

3.6.1 NUTRITION INTERVENTIONS FOR COLIC

Nutrition Interventions for Colic Resources
1. Dietary interventions for colic (CPS)

Nutritional Interventions for Colic References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Chau, K., Lau, E., Greenberg, S., Jacobson, S., Yazdani-Brojeni, P., Verma, N., & Koren, G. Probiotics for infantile colic: A randomized, double-blind, placebo-controlled trial investigating Lactobacillus reuteri DSM 17938.The Journal of Pediatrics 2015;166(1):74-78. Available from: J Pediatrics.	**Subjects:** Infants **Design:** Randomized, double-blind, placebo controlled trial **Methods:** 52 infants with colic, according to modified Wessel criteria, were assigned at random to receive L reuteri DSM 17938 (n = 24) or placebo (n = 28) for 21 days. Daily crying and fussing times were recorded in a structured diary, and maternal questionnaires were completed to monitor changes in infant colic symptoms and adverse events. The study's primary outcome was defined as a reduction in the duration of average crying and fussing times, from baseline (day 0) to end of treatment (day 21), to <3 hours per day. The secondary outcome measure was the number of participants who responded to treatment on days 7, 14, and 21.	Total average crying and fussing times throughout the study (from baseline to day 21) were significantly shorter among infants with colic in the probiotic group compared with infants in the placebo group (P = .028) (relative risk, 0.78; 95% CI, 0.58-0.98). Infants given L reuteri DSM 17938 showed a significant reduction in daily crying and fussing times at the end of treatment period compared with those receiving placebo (P = .045). On day 21, a significantly higher proportion of infants in the L reuteri DSM 17938 group responded to treatment with a ≥50% crying time reduction compared with infants given placebo (P = .035; relative risk, 3.3; 95% CI, 1.55-7.03). **Conclusion:** Findings from this study support the beneficial effects of administering L reuteri DSM 17938 to treat infantile colic in breastfed Canadian infants with colic, as was previously reported in other geographical regions.		B

Kianifar, H., Ahanchian, H., Grover, Z., Jafari, S., Noorbakhsh,Z., Khakshour, A., ... & Kiani, M. Synbiotic in the management of infantile colic: A randomised controlled trial. Journal of Paediatrics and Child Health 2014;50(10):801-805. Abstract available from: https://www.ncbi.nlm.nih.gov/pubmed/24962875	**Subjects:** Infants **Design:** Double blind, placebo controlled randomised trial **Methods:** Fifty breastfed infants aged 15–120 days with infantile colic randomly assigned to receive either the synbiotic sachet containing 1 billion CFU of: *Lactobacillus casei*, *L. rhamnosus*, *Streptococcus thermophilus*, *Bifidobacterium breve*, *L. acidophilus*, *B. infantis*, *L. bulgaricus* and fructooligosaccharide, or placebo daily for 30 days. Parents were asked to record details of crying times in a symptoms diary. The primary outcome measure was the treatment success (reduction in the daily crying time >50%) and the secondary outcome measure was symptom resolution (reduction in the daily crying time >90%).	The treatment success was significantly higher in synbiotic group (82.6%) compared with placebo (35.7%) at day 7 ($P < 0.005$). At day 30, treatment success was 87% and 46% in synbiotic and placebo group, respectively ($P < 0.01$). Symptom resolution was also higher in synbiotic group (39%) compared with placebo (7%) at day 7 ($P < 0.03$) but not at day 30 (56% vs.36%, $P = 0.24$). **Conclusion:** A synbiotic containing a mixture of seven probiotic strains plus fructooligosaccharide may reduce infantile colic symptoms.		B

Iacovou M, Ralston RA, Muir J, Walter KZ, Truby Z. **Dietary management of infantile colic: a systematic review.** Matern Child Health J. 2012;16:1319–1331. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/21710185	**Subjects:** mothers and infants **Design:** systematic review **Methods:** Performed searches in MEDLINE, CINAHL, AMED, Scopus, NUTRITIONnetBASE, Cochrane Library) to retrieve studies examining whether dietary change provides an effective therapy for infantile colic. Randomized and non-randomized studies were included in the analysis.	The authors included 24 studies in the final review: two systematic reviews, 17 RCTs with 15–158 subjects, four studies with 6–115 subjects (three non-randomized interventions, and one case–control study), and one cross-sectional study. These studies examined the following dietary interventions: hypoallergenic maternal diet, partially hydrolyzed infant formula, extensively hydrolyzed infant formula, completely hydrolyzed infant formula, soy-based infant formula, fiber-enriched infant formula and carbohydrate alteration. Results suggest that in breastfed infants, a hypoallergenic maternal diet may improve symptoms of colic, while changing to a hydrolyzed protein formula may reduce colic in formula-fed infants. Other modifications either had poor, too little or conflicting evidence to support a recommendation. **Recommendations:** 1) Seek expert nutritional guidance as very restricted maternal diets have the potential to be nutritionally inadequate. 2) The use of hydrolyzed milk formula and the use of a hypoallergenic diet for the mother have cost implications that could be problematic for low-income families. 3) Support and reassurance is emphasized as this is a self-limiting condition that infants tend to grow out of by 3–4 months of age.	I B	2B 1B
JN Critch; Canadian Paediatric Society, Nutrition and Gastroenterology Committee. **Infantile colic: Is there a role for dietary interventions?** Paediatr Child Health 2011;16(1):47-49. Available from: http://www.cps.ca/documents/position/infantile-colic-dietary-interventions	**Subjects:** infants **Design:** practice point **Methods:** Updated the previous Canadian Paediatric Society practice point concerning the role of dietary modifications for infantile colic.	Regarding dietary interventions for the management of infantile colic, the authors conclude that the evidence is often conflicting and many of the studies were unblinded, suffered from small sample sizes and had inadequate outcome measures. Further, they emphasize that it is important to avoid making nutritional interventions in the vast majority of infants with colic. Certain modifications may (or may not) offer benefits: 1) maternal consumption of a hypoallergenic diet may reduce colic in the minority of infants who display symptoms of infantile colic secondary to cow's milk protein allergy, 2) extensively (not partially) hydrolyzed protein formulas may reduce colic in a small number of bottle-fed infants, 3) the therapeutic use of soy formulas in colic is not recommended because soy protein is a	II-2 C	2C

		frequent allergen in infancy, and 4) there is insufficient evidence to recommend the use of lactase or pro-prebiotics. **Conclusion:** Overall, certain dietary modifications may (or may not) offer benefits for the management of infantile colic.		

3.6.2 PROBIOTICS

Probiotics References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Hempel S, Newberry SJ, Maher AR, et al. **Probiotics for the prevention and treatment of antibiotic-associated diarrhea. A systematic review and meta-analysis.** JAMA. 2012;307(18):1959-1969. Abstract available from: PubMed	**Subjects:** All ages **Design:** Systematic review and meta-analysis **Methods:** The objective of this review was to evaluate the evidence for probiotic use in the prevention and treatment of antibiotic-associated diarrhea (AAD). The authors performed a systematic search in 12 relevant electronic databases up to February 2012. RCTs for the prevention or treatment of AAD were included.	The majority of 82 included trials used Lactobacillus-based interventions alone or in combination with other. Strains were poorly documented. Overall, using probiotics as adjunct therapy reduces the risk of AAD, with an RR of 0.58 (95% CI, 0.50 to 0.68; P < .001; I^2, 54%). The result was consistent across a number of subgroup and sensitivity analyses. The treatment effect equates to a Number Needed to Treat (NNT) of 13. The main limitations to this result are residual unexplained heterogeneity, poor documentation of the probiotic strains, and lack of assessment of probiotic-specific adverse events. **Conclusion:** Adjunct probiotic administration is associated with a reduced risk of AAD.	I B	A
Canadian Paediatric Society. **Using probiotics in the paediatric population.** Paediatrics & Child Health. 2012;17(10):575. Canadian Paediatric Society	**Subjects:** Infants, children, and adolescents **Design:** Position statement Statement compiled by the CPS Nutrition and Gastroenterology Committee. The statement examines the evidence supporting the use of different probiotics to treat common paediatric conditions, such as diarrhoea, atopy, functional	Based on their review of the literature, the committee concludes that there are benefits to using probiotics for treating some diseases, such as antibiotic-associated diarrhoea and acute infectious viral diarrhoea, and to help prevent necrotizing enterocolitis. There is insufficient evidence to support the use of probiotics to treat or prevent IBD, colic, and atopic diseases. Authors also advise that caution should be exercised in giving probiotics to patients with an immunodeficiency, that the efficacy of probiotics is both strain- and disease-specific, and that any probiotic must be provided in adequate amount.	I A	2B

	intestinal disorders and necrotizing enterocolitis. Authors conducted a literature review in English and French using Medline, the Cochrane database and relevant websites.	**Recommendation:** Probiotics may help prevent antibiotic-associated diarrhea and necrotizing enterocolitis in preterm infants who are at risk of necrotizing enterocolitis.		
Johnston BC, Goldenberg JZ, Vandvik PO, Sun X, Guyatt GH. **Probiotics for the prevention of pediatric antibiotic-associated diarrhea.** Cochrane Database of Systematic Reviews. 2011;(11). The Cochrane Library	**Subjects:** Children (0 to 18 years) receiving antibiotics **Design:** Systematic review **Methods**: The authors performed a comprehensive search using MEDLINE, EMBASE, CENTRAL, CINAHL, AMED, the Web of Science and more to identify randomized controlled trials that compare probiotics to placebo, active alternative prophylaxis, or no treatment and measure the incidence of diarrhoea secondary to antibiotic use (AAD).	The authors looked primarily at the incidence of diarrhoea and the number and type of adverse events. Secondary outcomes included mean duration of diarrhoea and mean stool frequency. Sixteen studies (N= 3,432) met the inclusion criteria, eight of which had a low risk of bias (versus high). For the incidence of diarrhoea, the relative risk calculated was of the magnitude of 0.4 (95% CI, 0.29-0.55) based on 7 studies (N=1,474) with an overall low risk of bias. The mean duration of diarrhoea in the intervention group was 0.6 days lower (95% CI, 1.18 to 0.02 lower). There was heterogeneity in probiotic strain, dose, and duration, as well as in study quality. Nevertheless, the overall evidence provided by this systematic review suggests that probiotics, and possibly high-dose probiotics, have a protective effect in preventing AAD. **Conclusion:** Probiotics have a protective effect in preventing antibiotic-associated diarrhea.	I A	1A

3.6.3 REDUCING BOTTLE USE IN TODDLERS

Reducing Bottle Use in Toddlers Recommendations	Strength of Recommendation
1. Counsel on weaning of bottle use at 9 month-visit. **2.** Promote open cup instead of bottle at the 12-13 and 15 month visits.	Consensus Consensus

Reducing Bottle Use in Toddlers References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/index-eng.php	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	Encouraging use of an open cup for older infants can help avoid prolonged bottle-feeding. Use of bottles among young children has been associated with the consumption of excess calories and may contribute to the risk of obesity and caries in childhood.		C
Maguire JL, Birken CS, Jacobson S, Peer M, Taylor C, Khambalia A, Mekky M, Thorpe KE, Parkin P. **Office-Based Intervention to Reduce Bottle Use Among Toddlers: TARGet Kids! Pragmatic, Randomized Trial.** Pediatrics. 2010; 126: e343-e350. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/20624802	**Subjects:** 9 month old infants **Design:** RCT **Methods:** Parents of 9 month old infants were randomized (through a computerized, random number generator) to intervention or control group. The intervention included parents following a 1-week protocol to wean their babies from the bottle. Control group received a placebo counselling session. Allocation concealment was done using sequentially numbered, opaque, sealed	Out of 251 randomized infants, 201 completed follow-up at 2 years old. All parents were counselled on healthy nutrition and told to limit fruit juice intake. Only parents in the intervention group were told to limit the amount of milk consumption per day as part of the weaning process. Rates of iron depletion and milk consumption were not statistically significant between the two groups. Intervention group infants started using a cup 3 months earlier and were weaned from the bottle 4 months earlier compared to control group. Overall, there was a 60% reduction in prolonged bottle use. This study recommends weaning counselling at 9 months because it is easier for the child to give up the bottle earlier in life. Also, there is time at the 9 month visit to spend time on anticipatory guidance because there are no vaccines given at this time.	I	

	envelopes and all 71 paediatricians and study personnel were blinded. Outcome measures were reduced bottle use and iron depletion at 2 years old.			

3.6.4 AVOID JUICES/SWEETENED LIQUIDS/FOODS WITH HIGH SUGAR OR DIETARY SODIUM CONTENT

Avoid Juices/ Sweetened Liquids/Foods with high sugar or dietary sodium content Recommendation	Strength of Recommendation
1. Avoid all sweetened fruit drinks, sport-drinks, energy drinks and soft-drinks; restrict fruit juice consumption to a maximum of 1/2 cup (125 mL) per day.	**Good**
2. Limit the consumption of prepared food and beverage products that are high in sugar content	**Good**
3. Limit/avoid consuming highly processed foods that are high in dietary sodium.	Consensus

Avoid Juices/ Sweetened Liquids/Foods with high sugar or dietary sodium content References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Health Canada, Canadian Paediatric Society, Dietitians of Canada and Breastfeeding Committee for Canada. **Nutrition for healthy term infants - recommendations from 6 to 24 months.** 2014. Available from: http://www.hc-sc.gc.ca/fn-an/nutrition/infant-nourisson/index-eng.php	**Subjects:** 6 to 24 months **Design:** Nutrition guidelines **Methods:** A joint statement of Health Canada, Canadian Paediatric Society, Dieticians of Canada, and Breastfeeding Committee for Canada.	Fruit juice lacks the fibre of whole fruit. Recommend offering water frequently. Juice should be offered much less frequently if at all. Offerings should be limited to no more than one or two times per day. Approximate daily amount could be 125-175 mL/day.		
Danyliw AD[1], Vatanparast H, Nikpartow N, Whiting SJ. **Beverage patterns among Canadian children and relationship to overweight and obesity.** Appl Physiol Nutr Metab. 2012 Oct;37(5):900-6. Available	**Subjects:** children and adolescents aged 2 to 18 years **Design:** Cross-sectional study (*n* = 10,038) **Methods:** Using data from the Canadian Community Health Survey 2.2, the	Clustering resulted in distinct groups of who drank mostly fruit drinks, soft drinks, 100% juice, milk, high-fat milk, or low-volume and varied beverages (termed "moderate"). Boys aged 6-11 years whose beverage pattern was characterized by soft drink intake (553 ± 29 g) had increased odds of overweight-obesity (odds ratio 2.3, 95% confidence interval 1.2-4.1) compared with a "moderate" beverage pattern (23 ± 4 g soft drink). No significant relationship emerged between beverage pattern and overweight and obesity	III	C

from: PubMed	authors used cluster analysis to identify beverage intake patterns, and logistic regression to determine the association between overweight and obesity and beverage intake patterns, adjusting for potential confounders.	among other age-sex groups. **Conclusion:** Using national cross-sectional dietary intake data, Canadian children do not show a beverage-weight association except among young boys who drink mostly soft drinks, and thus may be at increased riskfor overweight or obesity.		

O'Connor TM[1], Yang SJ, Nicklas TA. **Beverage intake among preschool children and its effect on weight status.** Pediatrics. 2006 Oct;118(4):e1010-8. Available from: Pediatrics	**Subjects:** Children aged 2 to 5 years **Design:** National Health and Nutrition Examination Survey 1999-2002 (*n* = 1,552) **Methods:** Descriptive statistics and group comparisons of beverage intake and overweight classification.	After removal of subjects with missing data, a total of 1160 children were analyzed, 579 (49.9%) were male. White children represented 35%, black children represented 28.3%, and Hispanic children represented 36.7% of the sample. Twenty-four percent of the children were overweight or at risk for overweight (BMI ≥85%), and 10.7% were overweight (BMI ≥95%). Eighty-three percent of children drank milk, 48% drank 100% fruit juice, 44% drank fruit drink, and 39% drank soda. Whole milk was consumed by 46.5% of the children, and 3.1% and 5.5% of the children consumed skim milk and 1% milk, respectively. Preschool children consumed a mean total beverage volume of 26.93 oz/day, which included 12.32 oz of milk, 4.70 oz of 100% fruit juice, 4.98 oz of fruit drinks, and 3.25 oz of soda. Weight status of the child had no association with the amount of total beverages, milk, 100% fruit juice, fruit drink, or soda consumed. There was no clinically significant association between the types of milk (percentage of fat) consumed and weight status. **Conclusion:** Increased beverage consumption was associated with an increase in the total energy intake of the children but not with their BMI.	III	C

Manjula Gowrishankar, Becky Blair, Michael J. Rieder, Canadian Paediatric Society, Nutrition and Gastroenterology Committee, Drug Therapy and Hazardous Substances Committee. **Dietary intake of sodium by children: Why it matters.** Paediatr Child Health 2020 25(1):47–53. https://www.cps.ca/en/documents/position/dietary-intake-of-sodium-by-children		Abstract: Dietary sodium is required in very small amounts to support circulating blood volume and blood pressure (BP). Available nutritional surveillance data suggest that most Canadian children consume sodium in excess of their dietary requirements. Approximately 80% of the sodium Canadians consume comes from processed and packaged foods. High sodium intakes in children may be an indicator of poor diet quality. Results from systematic reviews and meta-analyses have demonstrated that decreasing dietary sodium in children leads to small but clinically insignificant decreases in BP. However, population-level strategies to reduce sodium consumption, such as food product reformulation, modifying food procurement processes, and federal healthy eating policies, are important public health initiatives that can produce meaningful reductions in sodium consumption and help to prevent chronic disease in adulthood.		

3.6.5 VEGETARIAN DIETS

Vegetarian Diets Recommendations	Strength of Recommendation
1. Inquire about vegetarian diets.	Consensus

Vegetarian Diets References
1. Vegetarian diets in children and adolescents (CPS)

Vegetarian Diets References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Community Paediatrics Committee, Canadian Pediatric Society. **Vegetarian diets in children and adolescents.** Paediatrics & Child Health. 2010; 15(3), 303-14. Available from: http://www.cps.ca/english/statements/CP/cp10-02.htm Reaffirmed Feb 2018	**Subjects:** Children and adolescents **Design:** Review **Methods:** Statement compiled by the CPS Community Paediatrics Committee. Searched PubMed (1980 to 2008).	The committee concludes that a well-balanced vegetarian diet ensuring adequate amounts of specific nutrients can support growth and development at all stages (fetus to adolescent). The recommendations highlight the particular nutrients to monitor in children following various vegetarian diets (eg. vegans, lacto-ovo-vegetarians). Guides and tools are referenced for healthcare professionals and families/children.	II B	

3.6.6 FISH CONSUMPTION

Fish Consumption Recommendations	Strength of Recommendation
1. Fish consumption: 2 servings/week of low mercury fish	Consensus Consensus

Fish Consumption Resources
1. Fish consumption and mercury (HC)

Fish Consumption References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Magnusson, J., Kull, I., Rosenlund, H., Håkansson, N., Wolk, A., Melén, E., ... & Bergström, A. Fish consumption in infancy and development of allergic disease up to age 12 y. The American Journal of Clinical Nutrition 2013;97(6):1324-1330. Available from: AJCN.	**Subjects:** Infants **Design:** Longitudinal study based on the population-based, prospective birth cohort BAMSE **Methods:** A total of 3285 children from a prospective Swedish birth cohort were included. At 1, 2, 4, 8, and 12 y, parental questionnaires were used to obtain information on lifestyle factors, environmental exposures, and symptoms of allergic disease. The frequency of fish intake in infancy was assessed in the 1-y questionnaire. Serum immunoglobulin (Ig) E concentrations associated with common allergens were obtained at age 8 y.	Generalized estimating equations and multivariate logistic regression were used to examine associations between fish consumption in infancy and prevalent and incident allergic disease at ages 1–12 y, including sensitization and IgE-associated disease at age 8 y. At 1 y of age, 80% of the children consumed fish regularly (ie, ≥2 times/mo). From 1 to 12 y of age, regular fish consumption in infancy reduced overall risks of prevalent and incident allergic disease [adjusted OR (95% CI) after restriction to children without early symptoms of allergic disease was 0.74 (0.60, 0.90) (P = 0.003) for prevalent rhinitis and 0.78 (0.63, 0.97) (P = 0.028) for prevalent eczema. **Conclusion:** Regular fish consumption early in life may reduce overall risk of allergic disease up to 12 y of age, particularly risks of rhinitis and eczema.		B

Wine O, Osornio-Vargas AR, Buka IS**. Fish consumption by children in Canada: Review of evidence, challenges and future goals.** Paediatr Child Health. 2012;17(5):241-245. Available from: Pulsus	**Subjects:** focus on children **Design:** narrative review **Methods:** The authors performed comprehensive searches in The Cochrane Library and PubMed to identify recent publications (2003-2011) from the US and Canada on the health benefits and health risks associated with fish consumption. This review also presents Health Canada's fish consumption advice for children and discusses public health challenges of communicating certain recommendations.	The authors weighed the risk and benefits of fish consumption in children to inform the best practices for children's health. **Recommendation:** -Health Canada recommends children consume 2 portions weekly (75g each) -Salmon, farmed trout, sardines, mackerel (Atlantic), anchovies oysters and herrings are excellent sources of omega-3 PUFAs -For canned tuna, there are no limitations on light tuna, eat Albacore (white tuna) moderately, and limit weekly servings for children <4 years to one (75g = ½ small can) and children between 5 and 11 years to two (125g = 1 small can) -Limit consumption of swordfish, fresh/frozen tuna, orange roughy, shark, marlin and escolar once a month -Consult local advisories before consuming catch	III I	2C
Health Canada Advisories: **Human Health Risk Assessment of Mercury in Fish and Health Benefits of Fish Consumption** available from: http://www.hc-sc.gc.ca/fn-an/pubs/mercur/merc_fish_poisson-eng.php **Mercury** available from: http://www.hc-sc.gc.ca/fn-	Target audience: All Canadians Design: Government Advisory/Statement	Health Canada's standards for mercury in fish, the most stringent and protective in the world, have been revised and strengthened. The standards now include fish previously excluded from Health Canada's standard (fresh and frozen tuna, shark, swordfish, escolar, marlin and orange roughy) and are subject to Canada's 1.0 parts per million mercury limit. **Recommendations:** - general population: 150 g/week of these fish species combined; - women who are or may become pregnant and breastfeeding mothers: up to 150 g/month; - children between 5 and 11 years of age: up to 125 g/month; - children between 1 and 4 years of age: no more than 75 g/month.	III	

an/securit/chem-chim/environ/mercur/index-eng.php **Health Canada's revised assessment of mercury in fish enhances protection while reflecting advice in Canada's Food Guide** available from**:** http://www.healthycanadians.gc.ca/recall-alert-rappel-avis/hc-sc/2007/13194a-eng.php		Health Canada still advises on the importance and nutritional benefits of fish consumption.		
Kris-Etherton PM, Innis S, American Dietetic Association, Dietitians of Canada. **Position of the American Dietetic Association and Dietitians of Canada -dietary fatty acids.** J Am Diet Assoc. 2007 Sep;107(9):1599-611. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/17936958	**Subjects:** Healthy adults and children **Design:** Position statement **Methods:** This paper evaluates the evidence of benefits and adverse effects (or lack thereof) of dietary fatty acids to issue dietary recommendations for total fat, SFA, TFA, monounsaturated fatty acids (MUFA), and n-6 and n-3 PUFA for healthy individuals.	The American Dietetic Association (ADA)/Dietitians of Canada (DC)'s position paper on dietary fatty acids is consistent with other expert recommendations that omega-3 fats from fish are an important part of a healthy diet. Fish and seafood, particularly fatty fish such as mackerel, herring, salmon, tuna, and trout, as well as oysters, are the richest dietary sources of the n-3 longer carbon chain PUFA, EPA, and DHA. **Recommendations:** ADA and DC recommend a food-based approach for achieving these fatty acid recommendations; that is, a dietary pattern high in fruits and vegetables, whole grains, legumes, nuts and seeds, lean protein (i.e., lean meats, poultry, and low-fat dairy products), fish (especially fatty fish high in n-3 fatty acids), and use of nonhydrogenated margarines and oils.		

4.0 EDUCATION AND ADVICE

4.1 INJURY PREVENTION

Injury Prevention Recommendations	Strength of Recommendation
1. In Canada, unintentional injuries are the leading cause of death in children and youth. Most of these preventable injuries are caused by motor vehicle collisions, suffocation, drowning, fire, poisoning, and falls. Injury deaths in Canada (PHAC). Unexplained injuries (e.g. fractures, bruising, burns) or injuries that do not fit the rationale provided or developmental stage raise concern for child maltreatment.	Consensus

4.1.1 Injury Prevention Resources

Websites	Description
Parachute 2012. Available from Parachute	Parachute is a national, charitable organization dedicated to preventing injury and saving lives. It was created from the amalgamation of four leading Canadian injury prevention groups: Safe Communities Canada, Safe Kids Canada, SMARTRISK and ThinkFirst Canada. This organization aims to become a strategic injury prevention partner for families, communities, the health sector, researchers, governments and business.
Transportation Matrix	This website is part of the American Academy of Pediatrics' (AAP). Transportation Initiative for Children's Health. This tool provides paediatricians and other child health care providers with links to key resources within the AAP with regards to issues related to transportation and beyond. The website is divided into four topical areas: 1) *Injury Prevention* addresses several issues to keep children safe on the road, 2) *Air Quality* addresses important threats to children's health, such as asthma, which can be lessened by reducing vehicle emissions and increasing use of non-motorized transportation, mass transit, and carpooling, 3) *Physical Activity* provides resources for policy, planning, and programs that can encourage use of non-motorized forms of transportation and have significant health benefits, and 4) *Built Environment* addresses the he shape and character of the built environment which have a large and significant effect on children's health.

4.1.2 Injury Prevention (General) References

Reference	Methods	Outcomes	CTFPHC	GRADE

Baker R, Kendrick D, Tata LJ, Orton E. Associaition between maternal depression and anxiety episodes and rates of childhood injuries: a cohort study from England. *Injury Prevention* 2017;**23:**396-402.		Abstract **Background** Maternal depression is common and associated with several child health outcomes. The impact on childhood injuries is underexplored, with existing studies relying on maternal reporting of injury occurrences. Using population healthcare databases from England, we assessed the association between maternal depression and/or anxiety episodes and rates of child poisonings, fractures, burns and serious injuries. **Methods** We conducted a prospective cohort study of 207 048 mother-child pairs with linked primary care and hospitalisation data from the Clinical Practice Research Datalink and Hospital Episode Statistics, 1998–2013. Episodes of maternal depression and/or anxiety were identified using diagnoses, prescriptions and hospitalisations, with the child's follow-up time divided into exposed and unexposed periods. Adjusted IRRs (aIRR) for child injury during maternal mental health episodes were estimated using Poisson regression. **Results** 54 702 children (26.4%) were exposed to maternal depression and/or anxiety when aged 0–4 years. During follow-up, 2614 poisonings, 6088 fractures and 4201 burns occurred. Child poisoning rates increased during episodes of maternal depression (aIRR 1.52, 95% CI 1.31 to 1.76), depression with anxiety (2.30, 1.93 to 2.75) and anxiety alone (1.63, 1.09 to 2.43). Similarly, rates of burns (1.53, 1.29 to 1.81) and fractures (1.24, 1.06 to 1.44) were greatest during depression with anxiety episodes. There was no association between maternal depression and/or anxiety and serious child injuries. **Conclusions** Maternal depression and/or anxiety episodes were associated with increased rates of child poisonings, fractures and burns. While mechanisms are unclear, prompt identification and treatment of maternal depression and/or anxiety and provision of safety advice (eg, safe medication storage) may reduce child injury risk.		
Moller, H., Falster, K., Ivers, R., & Jorm, L. **Inequalities in unintentional injuries between indigenous and**	**Subjects:** Children (0–19 years) and adults (>19 years) **Design:** Systematic review	To date, this is the first systematic review of studies on inequalities in unintentional injuries between indigenous and non-indigenous children. 39 studies were included, including 27 studies specifically focused on children (0–19 years), and 12 studies including		

non-indigenous children: a systematic review. Inj Prev. 2015; 21(e1): e144-152. Abstract available from: Pubmed.	**Methods:** Included studies related to 3 concept areas: children (0–19 years), indigenous status, and unintentional injuries, using 10 databases and institutional websites. Studies were included according to the following criteria: (1) presented findings from primary research; (2) investigated one or more types of unintentional injuries; (3) included children aged 0–19 years; (4) included indigenous children and a comparator group; and (5) presented results as rates or ratios. Methodological quality was assessed using the Liverpool University Quality Assessment Tool (LQAT).	individuals >19 years in the sample and/or providing less detailed results for 0–19-year-olds or smaller subgroups within this age range. Results indicate that indigenous children experience a significantly higher burden of morbidity and mortality from unintentional injuries than non-indigenous children. The leading causes of inequalities are burns, poisoning and transport injuries. Studies that differentiated by age group showed that inequalities are greatest in the younger age groups, in particular for transport injuries. Additionally, mortality rates due to suffocation are higher in indigenous children compared with non-indigenous children, and cutting and piercing injuries result in higher hospitalization rates. Substantial variation in mortality rate ratios are also observed for drowning, the highest mortality difference of 10.1 being reported in a Canadian study. However, most studies show a lower risk or no significant difference in rates of hospitalization and mortality due to falls in indigenous compared with non-indigenous children. Underlying risk factors such as socioeconomic status and maternal education seem to contribute somewhat to the differences observed between indigenous and non-indigenous children.		
Theurer, W. M., & Bhavsar, A. K. **Prevention of unintentional childhood injury**. Am Fam Physician. 2013; 87(7): 502-509.	**Subjects:** Children and adolescents **Design:** Review **Methods:** This article provides clinical recommendations for preventing injuries from motor vehicle crashes (MVCs), suffocation, drowning, poisoning, fires, falls, and bicycling. A	This article provides strategies for preventing unintentional childhood injuries in various age groups, including infants, toddlers, and older children, for different types of injuries, such as MVCs, suffocation, drowning, poisoning, fires, falls and bicycling. Additionally, the authors provide an algorithm for the use of child safety seats. Listed below are some key clinical recommendations for practice: – Advise parents to reduce the risk of child death or injury by ensuring that crib sheets fit tightly, using only approved and properly assembled cribs, and removing cords and other objects that could cause entrapment or strangulation		C A C

	PubMed and Cochrane database search for articles on injury prevention in infants, children and adolescents was conducted in 2011. The search included meta-analyses, randomized controlled trials, guidelines, case studies, policy papers, and reports from the Agency for Healthcare Research and Quality evidence, U.S. Preventive Services Task Force, and Bandolier. Policy statements from the American Academy of Pediatrics were also reviewed.	– Fencing that isolates a pool from the rest of the yard and surrounding area more effectively prevents childhood drownings than other types of fencing – Counsel caregivers to contact poison control or emergency services immediately after a potential child poisoning – Encourage parents to maintain functional smoke detectors and to educate children about what to do in the event of a fire – Counsel children and family members about the importance of consistent helmet use when bicycling – Education using child-directed, school-based programs is effective in improving the appropriate use of child safety seats Although direct counseling by physicians appears to improve some parental safety behaviors, its effect on reducing childhood injuries is uncertain. Nevetheless, family physicians are ideally positioned to provide focused safety counseling to individuals and families. They can also be active advocates for childhood safety in their communities.		C C C
Batra, E. K., Midgett, J. D., & Moon, R. Y. **Hazards Associated with Sitting and Carrying Devices for Children Two Years and Younger.** J Pediatr. 2015; 167(1): 183-187. doi:10.1016/j.jpeds.2015.03.044	**Subjects:** Children ≤2 years old **Design:** Retrospective review **Methods:** Retrospective review of deaths involving sitting and carrying devices (car seats, bouncers, swings, strollers, and slings) reported to the US Consumer Product Safety Commission between 2004 and 2008. Results were used to develop anticipatory guidance for counseling parents regarding the use of such products.	Sitting and carrying devices (car seats bouncers, swings, strollers, and slings) are used as sleeping devices by many parents of children ≤2 years of age. This retrospective study analyzed reported mechanisms of injury and characterized risk factors for children ≤2 years of age who died in sitting and carrying devices. Of the 47 deaths analyzed, 31 occurred in car seats, 5 in slings, 4 each in swings and bouncers, and 3 in strollers. The cause of death was asphyxiation in all cases except one. 52% of deaths in car seats were attributed to strangulation from straps, and the others were attributed to positional asphyxia. **Recommendations** for use of sitting and carrying devices: • Children ≤2 years of age should be properly restrained and not be left unsupervised in sitting and carrying devices. • Car seats should not be used as sleeping devices outside of the vehicle.		C

		• Children should never be in a car seat with unbuckled or partially buckled straps. • Infants in slings should have their faces visible and above the edge of the sling, should not have their faces covered by fabric, and their chins should not be compressed into their chests.		
Keim SA, Fletcher EN, TePoel MRW, McKenzie LB. **Injuries Associated With Bottles, Pacifiers, and Sippy Cups in the United States, 1991–2010.** Pediatrics. 2012;129;1104; originally published online May 14, 2012. Abstract available from: Pediatrics	**Subjects:** Children < 3 years treated in emergency departments for an injury associated with a bottle, pacifier, or sippy cup **Design:** Retrospective cohort (1991-2010) **Methods:** The authors of this study aimed to investigate the range of injuries requiring emergency department visits associated with bottles, pacifiers, and sippy cups among children.	This study based on a nationally representative sample (US) revealed that on average 2,270 cases of injuries related to the use of bottles, pacifiers, and sippy cups occurred every year between 1991-2010. The majority of injuries involved 1-year-old children (66.4%) and boys (61.2%). Most injuries (95.9%) occurred at home, and most children (98.8%) were not hospitalized. The most common mechanism was a fall while using the product (86.1% of injuries). **Conclusion:** Children who are just learning to walk and run are at the highest risk of these injuries and that close adherence to current AAP recommendations regarding age-appropriate use of these products may help prevent injuries.	III	
Natalie L Yanchar, Lynne J Warda, Pamela Fuselli; Canadian Paediatric Society, Injury Prevention. **Child and youth injury prevention: A public health approach.** Paediatr Child Health. 2012. 17(9): 511. Available from: Canadian Paediatric Society	**Subjects:** children and youth **Design:** position statement **Methods**: This position statement describes the burden and pattern of unintentional injuries of children in Canada, as well as the principles of effective intervention for prevention.	This statement is a background document for health professionals, health policy-makers and researchers designed to educate about unintentional injuries in children and orient efforts in injury prevention. This position statement also recommends actions and resources for health professionals and practitioners. **Recommendations:** 1) Health practitioners should include injury prevention in their practices (eg, supporting car seat and home safety knowledge). 2) Health practitioners should advocate for local and regional injury prevention policies and actions.	III I A	1C 1C

Bond GR, Woodward RW, Ho M. **The growing impact of pediatric pharmaceutical poisoning.** J Pediatr. 2012 Feb;160(2):265-270.e1. Abstract available from: PubMed	**Subjects:** Children aged ≤ 5 years **Design:** Retrospective cohort **Methods:** Patient records from 2001-2008 obtained from the National Poison Data System of the American Association of Poison Control Centers for children evaluated in a health care facility following exposure to a potentially toxic dose of a pharmaceutical agent. . Pharmaceutical agents were classified as OTC or prescription. Exposures were classified as child self-ingested the medication or as therapeutic error.	A total of 453 559 children were evaluated for ingestion of a single pharmaceutical product. Child self-exposure was responsible for 95% of visits. Child self-exposure to prescription products dominated the health care impact with 248,023 of the visits (55%), 41,847 admissions (76%), and 18,191 significant injuries (71%). The greatest resource use and morbidity followed self-ingestion of prescription products, particularly opioids, sedative-hypnotics, and cardiovascular agents. These results confirm that numbers of children aged 5 years or less visiting EDs after medication exposure is increasing. The largest part of that burden (admissions, morbidity, and mortality) results from children finding and ingesting medication by themselves. **Conclusion:** The problem of paediatric medication poisoning is getting worse. **Recommendation:** 1) Education interventions should readdress home storage of all medications, repackaging of medications, particularly grandparents' medications in 'pill minders,' and the fact that older siblings may not be as careful as parents when opening containers or taking medications. 2) Storage devices and child-resistant closures may need to improve.	II-3 B	1B
P Fuselli; NL Yanchar; Canadian Paediatric Society, Injury Prevention. **Preventing playground injuries.** Paediatr Child Health. 2012;17(6):328. Available from: Canadian Paediatric Society	**Subjects:** Children **Design:** Position statement **Methods:** This position statement reviews the risks associated with playgrounds and the strategies for safer play. This position statement replaces the one published in 2002.	This position statement reports that playground injuries are common, and especially in children aged 5 to 9 years. Because a significant proportion of injuries involve backyard equipment, the prevention strategies suggested in this statement mainly consist of improving playground design, especially to equipment height and surfacing. **Recommendation:** Health care providers should offer anticipatory guidance about playground injuries and what parents can do to reduce children's risk.	III I	1C
Anna Banerji; Canadian Paediatric Society, First Nations, Inuit and Métis	**Subjects:** Indigenous children and youth **Design:** Position statement	For Indigenous children and youth, injuries occur at rates three to four times the national average. Reasons for this discrepancy include lower incomes, less education, higher unemployment,	III I	1C

Health Committee. **Preventing unintentional injuries in Indigenous children and youth in Canada.** Paediatr Child Health. 2012;17(7):393. Reaffirmed: Jan 30 2015. Available from: Canadian Paediatric Society	**Methods:** This statement presents the current available evidence on unintentional injuries in Canadian Indigenous children.	unsafe and substandard housing, and local shortages of health care personnel and resources. This contrasts with the lack of statistics, ongoing surveillance or injury prevention programs in this population. This statement presents common causes of unintentional injuries or deaths due to injuries (fires, motor vehicles collision, drowning, falls, etc.) as well as injury prevention strategies. The CPS makes recommendations regarding surveillance, education and advocacy. These are intended primarily for policy-makers but can be useful to health providers caring for Indigenous children. **Recommendation:** Provide a culturally and multidisciplinary framework for injury prevention strategies.		
Kendrick D, Young B,Mason-Jones AJ, Ilyas N, Achana FA, Cooper NJ, Hubbard SJ, Sutton AJ, Smith S, Wynn P, Mulvaney C, Watson MC, Coupland C. **Home safety education and provision of safety equipment for injury prevention.** Cochrane Database of Systematic Reviews. 2012; 9. Abstract available from: The Cochrane Library	**Subjects:** 19 years and under **Design:** Systematic review **Methods:** The authors searched all relevant electronic databases (MEDLINE, EMBASE, PsychInfo, CINHAL) for randomized controlled trials and controlled before and after studies evaluating the effects home safety education with or without the provision of safety equipment.	Authors included studies where home safety interventions where provided to children or families to reduce home injuries or increase home safety practices or use of home safety equipment. Most of the studies included in the meta-analysis were based on one-to-one, face-to-face education delivered either at home or in a clinical setting. The outcomes of interest were injury rates, safety practices and possession and use of home safety equipment. Authors found that some evidence of a favourable effect of such interventions mainly on safety practices (safe hot tap water temperatures, functional smoke alarms, a fire escape plan, storing medicines and cleaning products out of reach, having syrup of ipecac or poison control centre numbers accessible, having fitted stair gates, and having socket covers on unused sockets. **Conclusion:** Child health and social care providers should offer home safety interventions, which may include education and access to free, low cost or discounted safety equipment, as part of their child health and wellbeing programmes.	I, II-2 A	1B
Morrongiello BA, Zdzieborski D, Sandomierski M, Munroe K. **Results of a**	**Subjects:** Parents and children	Intervention (n = 96) and Control (n = 90) groups were approximately equal with respect to child sex and age. Comparisons of post- with pre-intervention diary reported home supervision	I A	1A

randomized controlled trial assessing the efficacy of the Supervising for Home Safety program: Impact on mothers' supervision practices. Accid Anal Prev. 2013 Jan;50:587-95. Abstract available from: PubMed	**Design**: Randomized controlled trial **Methods:** Parent volunteers were recruited from the community and randomly assigned to either an Intervention or Control group. The intervention group consisted of the 4 week *Supervising for Home Safety* intervention program. Parents and children aged 2-5 years were unobtrusively observed in a naturalistic laboratory setting and used a participant-event monitoring procedure to complete supervision recording sheets weekly both before and after exposure to the intervention program. Control parents completed the same measures but received a program focusing on child nutrition and active lifestyles. Unobtrusive video recordings of parent supervision of their child in a room containing contrived hazards also were taken pre- and post-intervention.	practices revealed a significant decrease in time that children were unsupervised, an increase in in-view supervision, and an increase in level of supervision when children were out of view, with all changes found only for the Intervention group. Similarly, only parents in the Intervention group showed a significant increase in attention to the child in the contrived hazards context, with these differences evident immediately after and 3 months after exposure to the intervention. These results provide the first evidence that an intervention program can positively impact caregiver supervision. **Recommendation:** Programs to educate home safety supervision appear to have significant benefits and should be encouraged/advocated by health practitioners if they are available.		
Gardner HG and the Committee on Injury, Violence, and Poison Prevention. **Office-based**	**Subjects:** 0 to 18 years old **Design:** Clinical report **Methods:** Reviews topics for office-based counselling.	This clinical report gives recommendations for physicians to advise parents and children about unintentional injury risk and prevention, which are consistent with AAP and CPS policy statements on these topics. Separate recommendations are given for different ages (i.e.,		

counselling for unintentional injury prevention. Pediatrics. 2007; 119: 202-206. Abstract available from: PubMed	Topics covered are: traffic safety, burn prevention, fall prevention, choking prevention, drowning prevention, safe sleep environments, CPR, poison control and firearm safety.	infants, preschool-aged children, school-aged children, and adolescents). This is a consensus document put together by experts in the field of injury prevention.		
Kendrick, D., Majsak-Newman, G. Benford, P., Coupland, C. Timblin, C., Hayes, M. Goodenough, T., Hawkins, A. Reading, R. **Poison prevention practices and medically attended poisoning in young children: multicentre case-control study.** Inj Prev. 2017. 23(2); 930-101	**Subjects:** children aged 0–4 years **Design**: multicentre case-control study **Methods:** Multicentre case–control study conducted at hospitals, minor injury units and family practices from four study centres in England between 2010 and 2013. Participants comprised 567 children presenting with unintentional poisoning occurring at home and 2320 community control participants matched on age, sex, date of event and study centre. Parents/caregivers provided data on safety practices, safety equipment use, home hazards and potential confounders by means of self-completion questionnaires. Data were analysed using conditional logistic regression.	**Recommendations:** If our associations are causal, improving prevention practices, particularly storing out of reach and putting poisons away immediately after use could reduce medically attended poisonings in children aged 0–4 years. Poison prevention education can be provided during well-child contacts, when prescribing for families with young children and after poisoning events. Advice should cover cupboard/cabinet lock use and provision of free or low-cost locks for low-income families. Commissioners should ensure child health services include these activities. Increasing effectiveness and durability of cupboard/drawer/ cabinet latches and locks and changes to CRCs, their testing protocols and specifications of products required to be in such containers could also help prevent poisonings. **Conclusion:** We found not storing medicines out of reach, not storing medicines safely (locked away or out of reach) and not putting medicines and household products away immediately after use increased the odds of secondary care attended poisonings in children aged 0–4 years. If our associations are causal, implementing these poison prevention practices could each prevent between 11% and 20% of poisonings**.**		

Green, J. L., Wang, G. S. Reynolds, K. M.,Banner, W. Bond, G. R., Kauffman, R. E. Palmer, R. B., Paul, I. M. Dart, R. C. **Safety Profile of Cough and Cold Medication Use in Pediatrics.** Pediatrics. 2017.139(6) Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28562262	**Subjects:** Children <12 years of age **Methods:** Cases with Adverse Events (AEs) after ingestion of at least 1 CCM ingredient (brompheniramine, chlorpheniramine, dextromethorphan, diphenhydramine, doxylamine, guaifenesin, phenylephrine, and pseudoephedrine) in children <12 years of age were collected from 5 data sources. An expert panel determined relatedness, dose, intent and risk factors.	**Conslusion**: Of the 4202 cases reviewed, 3251 (77.4%) were determined to be at least potentially related to a CCM, with accidental unsupervised ingestions (67.1%) and medication errors (13.0%) the most common exposure types. Liquid (67.3%), pediatric (75.5%), and singleingredient (77.5%) formulations were most commonly involved. AEs occurring in >20% of all cases included tachycardia, somnolence, hallucinations, ataxia, mydriasis, and agitation. Twenty cases (0.6%) resulted in death; most were in children <2 years of age (70.0%) and none involved a therapeutic dose. The overall reported		C
Wynn, P. M., Zou, K., Young, Ben Majsak-Newman, G., Hawkins, A. Kay, B., Mhizha-Murira, J. Kendrick, D. **Prevention of childhood poisoning in the home.** International journal of injury control and safety promotion. 2016. 23(1); 3-28	**Subjects: children aged 0-19 years** **Design:** Systematic Review **Methods:** Search terms for MEDLINE are shown in Table 1, with the strategy adapted as necessary for other databases. Other electronic sources searched are shown in Table 2. The journal 'Injury Prevention' (March 1995-January 2012) and abstracts from 1st-10th World Conferences on Injury Prevention and Control (1989-2010) were hand searched independently by two researchers. Reference lists of included reviews and primary studies were searched for relevant citations. Full-text articles were retrieved regardless of language and translated where necessary. The search terms were	**Conclusion:** There is evidence that non-legislative education and engineering poison prevention interventions improve poison prevention practices, but there is insufficient evidence that they reduce poisonings in childhood. Interventions involving parent education and provision of home safety equipment should be considered alongside broader strategies (e.g. packaging legislation, PCCs) to prevent childhood poisoning. Further research is required to assess the effectiveness and cost-effectiveness of non-legislative interventions including education, the provision of home safety equipment and PCCs to enhance the evidence base in this area.		

	adapted for study design and the same sources were searched from 2001 to January 2012 for primary studies, as we considered the most comprehensive review to date that included poison prevention outcomes was that published by Towner et al. (2001).			
Alfonzo, M. J., Baum, C. R. **Magnetic Foreign Body Ingestions.** Pediatr Emerg Care. 2016. 32(10); 698-702	**Subjects:** **Design:** Review Article **Methods:** This article presents the background and mechanism of injury of magnet ingestion, as well as recommended management and potential complications. We also review current legislation and opportunities for further patient advocacy regarding this polarizing problem.	**Conclusion:** Despite their attraction, high-powered magnets are an avoidable source of potentially life-threatening injury. Parents and caregivers should remove them from the reach of children, and medical providers should maintain a high index of suspicion of their ingestion. Prompt evaluation and likely removal may be life saving and intestine saving. Although the CPSC has made strides in commercial regulation, only time will tell if these regulations can halt the alarming rise in magnetic FBIs among children in the United States**.**		C

4.1.3 MOTORIZED VEHICLE SAFETY

Motorized Vehicle Safety Recommendations	Strength of Recommendation
1. Never leave a child unattended in a vehicle. **2. Those < 13 years should sit in the rear seat, away from all airbags** **3. Car seats: Install and follow size recommendations as per specific car seat model, and keep in each stage as long as possible, until the weight and height limit of the seat is reached: Infant/toddlers in a rear-facing car seat; Children who weigh at least 10 kg in a forward-facing seat with a harness; Children who weigh at least 18 kg in a booster seat. Then use properly fitted lap and shoulder belt in the rear seat for children taller than 145 cm (4' 9") and < 13 years. Replace car seat if in a collision.** **4. Children and youth younger than 16 years of age should not operate an ATV or a snowmobile, including youth models.**	

Motorized Vehicle Safety Resources
1. Transport Canada 2. Child passenger safety (AAP) 3. Preventing ATV injuries (CPS) 4. Snowmobile safety (Caring for Kids CPS)

Motorized Vehicle Safety References

Reference	Methods	Outcomes	CTFPHC	GRADE
Denning, G. M., Harland, K. K., & Jennissen, C. A. **Age-based risk factors for pediatric ATV-related fatalities.** Pediatrics. 2014; 134(6): 1094-1102. Available from: Pediatrics.	**Subjects:** Children <18 years old **Design:** Retrospective study **Methods**: This study determined the major contributors to all-terrain vehicle (ATV)-related	An inverse relationship was observed between pediatric age group and being a passenger victim. Within the <6 years old age group, more than three fourths of victims were passengers. This pediatric age group also had a significantly lower proportion of helmeted riders than other age groups due to the high percentage of passenger victims who were less likely to be helmeted. Although lower than other age groups, almost 40% of children <6 years of age were killed in roadway crashes. These victims were involved in a		B

	deaths among different pediatric age groups using deidentified Consumer Product Safety Commission (CPSC) fatality data from 1985 to 2009. Age categories analyzed were <6, 6-11, 12-15, and 16-17 years of age. Variables included helmet use, operator/passenger, engine size, crash location, and crash mechanism (collision/non-collision). Multivariable logistic regression was used to calculate adjusted odds ratios (aOR) and 95% confidence intervals (95% CI) for categorical variables, after controlling for significant covariables.	much higher percentage of non-collision events. More than 60% of pediatric victims suffered a head injury. Amongst all age groups, the highest proportion of head injuries was among passenger victims. Additionally, higher proportions of victims without helmets suffered head injuries. However, even with a helmet, more than half of all fatalities included injuries to the head. The authors conclude that age-dependent variations in pediatric ATV-related deaths suggest that injury prevention strategies must be targeted to specific age groups. Recommendations proposed include age restriction legislation, targeted adult education regarding the hazards of carrying children on ATVs, engineering changes in seat design, and the passage and/or stronger enforcement of “no passenger” laws.		

Durbin DR. Committee on Injury, Violence, and Poison Prevention. **Child passenger safety.** **P**ediatrics. 2011;127(4):e1050-66. Reaffirmed November 2014. Available from: Pediatrics.	**Subjects:** Children and adolescent **Design:** Policy statement **Methods:** The AAP presents 5 recommendations for best practice to optimize safety in passenger vehicles for children from birth through adolescence. A summary of the evidence supporting the recommendations can be found in the Technical Report.	Authors provide four evidence-based recommendations along with complementary information for best practices in the choice of a child restraint system to optimize safety in passenger vehicles for children from birth through adolescence. A fifth evidence-based recommendation is intended for children younger than 13 years to ride in the rear seats of vehicles. They also provide an algorithm to facilitate the implementation of the recommendations by paediatricians to their patients and families. These recommendations are for the most part similar to the CPS recommendations. **Recommendations:** 1) All infants and toddlers should ride in a rear-facing child safety seat until they are 2 years of age or until they reach the highest weight or height allowed by the manufacturer of their child safety seat. 2) All children 2 years or older, or those younger than 2 years who have outgrown the rear-facing weight or height limit for their child safety seat, should use a forward-facing child safety seat with a harness for as long as possible, up to the highest weight or height allowed by the manufacturer of their child safety seat. 3) All children whose weight or height is above the forward- facing limit for their child safety seat should use a belt-positioning booster seat until the vehicle lap-and- shoulder seat belt fits properly, typically when they have reached 4 feet 9 inches in height and are between 8 and 12 years of age. 4) When children are old enough and large enough to use the vehicle seat belt alone, they should always use lap-and-shoulder seat belts for optimal protection. 5)All children younger than 13 years should be restrained in the rear seats of vehicles for optimal protection.	III-3 A	1C 1C 1C 1C 1C

Recommendations for snowmobile safety. Paediatr Child Health. 2004; 9(9): 639-646. Reaffirmed: Jan 30 2013. Available from: CPS.	**Subjects:** Children and youth **Design:** CPSposition statement **Methods**: Recommendations on snowmobile safety for children <16 years of age, snowmobilers >16 years of age, and manufacturers.	Snowmobiles continue to pose a significant risk to children <15 years of age. Head injuries remain the leading cause of mortality and serious morbidity, arising largely when snowmobilers collide, fall or overturn during operation. Children have also been injured while being towed by snowmobiles in a variety of conveyances. In general, children <8 years of age who are injured or killed on snowmobiles tend to be passengers on snowmobiles or sleds. The CPS recommends that: 1. Recreational operation of snowmobiles is inappropriate for children and younger adolescents. Children <16 years of age should not operate snowmobiles. Furthermore, children <6 years of age do not have the strength or stamina to be transported safely as passengers on snowmobiles. Winter recreational activities for children should be developmentally appropriate, and 2. Advertisements that promote snowmobiling should not be directed to young adolescents. Advertisements should not depict young adolescents driving snowmobiles.		

Truong, W. H., Hill, B. W., & Cole, P. A. **Automobile safety in children: a review of North American evidence and recommendations**. J Am Acad Orthop Surg. 2013; 21(60): 323-331. Abstract available from: Journal of the AAOS.	**Subjects:** Children **Design:** Review **Methods:** Summarizes current recommendations in Canada and US (US National Highway and Traffic Safety Administration, Transport Canada, American Academy of Pediatrics) along with evidence for the use of child safety restraint systems.	When appropriate restraint systems (based on age and weight) are used, a significant decrease occurs in the rates of mortality and serious injury due to motor vehicle crashes (MVC). The epidemiologic data suggests that children up to 2 years old are safer in rear-facing car seats (RFCSs) compared to forward-facing car seats (FFCS), on the basis of which many experts recommend prolonging the use of RFCSs to the maximum manufacturer limits (ie, beyond age 1 year and 20 lb weight). Conversely, FFCS are more effective than seat belts alone in children aged 1-4 years. Studies show that the risk of serious injury and hospitalization is lower in children seated in FFCSs. Studies using motor vehicle crash surveillance data have demonstrated decreased risk in mortality for children 4-8 years of age using booster seats compared with seat belts alone. Although one matched cohort study did not show a significant reduction in mortality, the authors still recommended the use of booster seats because of concern for nonfatal abdominal injuries associated with the use of seat belts alone in this age group. Several studies have also examined the risk of injury related to where the child is seated in the vehicle during an MVC. The rear center seat is consitstently associated with the lowest overall risk of death. Side impact crashes areaa more likely to cause serious injury and fatality, with the greatest risk associated with perimeter seating. Proximity to airbags also increases fatalities in children. Parental compliance with child safety seats is poor, with up to 99% of children in certain age groups improperly restrained. Physician education and active participation in patient education regarding proper use of child safety restraints is vital to optimizing parental understanding of proper recommendations. Table 3 lists several resources on car seat safety for physicians and parents. This review also highlights the need for educational materials that are culturally appropriate to reach ethnic populations.		
American Academy of Pediatrics. **Car Safety Seats: A Guide for Families**. 2013. Available	**Subjects:** Children **Design:** Guidelines for parents	The report gives detailed descriptions of available restraint types for use at various ages, heights and weights. The AAP have similar recommendations as the CPS: rear-facing, forward-facing, booster and then seat belts should be sequentially used.	III A	

from:American Academy of Pediatrics	**Methods**: Recommendations for parents on proper use, installation and type of child restraint for transportation of children in a vehicle.			

Yanchar NL, CPS Injury Prevention Committee. Preventing injuries from all-terrain vehicles. August 2012. Available from CPS.		**Recommendations:** • Children and youth younger than 16 years of age should not operate an ATV. The lack of evidence that youth models reduce the risk of injury means this recommendation must apply to all vehicle sizes, including youth models. For youth operators who are **at least** 16 years of age, as well as adults, the following recommendations are made: • ATV operators should wear a government-certified helmet, eye protection, and protective clothing and footwear at all times. • Operators of ATVs designed for single riders should **never** take on passengers. • ATV drivers should not operate a vehicle after drinking alcohol or when potentially impaired by other substances. • ATV drivers should complete an approved training course. Training should have both theoretical and practical components and include mandatory testing to pass the course. Postcourse evaluations should be instituted to ensure that training courses are producing safer riders. Provinces and territories must harmonize and pass effective off-road vehicle legislation that mandates: • a minimum operator age of at least 16 years, • restricting passengers to the number for which the vehicle was designed, • compulsory helmet use with no exemptions, and • training courses, licensing and registration. In regions where ATVs provide one of the only means of transportation, such as Canada's remote and isolated communities, local education programs that convey their potential dangers to children and youth and that promote safer riding behaviours are essential. Community-based programs should include prohibiting ATV use as a form of recreation by children and youth.		
Bull MJ, Engle WA, and the Committee on Injury, Violence and Poison	**Subjects:** Newborns **Design:** Clinical report	The size of the infant being transported by vehicle is an important consideration. According to this report, any necessary medical equipment should be restrained during travel. Risks while traveling	III A	

Prevention and the Committee on Fetus and Newborn. American Academy of Pediatrics. **Safe transportation of preterm and low birth weight infants at hospital discharge.** Pediatrics. 2009; 123: 1424-1429. Abstract available from: PubMed	**Methods:** Gives guidelines for physicians and other caregivers who counsel parents of preterm and low birth weight infants.	include oxygen desaturation, apnea or bradycardia. They report that families should be taught by trained hospital staff to correctly position the car safety seat. As well, proper positioning of the infant in the seat is important. It is suggested in this report that infants be placed in the car seat while still in the hospital and watched for 90 to 120 minutes to help ensure safe travel.		
Rice TM, Anderson CL. **The effectiveness of child restraint systems for children aged 3 years or younger during motor vehicle collisions: 1996 to 2005.** American Journal of Public Health. 2009; 99: 252-257. Available from: PubMed	**Subjects:** ≤3 years old **Design:** Matched cohort study (N=6,303) **Methods:** Data obtained from the Fatality Analysis Reporting System from 1996 to 2005. Identified crashes involving vehicles carrying a child ≤3 years and in which at least 1 person died from the matched pair.	This cohort study reports that child safety seats are extremely effective in reducing the risk of death during severe traffic accidents and collisions. Restrained children were 67% less likely to suffer a fatal injury than children who were unrestrained. The authors suggest that parents of young children should be encouraged to use child safety seats instead of seat belts.	II-2 A	
Henary B, Sherwood CP, Crandall JR, Kent RW, Vaca FE, Arbogast KB, Bull MJ. **Car safety seats for children: rear facing for best protection.** Injury Prevention. 2007; 13: 398-402. Abstract available from: PubMed	**Subjects:** 0 to 23 months old **Design:** Case-control study (N=870) **Methods:** U.S. National Highway Traffic Administration vehicle crash database for the years 1988-2003 was used to obtain data on children 0 to 23 months who were sitting in a rear-facing car	This case-control study showed that RFCS are more effective than FFCS in restraining children 0 to 23 months old. Infants (<1 year old) were at an even greater risk of injury (5.32 [3.43-8.24]) when analyzed separately. Overall, children who suffered serious injuries were 1.76 (95% CI: 1.40-2.20) times more likely to be riding in a FFCS as compared to children riding in a RFCS.	II-2 A	

	seat (RFCS) or forward-facing car seat (FFCS) and involved in a car crash.			
Winston FK, Durbin DR, Kallan MJ, Moll EK. **The danger of premature graduation to seat belts for young children.** Pediatrics. 2000;105:1179-1183. Abstract available from: PubMed	**Subjects:** 2 to 5 years old **Design:** Case-control study (N=2,077) **Methods:** Data obtained through the Partners for Child Passenger Safety child-focused crash surveillance system and from reported crashes to State Farm Insurance. Driver and parental reports were obtained through phone interviews using a validated survey.	In this study, young children wearing seat belts are more likely to sustain an injury (particularly head injuries) in the event of a car crash than children in child restraint systems (CRS). Very few children 4 to 8 years old were in booster seats (i.e., the appropriate CRS) and were thus not properly restrained. According to this study, the authors report that the use of belt-positioning booster seats is recommended until the child is the appropriate height and weight for seat belt use.	II-2 A	
Berg MD, Cook L, Corneli HM, Vernon DD, Dean JM. **Effect of seating position and restraint use on injuries to children in motor vehicle crashes.** Pediatrics. 2000; 105: 831-835. Abstract available from: PubMed	**Subjects:** 0 to 14 years old **Design:** Case-control study (N=5,751) **Methods**: Analyzed motor vehicle crash records from 1992 to 1996 from the Utah Department of Transportation. Study included crashes that resulted in injuries and crashes with damage costing over $750.	Out of the 5,751 children involved in the accidents, 37% of children 0 to 4 years old were riding in the front seat and only 38% were optimally restrained. The odds ratio (OR) for being involved in a serious car accident is 1.7 (95% CI: 1.6-2.0) times higher for children sitting in the front as compared to the back of a vehicle. The OR for no restraint use was 2.7 (95% CI: 2.4-3.1) compared to restraint use. The investigators report that young children should be properly restrained and seated in the back seat of a vehicle.	II-2 A	

4.1.4 BICYCLE HELMETS

Bicycle Helmets Recommendations	Strength of Recommendation
1. Wear bike helmets **2.** Advocate for helmet legislation for all ages. **3.** Replace if it has sustained impact or is >5 years old	**Good** Consensus

Bicycle Helmets Resources
1. Bicycle helmet legislation (CPS)

Bicycle Helmets References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Lindsay, H., & Brussoni, M. **Injuries and helmet use related to non-motorized wheeled activities among pediatric patients**. Chronic Dis Inj Can. 2014; 34(2-3): 74-81.	**Subjects:** Children ≤16 years old **Design:** Retrospective study **Methods:** This study describes the epidemiology of injuries associated with non-motorized wheeled activity, as well as helmet use in pediatric patients presenting to emergency departments (EDs), to determine if helmet use varies based on regional	Between 2004 and 2009, a total of 28 618 patients with 35 184 injuries from non-motorized wheeled activities were recorded. Patients with cycling-related injuries accounted for 72.8% of the total sample. Most children presenting with injuries from non-motorized wheeled activities were between 9-12 years old (37.2%). Mechanisms of injury were similar across activities, with falls being the most common (82%–91%). Cyclists also presented with collisions and motor vehicle collisions as a mechanism of injury 5.9% of the time. The most common types of injuries seen were superficial injuries and fractures, followed by musculoskeletal injuries such as sprains. Severe injuries, particularly those classified as injuries to internal organs or neurovascular injuries or multiple, were most numerous among cyclists. Head injuries accounted for		C

	legislation. ED surveillance data was abstracted between 2004 and 2009 from the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP) describing patients with injuries caused by all wheeled, non-motorized devices,	over 8.3% of injuries overall, and were also most likely to be among cyclists. Across all activities and regardless of age or sex, children wearing helmets were less likely to experience a head injury compared with those not wearing a helmet. Conversely, hospitalized cyclists were significantly less likely to be wearing a helmet, regardless of age or sex, compared with patients who were discharged home from the ED. Patients presenting to the ED with an injury from non-motorized wheeled vehicles in jurisdictions where helmet use is mandated had significantly lesser odds (OR = 0.86, 95% CI: 0.80–0.94) of having sustained a head injury,		

	including bicycling (including unicycles and tricycles), skateboarding, in-line skating/rollerblading or using a scooter.	regardless of age and sex. There was also an association between legislation and helmet use, as patients presenting in legislated jurisdictions had 2.12 times greater odds of reporting helmet use (95% CI:1.99–2.26). This study provides compelling evidence for the importance of helmet legislation for injury prevention.		
Brent E Hagel, Natalie L Yanchar; Canadian Paediatric Society, Injury Prevention Committee. **Bicycle helmet use in Canada: The need for legislation to reduce the risk of head injury.** Paediatr Child Health 2013;18(9):475-80. Available from: CPS	**Subjects:** Children **Design:** Position Statement **Methods:** Reviewed the evidence on bicycle helmet use in Canada, the risk of head injury, and helmet legislation.	**Recommendations:** Based on current evidence and the importance of preventing head injuries in children and youth, the CPS makes the following recommendations: 1) All jurisdictions in Canada should legislate and enforce bicycle helmet use for all ages. 2) Legislation should be rolled out using social marketing and education to raise awareness of bicycle helmet efficacy, accessibility and importance. 3) Other strategies to prevent bicycling injuries, such as separating riders from motor traffic with bicycle lanes, pathways for commuting and recreational cycling, and community safety programs should be implemented concurrently. 4) Physicians should counsel families about the importance of wearing bicycle helmets. Where all-ages legislation does not exist, parents should wear a bicycle helmet to model good behaviour and protect themselves. 5) Sales tax exemptions or rebates and federal tax credits to make the purchase of bicycle helmets less expensive should be adopted.		
Russell, K., Foisy, M., Parkin, P. and Macpherson, A. **The promotion of bicycle helmet use in children and youth: an overview of reviews.** Evid.-Based Child Health. 2011;6: 1780–1789. Abstract available from: The Cochrane Library	**Subjects:** children **Design:** overview of reviews **Methods:** The authors searched the Cochrane Database of Sytematic Reviews for systematic reviews of the effectiveness of helmet use in children on head injuries. The search included ways to promote	The authors found three systematic reviews including 21 observational studies and 14 experimental studies. One review examined the role of nonlegislative strategies to promote bicycle helmet use, a second the role of legislation on helmet use and effectiveness, and a third on the effectiveness of helmet use for the prevention of head and facial injuries. The authors of this overview report that helmet use among children significantly reduced the odds of medically reported head injuries by 63% and the odds of brain injuries by 86%. Mandatory helmet legislation were also effective for some health outcomes and nonlegislative helmet promotion activities significantly increased helmet use.	II-1 A	1B

	helmet use in this population.	**Conclusion:** Child health professionals should recommend helmet use and work towards the enactment of helmet legislation in jurisdictions where such legislation does not exist.		
American Academy of Pediatrics, Committee on Injury and Poison Prevention. **Bicycle helmets**. Pediatrics. 2001; 108: 1030-1032. Reaffirmed February 2012. Abstract available from: PubMed	**Subjects:** Children **Design:** Policy statement **Methods:** This policy statement describes the role of the paediatrician in helping to attain universal helmet usage among children and teens.	This policy statement reports that all bicyclists should wear a properly fitting helmet every time they are riding. Parents and children should also learn the essential aspects of bike safety. The AAP recommends that physicians should counsel parents and encourage bicycle helmet use during well-child visits as well as in the community.	III A	
Wesson DE, Stephens D, Lam K, Parsons D, Spence L, Parkin PC. **Trends in Pediatric and Adult Bicycling Deaths Before and After Passage of a Bicycle Helmet Law**. Pediatrics. 2008;222(3):605-610. Available from: http://www.ncbi.nlm.nih.gov/pubmed/18762532	**Subjects:** All ages **Design:** Before and after study **Methods:** This is a pre-post study to determine the effect of bike helmet legislation on bicycle-related mortality. Average numbers of deaths per year and mortality rates per 100 000 person-years were analyzed over a 12 year period from 1991 to 2002. Bicycle helmet legislation was passed in 1995 in Ontario. Analysis was done on deaths occurring in the age group 1-15 and 16 and over. Data was collected from database of the Office	Overall, there were 362 bicycle-related deaths in the 12 year period of this study (107 in the age group 1-15 years and 255 in the 16 year old and above group). After legislation, for bicyclists 1 to 15 years old, the average number of deaths per year decreased 52%. This reduction was not seen in the older age group. Due to the fact that legislation was enforced in the younger age group by fining the parents of the children and not enforced for the older age group, this study reported that legislation may have a positive effect on reducing the number of bicycle-related deaths.	III A	

	of the Chief Coroner of Ontario.			
Thompson DC, Rivara FP, Thompson RS. **Helmets for preventing head and facial injuries in bicyclists.** Cochrane Database Syst Rev. 2000;(2):CD001855. Abstract available from: PubMed	**Subjects**: All ages **Design:** Systematic review **Methods:** Searched databases such as CENTRAL, MEDLINE AND EMBASE. Checked reference lists of past reviews and review articles and contacted colleagues around the world. Searches were last updated November 2006.	Five case-control studies met the inclusion criteria. This review reports that helmets provide a 63 to 88% reduction in the risk of head, brain and severe brain injury for all ages of bikers. Helmets also reduce head and facial injuries for all ages of bikers involved in all types of crashes (including crashes involving motor vehicles). All studies found a large protective effect of wearing helmets.	II-2 A	

4.1.5 BATH AND WATER SAFETY

Bath Safety and Water Safety Recommendations	Strength of Recommendation
1. Keep hot water at a temperature < 49°C to prevent burns. *2.* Never leave a young child alone in the bath. Do not use infant bath rings or bath seats. *3.* Recommend adult supervision, CPR training for adults, 4-sided pool fencing with self closing and latching gates, lifejackets, swimming lessons, and boating safety to decrease the risk of drowning.	*Fair* *Fair* *Fair*

Bath Safety and Water Safety Resources
1. Prevention of drowning (AAP)

Bath Safety and Water Safety References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Denny SA, Quan L, Gilchrist J, McCallin T, Shenoi R, Yusuf S, Hoffman B, Weiss B and COUNCIL ON INJURY, VIOLENCE, AND POISON PREVENTION. Prevention of Drowning. Pediatrics May 2019, 143 (5) e20190850. Available at: **Pediatrics**	Policy statement	**Abstract** Drowning is a leading cause of injury-related death in children. In 2017, drowning claimed the lives of almost 1000 US children younger than 20 years. A number of strategies are available to prevent these tragedies. As educators and advocates, pediatricians can play an important role in the prevention of drowning.		
Peden, A.E., Franklin, R.C., Pearn, J.H. **Unintentional fatal child drowning in the bath: A 12-year Australian review (2002–2014).** Journal of Paediatrics and Child Health.	**Subjects:** Children(0-17 years) **Design:** Review **Methods:** We report a total population study of all childhood (0–17 years)	**Conclusions:** On average, 6.5 children drown every year in baths in Australia. Children aged younger than 1 year are most affected, with both genders equally represented. Infants and toddlers left unsupervised, false confidence in the preventive role of bath aids, unrealistic		C

2018. 54:153-159 Retrieved From: https://onlinelibrary.wiley.com/doi/epdf/10.1111/jpc.13688	unintentional drowning fatalities in baths (bathtubs, spa baths and showers) in Australia between 1 July 2002 and 30 June 2014. Demographic, forensic and aetiological data (including co-bathing, use of bath aids, supervision and enactment of cardiopulmonary resuscitation) were documented for each victim	expectations in the supervisory capabilities of co-bathing children and epilepsy remain threats to children in the bath		
Wallis BA, Watt K, Franklin RC, Taylor M, Nixon JW, Kimble RM. Interventions associated with drowning prevention in children and adolescents: systematic literature review. *Inj Prev*. 2015;21(3):195-204		**Abstract** **Introduction:** Drowning remains a leading cause of preventable death in children across the world. This systematic review identifies and critically analyses studies of interventions designed to reduce fatal and non-fatal drowning events among children and adolescents or reduce the injury severity incurred by such incidents. **Methods:** A systematic search was undertaken on literature published between 1980 and 2010 relating to interventions around fatal and non-fatal drowning prevention in children and adolescents 0-19 years of age. Search methods and protocols developed and used by the WHO Global Burden of Disease Injury Expert Group were applied. **Results:** Seven studies fulfilled the inclusion criteria. Interventions were categorised into three themes of Education, Swimming Lessons and Water Safety, and Pool Fencing. All are possible effective strategies to prevent children from drowning, particularly young children aged 2-4 years, but very little evidence exists for interventions to reduce drowning in older children and adolescents. There were methodological limitations associated with all studies, so results need to be interpreted in the context of these. **Conclusions:** Relatively few studies employ rigorous methods and high levels of evidence to assess the impact of interventions designed to		

		reduce drowning. Studies are also limited by lack of consistency in measured outcomes and drowning terminology. Further work is required to establish efficacy of interventions for older children and adolescents. There is a need for rigorous, well-designed studies that use consistent terminology to demonstrate effective prevention solutions.		
Kemp, A. M., Jones, S., Lawson, Z., & Maguire, S. A. **Patterns of burns and scalds in children**. *Arch Dis Child.* 2014; 99(4): 316-321. doi:10.1136/archdischild-2013-304991.	**Subjects:** 0 to 16 years old **Design:** Multicenter cross-sectional study **Methods:** A UK study describing the mechanisms, agents and clinical features of unintentional burns and scalds in children of different developmental ages (<5 years, 5-16 years) presenting at emergency departments (EDs) and burn units between 2008-2010. Clinical assessment and data collection included location and distribution of burn or scald, age of child, motor developmental milestone, place of injury, agent, mechanism and severity of injury. Victims of household fires were excluded. A Mann–Whitney U test was performed to test a difference in age distribution for each unit. A $\chi 2$ goodness-of-fit test was performed to assess differences in the distribution of burn type.	A total of 1 215 cases were reported. The peak prevalence for all causes of injuries was in 1-year-olds, with the exception of flame burns. The prevalence started to increase at 9 months of age corresponding to the onset of independent mobility. Of the injuries reported, 58% (709/1215) were scalds, 32% (390) contact, 5.5% (67) flame, 1.6% (20) radiation, 1% (13) chemical, 1% (11) friction and 0.4% (5) electrical burns. Three categories of scalding agent were involved: hot beverages 49.6% (352), water 37.6% (267) and food 12.7% (90). 78% (554/709) of scalds were sustained by children (<5 years), and the most common agent was a hot beverage in a cup or mug. The most common mechanism in children (<5 years) was to pull a hot drink (n=186), hot water (n=62) or hot food (n=18) down over themselves. The youngest child to do this was 8 months of age. Children (<5 years) sustained a significantly greater proportion of scalds to the face, arms and upper trunk. Similarly, 71% (277/390) of burns occurred in children (<5 years). The four categories of agents were the following: 41% portable (160/390), 37% fixed household appliances (145/390), 19% outdoor agents (74/390) and 3% miscellaneous (11/390). 73% of burns due to portable items (117/160) were from irons or hair straighteners. 83% (252/305) of household incidents occurred in children (<5 years), where the most common mechanism was touching a hot item. 67% of contact burns affected the hands and 82.4% (216/262) were palmar.		C

	Descriptive analysis compared children <5 years and those 5–16 years. The proportions of the populations affected with 95% CIs were calculated, and two-sample z-tests (significance level of 5%) were employed to examine differences between age groups.			
Mao SJ, McKenzie LB, Xiang H, Smith GA. **Injuries associated with bathtubs and showers among children in the United States.** Pediatrics. 2009 Aug;124(2):541-7. Abstract available from: PubMed	**Subjects:** children ≤18 years of age **Design:** retrospective cohort **Methods:** The goal of this study was to describe the epidemiological features of injuries associated with bathtubs and showers, especially those related to slips, trips, and falls, among US children. Data was from the US Consumer Product Safety Commission National Electronic Injury Surveillance System from 1990 through 2007.	There were an estimated 791,200 bathtub- and shower-related injuries among children ≤18 years of age who were treated in US emergency departments in 1990–2007, with an average of 43,600 cases per year or ∼5.9 injuries per 10,000 US children per year. The largest number of injuries involved children 2 years of age; children ≤4 years accounted for 54.3% of injuries. The most common diagnosis was laceration (59.5%). The most common mechanism of injury was a slip, trip, or fall, accounting for 81.0% of cases or 4.6 injuries per 10,000 US children per year. The most frequently injured body part was the face (48.0%), followed by the head/neck (15.0%). The majority (71.3%) of injuries occurred in a bathtub. Of the cases with a known place of injury, 97.1% occurred at home. An estimated 2.8% of patients were admitted, transferred to another hospital, or held for observation. **Conclusion:** 1) Slips, trips, and falls in bathtubs and showers are a common cause of injury among children, especially children ≤4 years of age. 2) The incidence of these injuries may be decreased by increasing the coefficient of friction of bathtub and shower surfaces.	II-2 B	1C
Brenner RA, Gitanjali ST, Haynie DL, Trumble AC, Qian C, Klinger RM, Klebanoff MA. **Association between swimming lessons and drowning in childhood.** A case-control study. *Arch Pediatr Adolesc*	**Subjects:** 1 to 19 years old **Design:** Case-controlstudy **Methods**: Interviews were conducted with 61of the 88 families who had a child aged 1 to 4 years unintentionally drown. These were identified	Of the 61 cases interviewed, only 3% had taken formal swimming lessons as compared to 26% of the controls. There was an 88% reduction in the risk of drowning when 1 to 4 year olds participated in formal swimming lessons (95% CI: 0-.01-0.97). Informal swimming lessons did not significantly reduce the risk of drowning. **Conclusion:** Swimming lessons do provide some protective effect, however, due to the imprecise estimate (shown in the wide confidence intervals) the true magnitude of the effect remains	II-2 B	

Med 2009;163(3):203-210. Abstract available from: PubMed	across specific jurisdictions in the U.S. through medical examiners or coroners. Cases were matched with 213 controls based on age, sex and area of residence by random-digit-dialling.	unclear.		
Byard RW, Donald T. **Infant bath seats, drowning and near-drowning.** J Paediatr. Child Health. 2004; 40: 305-307. Abstract available from: PubMed	**Subjects:** 0 to 2 years old **Design:** Review **Methods:** Reviewed files of the Forensic Science Centre and Child Protection Unit, Women's and Children's Hospital, Adelaide, South Australia, for immersion incidents in bathtub seats.	Six cases of drowning and near-drowning were found over a 6-year period, three cases were reviewed in this article. One case of drowning occurred in a 7-month old boy who slipped from his bath seat. Two cases of near drowning happened in boys of the same age. The review reports that bathtub seats are associated with problems of trapping infants underwater if they slip down under the ring or seat. They have also been known to give parents false confidence to leave their children unattended.	III B	
Thompson DC, Rivara FP. **Pool fencing for preventing drowning in children.** Cochrane Database Systematic Review. 2000;2:CD0001047. Abstract available from: PubMed	**Subjects**: 0 to 14 years old **Design:** Systematic review **Methods:** Searched databases such as CENTRAL, MEDLINE AND EMBASE. Checked reference lists of past reviews and review articles and contacted relevant organizations and experts. Searches were last updated in October 2006.	Three case-control studies met the inclusion criteria. All 3 studies concluded that fenced pools are associated with a decreased risk of drowning compared to unfenced pools (OR 0.27 [95% CI: 0.16 to 0.47]). The study reports that isolation fencing (4-sided) is better than perimeter fencing (3-sided). Legislation and maintenance of pool fencing requires improvement in most communities.	I A	

4.1.6 CHOKING

Choking Recommendations	Strength of Recommendation
Avoid hard, small and round, smooth and sticky solid foods until age 4 years. Encourage child to remain seated while eating and drinking. Use safe toys, follow minimum age recommendations, and remove loose parts and broken toys.	Consensus

Choking References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Cyr, C., & Canadian Paediatric Society, I. P. C. **Preventing choking and suffocation in children**. Paediatr Child Health. 2012; 17(2): 91-94.	**Subjects:** Children **Design:** CPS position statement **Methods:** The present statement reviews definitions, epidemiology and effective prevention strategies for injuries due to choking, suffocation, and strangulation. Recommendations for improving safety, including research, surveillance, legislation and standards, product design and education, are provided.	Choking, suffocation and strangulation are important causes of unintentional injuries in infants and toddlers. Choking and suffocation are responsible for almost 40% of unintentional injuries in infants under the age of one in Canada. Morbidity associated with these injuries can be significant, including anoxic brain injury and esophageal perforation. Yet, nearly all deaths and serious injuries from choking, suffocation and strangulation are preventable. Due to the high burden among younger children, the target age for many prevention efforts is the first 4 years of life. Prevention strategies should include public education. Parental education by physicians has been shown to improve certain safety practices. General “childproofing” or “home safety” education, including measures to prevent choking and suffocation, does not seem to be as consistently effective at improving safety practices or reducing injury rates. Individual studies have however documented significant changes. Home visitation programs may also be effective in reducing hazards in the home, including choking and suffocation hazards. **Recommendations**: The CPS recommends that paediatric healthcare professionals educate parents and other caregivers about choking/suffocation prevention during health visits, as appropriate for their child’s age/developmental stage (see Table 3		

		in position statement). Parents and caregivers should also be encouraged to take CPR and choking first aid (infant/child CPR) courses. Additionally, paediatric healthcare providers should maintain their advanced paediatric resuscitation knowledge and skills.		
Soudek, Lucy McLaughlin, Robyn. **Fad over fatality? The hazards of amber teething necklaces.** Paediatrics & Child Health. 2017; 23(2): 106-110 Retrieved From: https://academic.oup.com/pch/article/23/2/106/4668731	**Methods:** Fifteen amber teething necklaces were purchased from retailers in Atlantic Canada. Necklaces were tested using the Breakaway Tension Test method reported in ASTM guidelines. Necklaces were tested with a 15 pound weight (industry standard) and with a 1.6 pound weight (mean force required to occlude a child's airway). It was recorded whether the necklace released or remained intact at the end of each trial.	**Conclusion:** To our knowledge, this is the first study that quantitatively assesses the force required to release a sample of amber teething necklaces. Some retailers claim that necklaces are safe as they would open before strangulation could occur. However, in our study, we demonstrated that 8 of 10 failed to open at 1.6 pounds (0.73 kg) of force, and 8 of 15 necklaces required greater than 15 pounds (6.8 kg) of force to open. Contrary to claims made by some retailers, the necklaces do not break open easily or at forces less than that which could strangle a child. Amber teething necklaces are a growing trend in North America and Europe with no scientific evidence to support their purposed analgesic mechanism; instead they may put children's lives at risk. Physicians seeing children wearing these necklaces should inform parents about the strangulation risk and advise safer teething solutions.		

4.1.7 COUNSEL ON PACIFIER USE

Counsel on Pacifier Use Recommendations	Strength of Recommendation
1. Pacifier use may decrease the risk of SIDS and should not be discouraged in the first year of life after breastfeeding is well established, but should be restricted in children with chronic/recurrent otitis media. *2.* Counsel on safe and appropriate use of pacifiers during routine anticipatory guidance.	*Fair* Consensus

Counsel on Pacifier Use References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
M Ponti; Canadian Paediatric Society, Community Paediatrics Committee. Recommendations for the use of pacifiers. Paediatr Child Health 2003;8(8):515-9. **Reaffirmed:** Feb 28, 2018. Available from: CPS		This statement reviews the available evidence to provide recommendations about the use of pacifiers in healthy term infants and children. A special section is included for the preterm infant. Systematic review of the literature was performed using Medline and Cochrane Library databases, limited only to English language articles. A manual search of the citations from these references was also used.		

Jaafar SH, Ho JJ, Jahanfar S, Angolkar M. **Effect of restricted pacifier use in breastfeeding term infants for increasing duration of breastfeeding**. Cochrane Database of Systematic Reviews. 2016; (8): CD007202. DOI: 10.1002/14651858.CD007202.pub4. Abstract available from: Cochrane Library.	**Subjects:** Infants **Design:** Systematic review **Methods:** Randomised and quasi-randomised controlled trials were included, comparing restricted versus unrestricted pacifier use in healthy full-term newborns who have initiated breastfeeding. Two review authors independently assessed trials for inclusion and risk of bias, extracted data and checked them for accuracy. The quality of the evidence was assessed using the GRADE approach.	This systematic review looked at the effect of restricted versus unrestricted pacifier use in healthy full-term newborns whose mothers have initiated breastfeeding and intend to exclusively breastfeed, on the duration of breastfeeding, other breastfeeding outcomes and infant health. Three trials were included in the review but only two trials (involving 1 302 healthy full-term breastfeeding infants) were included in the analysis. A meta-analysis of the two combined studies showed that pacifier use in healthy breastfeeding infants had no significant effect on the proportion of infants exclusively breastfed at 3 months (risk ratio (RR) 1.01; 95% confidence interval (CI) 0.96 - 1.07, two studies, 1 228 infants), and at 4 months of age (RR 1.01; 95% CI 0.94 - 1.09, one study, 970 infants, moderate-quality evidence). Pacifier use also had no effect on the proportion of infants partially breastfed at 3 months (RR 1.00; 95% CI 0.98 - 1.02, two studies, 1 228 infants), and at 4 months of age (RR 0.99; 95% CI 0.97 - 1.02, one study, 970 infants). Moderate-quality evidence suggest that pacifier use in healthy term breastfeeding infants before and after lactation is established does not reduce the duration of breastfeeding up to 4 months of age. However, there is insufficient information on the potential harms of pacifiers on infants and mothers.	I C	2B

		Conclusion: For mothers motivated to breastfeed, the decision to use a pacifier is based on personal preference. Note: Several methodological issues and issues regarding conflict of interest in one trial included were raised by a WHO expert committee as a comment to the article. According to these experts, the validity of the conclusions is questionable.		
Horne, R. S., Hauck, F. R., Moon, R. Y., L'Hoir M, P., Blair, P. S., Physiology, . . . Infant, D. **Dummy (pacifier) use and sudden infant death syndrome: potential advantages and disadvantages**. J Paediatr Child Health. 2014; 50(3): 170-174. doi:10.1111/jpc.12402.	**Subjects:** Infants **Design:** Policy statement **Methods:** Collection of evidence, discussion and conclusions from the working groups of the International Society for the Study and Prevention of Perinatal and Infant Death (ISPID) regarding pacifiers and SIDS.	Several systematic reviews have demonstrated a strong association between the lack of a pacifier being used by the infant for the final sleep and SIDS. However, advice surrounding the apparent protective effect of pacifiers has been controversial as there are a number of concerns regarding other health issues which need to be considered. This includes the possibility of decreased breastfeeding frequency and duration, increased infection rates, particularly otitis media, and dentition concerns. This position statement also highlights current recommendations in different countries. Typically, recommendations that advocate use of pacifiers for SIDS risk reduction include the following: 1. Pacifiers have been shown to be associated with reduced risk of SIDS, i.e. fewer babies who used a pacifier for the last sleep died than those who did not use a pacifier. 2. Pacifiers can be offered at nap time and bedtime in breastfed infants after 3–4 weeks of age, when breastfeeding is well established. 3. Pacifiers can be offered to bottle-fed infants from birth. If being used, they should be offered for all sleep periods. 4. Parents should be aware of the potential adverse effects of pacifier use. **Recommendation**: At present, the ISPID Board is unable to provide a definitive recommendation regarding the use of dummies (pacifiers) for SIDS risk reduction. However, the ISPID is in agreement that parents of newborns should be educated about the evidence and potential benefits and risks to using dummies (pacifiers), so that they are able to make informed choices regarding use for their own infants.		

Moon, R. Y., K. O. Tanabe, et al. **Pacifier use and SIDS: Evidence for a consistently reduced risk.** Maternal and Child Health Journal. 2012; 16(3): 609-614. Available from: Springer	**Subjects:** Infants **Design:** Case-control study (SIDS n = 260, control n = 260) **Methods:** The objective of this study was to examine the association between pacifier use during sleep and SIDS in relation to other risk factors and to determine if pacifier use modifies the impact of these risk factors.	Data source was a population based case–control study of 260 SIDS deaths and 260 matched living controls. Pacifier use during last sleep decreased SIDS risk (aOR 0.30, 95% CI 0.17–0.52). Furthermore, pacifier use decreased SIDS risk more when mothers were ≥ 20 years of age, married, nonsmokers, had adequate prenatal care, and if the infant was ever breastfed. Pacifier use also decreased the risk of SIDS more when the infant was sleeping in the prone/side position, bedsharing, and when soft bedding was present. The association between adverse environmental factors and SIDS risk was modified favorably by pacifier use, but the interactions between pacifier use and these factors were not significant. **Recommendation:** Pacifier use may provide an additional strategy to reduce the risk of SIDS for infants at high risk or in adverse sleep environments, but its use should be particularly encouraged for those infants who are in adverse sleepenvironments.	II-2 B	1B
Canadian Pediatric Society. **Recommendations for the use of pacifiers**. *Paediatric & Child Health* 2003; 8: 515-519. Reaffirmed: Feb 28 2018 Available from: http://www.cps.ca/en/documents/position/pacifiers	**Subjects**: Infants **Design:** Policy statement **Methods:** Reviewed literature on pacifier use in infants and its association with breastfeeding, otitis media, dentition, SIDS, infection and analgesic effects. Also reviewed product safety guidelines and pacifiers use in preterm infants.	**Recommendations** • Counsel about safe and appropriate use of pacifiers should be part of routine anticipatory guidance in the care of newborns, infants and children. • Until further research leads to more conclusive evidence on adverse outcomes, health care professionals should recognize pacifer use as a parental choice determined by the needs of their newborn, infant or child. • Early pacifier use should signify to health care professionals possible breastfeeding difficulties • Infants and children with chronic or recurrent otitis media should be restricted in their use of a pacifier • Pacifiers should not be routinely discouraged as the current evidence suggests a decreased risk of sudden infant death syndrome associated with their use		

		• Pacifiers should continue to be used in neonatal intensive care units for non-nutritive sucking and comfort in the preterm or sick infant		
Rovers MM, Numans ME, Langenbach E, Grobbee DE, Verheij TJM and Schilder AGM. **Is pacifier use a risk factor for acute otitis media? A dynamic cohort study.** Family Practice. 2008; 25: 233–236. Abstract available from: PubMed	**Subjects:** 0 to 4 years old **Design:** Prospective cohort study (N=476) **Methods:** Followed a cohort of infants from 2000 to 2005 from Leidsche Rijn, a residential area in Utrecht, The Netherlands. Parents completed a questionnaire on pacifier use at baseline and GPs diagnosed acute otitis media (AOM) events.	The odds ratio for pacifier use and a single AOM event was 1.3 (95% CI: 0.9-1.9) and was therefore not significant. However, for recurrent AOM, the odds ratio was 1.9 (95% CI: 1.1-1.3). According to this study, pacifier use appears to be a risk factor for recurrent AOM. The authors report that physicians should counsel parents on the risks of pacifier use once their child has received their first diagnosis of AOM.	II-2 B	

Hauck FR, Omojokun OO, Siadaty MS. **Do pacifiers reduce the risk of sudden infant death syndrome?** A meta-analysis. Pediatrics. 2005; 116: e716. Abstract available from: PubMed	**Subjects:** Infants **Design:** Meta-analysis **Methods:** Performed a systematic review of the literature by searching the MEDLINE database. All studies that met the inclusion criteria (published articles with data on the relationship between pacifier use and SIDS risk) as well as a test for homogeneity were included in the meta-analysis.	Nine studies were found during the systematic review however only 7 of the 9 case-control studies were included in the meta-analysis due to two of the studies being heterogeneous. The meta-analysis showed a reduced risk of SIDS with pacifier use when used for sleep (OR=0.71, 95% CI: 0.59-0.85). Based on this evidence, the authors recommend that pacifiers be used for infants less than 1 year of age. This is a US Preventive Services Task Force level B strength of recommendation, meaning the beneficial effects will outweigh any potential negative effects.	II-2 B	
Task Force on Sudden Infant Death Syndrome**. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment.** Pediatrics. 2016. 138 (5) Retrieved from: https://pediatrics.aappublications.org/content/138/5/e20162938	**Subjects:** Infants **Design:** Policy Statement **Methods:** The recommendations and strength of evidence for each recommendation are included in this policy statement. The rationale for these recommendations is discussed in detail in the accompanying technical report	The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating. Additional recommendations for SIDS reduction include the avoidance of exposure to smoke, alcohol, and illicit drugs; breastfeeding; routine immunization; and use of a pacifier. New evidence is presented for skin-to-skin care for newborn infants, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age.		
National Institute for Health and Care Excellence. Postnatal Care up to 8 weeks after birth. NICE Guideline. 2006.	**Subects:** Infants **Design:** Guideline **Methods:** The 2006 guideline was developed	See Guideline for specific recommendations.		

Available at: https://www.nice.org.uk/guidance/cg37/resources/postnatal-care-up-to-8-weeks-after-birth-pdf-975391596997	by the National Collaborating Centre for Primary Care which is based at the Royal College of General Practitioners. The Collaborating Centre worked with a Guideline Development Group, comprising healthcare professionals (including consultants, GPs and nurses), patients and carers, and technical staff, which reviewed the evidence and drafted the recommendations. The recommendations were finalised after public consultation. NICE's Clinical Guidelines Update Programme updated the recommendations on co-sleeping and SIDS in 2014. The Programme worked with a Standing Committee of healthcare professionals, methodologists and lay members from a range of disciplines and localities. See themethods and processesfor developing NICE clinical guidelines.			

Cyr. C. **Preventing choking and suffocation in children**. Pediatrics and Child Health. 2012. 17(2) Available at: https://www.cps.ca/en/documents/position/preventing-choking-suffocation-children	**Design:** Position Statement **Methods:** The present statement reviews definitions, epidemiology and effective prevention strategies for these injuries. Recommendations that combine approaches for improving safety, including research, surveillance, legislation and standards, product design and education, are made. Paediatric health care providers should be encouraging parents and other caregivers to learn CPR and choking first aid, as well as offering anticipatory, age-appropriate guidance to prevent these injuries, at regular health visits	See Position Statement for specific recommendations		

4.1.8 SMOKE DETECTORS/BURN INURIES

Smoke Detectors / Burn Injuries Recommendation	Strength of Recommendation
1. Install smoke detectors in the home on every level. *2. Keep hot water at a temperature <49°C* *3. Be vigilant with hot liquids on counter tops*	*Fair*

Smoke Detectors / Burn Injuries References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Deave, T., Goodenough, T., Stewart, J., Towner, E., Majsak-Newman, G., Hawkins, A., . . . Kendrick, D. **Contemporary hazards in the home: keeping children safe from thermal injuries**. Arch Dis Child. 2013; 98(7): 485-489. Abstract available from: Arch Dis Child.	**Subjects:** 0 to 4 years old **Design:** Multicenter study **Methods:** 200 parents of preschool children from 21 Children's Centres across 4 UK study sites took part between June-July 2010. Parents of children in each age group were invited to take part: <1 year, 1 year, 2 years, and 3 years. A structured interview was conducted with parents asking about a range of practices on the prevention of fire-related injury and contact burns. Data on whether families had a fire escape plan, along with information on which centre the families attended, were used to calculate an intra-class correlation coefficient (ICC) and 95% CI for having a fire escape plan using random effects logistic regression, accounting for clustering of responses between Children's Centres.	This UK multicenter study reported on fire injuries and thermal injury prevention practices in socioeconomically disadvantaged families. 96% of parents (n=191) reported having at least one smoke alarm in their home. Of these, 182 (95%) were reported to be working. 105 parents (54%) reported they had a bedtime safety routine though the number of elements ranged from 0 to 3, with a median of 1 (IQR 0–1). 81 parents (42% of the 191 respondents) reported having a fire escape plan; the number of elements ranged from 0 to 4, with a median of 1 (IQR 0–1). Only 9 parents (11%) had practiced their plan. Most parents had matches or lighters in the home (n=159, 80%) and 30 (19%) reported that a child <5 years could reach them. Irons were common (n=188, 94%) and 140 (70%) households had hair straighteners, of which 29% were used daily. When not in use but still hot, parents reported leaving hair straighteners in heatproof bags (n=17, 12%), on a heatproof mat (n=16, 11%), 'out of reach' or 'high up' (n=46, 33%), on a bedroom table (n=39, 28%), on a kitchen surface (n=13, 9%), in a separate room to the child (n=11, 8%) or in a wardrobe or drawer (n=5, 4%). The majority of parents reported that, if a young child touched a hot iron and sustained a burn smaller than 2 cm in diameter, they would run it under water for 10–15 min (n=165, 83%). 93 (47%) said they would seek medical help, but 44 (22%) said that they would apply ointment. **Conclusion**: Many families lack fire escape plans and fire prevention bedtime routines, and new potential hazards, such as hair straighteners, are emerging. Professionals working with families with children should provide evidence-based advice about reducing the risk of thermal injury (advise about functioning fire alarms, fire escape plan use and possibility of fire guards, safe use and storage of hair straighteners, first aid training).		C

Kemp, A. M., Jones, S., Lawson, Z., & Maguire, S. A. **Patterns of burns and scalds in children**. Arch Dis Child. 2014; 99(4): 316-321. Abstract available from: Arch Dis Child.	**Subjects:** 0 to 16 years old **Design:** Multicenter cross-sectional study **Methods:** A UK study describing the mechanisms, agents and clinical features of unintentional burns and scalds in children of different developmental ages (<5 years, 5-16 years) presenting at ED and burn units between 2008-2010. Clinical assessment and data collection included location and distribution of burn or scald, age of child, motor developmental milestone, place of injury, agent, mechanism and severity of injury. Victims of household fires were excluded. A Mann–Whitney U test was performed to test a difference in age distribution for each unit. A $\chi 2$ goodness-of-fit test	A total of 1 215 cases were reported. The peak prevalence for all causes of injuries was in 1-year-olds, with the exception of flame burns. The prevalence started to increase at 9 months of age corresponding to the onset of independent mobility. Of the injuries reported, 58% (709/1215) were scalds, 32% (390) contact, 5.5% (67) flame, 1.6% (20) radiation, 1% (13) chemical, 1% (11) friction and 0.4% (5) electrical burns. Three categories of scalding agent were involved; hot beverages 49.6% (352), water 37.6% (267) and food 12.7% (90). 78% (554/709) of scalds were sustained by children (<5 years), and the most common agent was a hot beverage in a cup or mug. The most common mechanism in children (<5 years) was to pull a hot drink (n=186), hot water (n=62) or hot food (n=18) down over themselves. The youngest child to do this was 8 months of age. Children (<5 years) sustained a significantly greater proportion of scalds to the face, arms and upper trunk. Similarily, 71% (277/390) of burns occurred in children (<5 years). The four categories of agents were the following; 41% portable (160/390), 37% fixed household appliances (145/390), 19% outdoor agents (74/390) and 3% miscellaneous (11/390). 73% of burns due to portable items (117/160) were from irons or hair straighteners. 83% (252/305) of household incidents occurred in children (<5 years), where the most common mechanism was touching a hot item. 67% of contact burns affected the hands and 82.4% (216/262) were palmar.		C

	was performed to assess differences in the distribution of burn type. Descriptive analysis compared children <5 years and those 5–16 years. The proportions of the populations affected with 95% CIs were calculated, and two-sample z-tests (significance level of 5%) were employed to examine differences between age groups.			
DiGuiseppi C, Higgins JP. **Interventions for promoting smoke alarm ownership and function.** Cochrane Database Syst Rev. 2001;(2):CD002246. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/11406039	**Subjects**: All **Design:** Cochrane review **Methods:** Searched appropriate databases for randomized, quasi-randomized or nonrandomized controlled trials completed or published after 1969 evaluating an intervention to promote residential smoke alarms.	Authors identified 26 trials, of which 13 were randomised. Overall, counselling and educational interventions had only a modest effect on the likelihood of owning an alarm (OR=1.26; 95% CI: 0.87 to 1.82) or having a functional alarm (OR=1.19; 0.85 to 1.66). Counselling as part of primary care child health surveillance had greater effects on ownership (OR=1.96; 1.03 to 3.72) and function (OR=1.72; 0.78 to 3.80). Results were sensitive to trial quality, however, and effects on fire-related injuries were not reported. In two non-randomized trials, direct provision of free alarms significantly increased functioning alarms and reduced fire-related injuries. Media and community education showed little benefit in non-randomized trials. **Conclusion:** 1) Counselling as part of child health surveillance may increase smoke alarm ownership and function. 2) Community smoke alarm give-away programmes apparently reduce fire-related injuries	I, II-1 A	1B

LeBlanc JC, Pless IB, King WJ, Bawden H, Bernard-Bonnin AC, Klassen T, Tenenbein M. **Home safety measures and the risk of unintentional injury among young children: a multicentre case-control study.** CMAJ. 2006; 175(8): 883-887. Available from: PubMed	**Subjects:** 0 to 7 years old **Design:** Case-control study **Methods:** Investigators used records from 5 pediatric hospital emergency departments to look for cases of falls, burns or scalds, ingestions or choking. Matched control subjects were children who presented during the same period with acute non-injury related conditions.	An investigator blinded to case/control status assessed 19 injury hazards at each child's home. Overall, 17% percent of homes had no functioning smoke alarm and 51% had no functioning fire extinguisher. After controlling for siblings, maternal education and employment it was found that cases differed from controls for 5 hazards: presence of a baby walker, presence of choking hazards, no child-restraint lids in bathroom, no smoke alarm and no functioning smoke alarm. Compared to controls, cases were 3.2 (95% CI: 1.4-7.7). times more likely to have been injured in a house without a smoke alarm	II-2 B	
DiGuiseppi C, Roberts I, Li L. **Smoke alarm ownership and house fire death rates in children.** J Epidemiol Community Health. 1998; 52: 760-761. Abstract available from: PubMed	**Subjects**: 0 to 14 years old **Design:** Ecological study **Methods:** Used data from the Office for National Statistics in England and Wales. Recorded all injury deaths of children 0 to14 years old from 1980-1995.	Case-control studies have shown that smoke alarms are associated with a reduced risk of death. In this study, a 10% increase in smoke alarm ownership was associated with a 13% risk reduction of fire death in infants 0 to 4 years old (95% CI 0.81-0.94). The main limitation of this study is in its ecological design. There are other factors that might be contributing to the decrease in deaths that are not related to fire alarms such as reduced risk of fire occurrence or severity in this time period,	II-3 B	
American Academy of Pediatrics. Committee on Injury and Poison Prevention. **Reducing the number of deaths and injuries from residential fires.** Pediatrics. 2000; 105: 1355-1357. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reports an overview of intervention strategies and prevention messages for reducing injury due to residential fires.	The review reports that smoke alarms need to be installed and maintained in the home; they should be tested once a month and the batteries should be changed once a year; young children and older adults are at the highest risk for incurring serious injury and death due to residential fires.	III B	

4.1.9 POISONS AND OTHER TOXINS: POISON CONTROL CENTRES

Poisons and other toxins: PCC# (Poison Control Centre number)	Strength of Recommendation
1. Keep medicines and cleaners and other toxins locked up and out of child's reach. **2. Have Poison Control Centre number handy.** 3. Use of ipecac is contraindicated in children. *4.* Install Carbon Monoxide Detectors.	**Good** **Good** *Fair*

Poison: PCC# (Poison Control Centre number) References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Burghardt, L. C., Ayers, J. W., Brownstein, J. S., Bronstein, A. C., Ewald, M. B., & Bourgeois, F. T. **Adult prescription drug use and pediatric medication exposures and poisonings**. Pediatrics. 2013; 132(1):18-27. Available from: Pediatrics.	**Subjects:** Children <19 years old **Design:** Retrospective database study **Methods:** This study aimed to estimate the association between adult drug prescriptions and exposures and poisonings in children, and any subsequent healthcare utilization and morbidity. Pediatric exposures and poisonings were measured using the National Poison Data System. Prescriptions written for adults were measured using the National Ambulatory Medical Care Surveys for 2000-2009. Associations	Poisonings from prescription medications remains a major cause of morbidity among children. This study measured drug- and age-specific associations for high-risk classes of medications and various pediatric age groups. Adult medication prescriptions including opioids, antihyperlipidemics, oral hypoglycemics, and β-blockers were statistically significantly associated with exposures and poisonings in children of all ages, with the strongest association observed for opioids. Across medications, the greatest risk was among children 0-5 years old, followed by 13- to 19-year-olds. There is substantial healthcare utilization and morbidity associated with these events among children of all ages. Rates of emergency department visits were highest for events related to hypoglycemics (60.1%) and β-blockers (59.7%), whereas serious injuries and hospitalizations occurred most frequently with opioids (26.8% and 35.2%, respectively) and hypoglycemics (19.5% and 49.4%, respectively). In children 0-5 years old, the highest rates of hospital visits were for exposures and poisonings related to β-blockers (62.7%) and hypoglycemics (61.2%). These findings support the need to develop prevention strategies that are both age- and medication-specific. For instance, pediatricians should consult parents on storing medications, focusing on how exposures vary		C

	between adult prescriptions for oral hypoglycemics, antihyperlipidemics, β-blockers, and opioids and exposures and poisonings among children 0-5, 6-12, and 13-19 years were analyzed by using multiple time-series analysis. Emergency department visits, serious injuries, and hospitalizations stemming from these associations were also described.	based on the child's age and intention.		

Lovegrove, M. C., Weidle, N. J., & Budnitz, D. S. **Trends in Emergency Department Visits for Unsupervised Pediatric Medication Exposures, 2004-2013**. Pediatrics. 2015; 136(4): e821-829. Available from: Pediatrics.	**Subjects:** Children <6 years old **Design:** Descriptive study **Methods:** Nationally representative data from the US National Electronic Injury Surveillance System–Cooperative Adverse Drug Event Surveillance project (2004-2013) was used to assess trends in emergency department (ED) visits for unsupervised medication exposures in children <6 years. For 2010-2013, the dosage form and prescription status of implicated medications were identified. Medications included any prescription or over-the-counter (OTC) medication, herbal/dietary supplement, or vaccine.	An estimated 640 000 ED visits were made in the US from 2004-2013 for unsupervised medication exposures in children aged <6 years, nearly 20% of which resulted in hospitalization. ED visits for unsupervised exposures increased by an average of 5.7% annually between 2004-2010, peaking at 75 842 in 2010, before decreasing by an average of 6.7% annually to 59 092 in 2013. From 2010-2013, 91.0% of unsupervised exposure visits involved 1 medication, most commonly an oral prescription solid (45.9%), oral OTC solid (22.3%), or oral OTC liquid (12.4%). More than 260 different prescription solids were implicated; opioids (13.8%) and benzodiazepines (12.7%) were the most common classes. Vitamins/minerals or herbal/alternative remedies were implicated in one quarter of visits for OTC solid medication exposures. 4 medications were implicated in 91.2% of OTC liquid exposure visits: acetaminophen (32.9%), cough and cold remedies (27.5%), ibuprofen (15.7%), and diphenhydramine (15.6%). Prevention efforts should address the development and implementation of innovative exposure-limiting packaging and the dissemination of evidence-based educational messages on safe use and storage of medications for parents and caregivers.		C

Valdez, A. L., Casavant, M. J., Spiller, H. A., Chounthirath, T., Xiang, H., & Smith, G. A. **Pediatric exposure to laundry detergent pods**. Pediatrics. 2014; 134(6): 1127-1135. Available from: Pediatrics.	**Subjects:** Children <6 years old **Design:** Retrospective database study **Methods:** This study investigated the epidemiologic characteristics and outcomes of laundry detergent pod exposures among US children using data from the National Poison Data System between 2012-2013. Variables analyzed included exposure route and site, patient's age and gender, month of exposure, management site, scenario associated with the child's access to the laundry detergent pod, level of healthcare received, reason for exposure, and therapy performed.	The category of household cleaning products is the 3rd leading substance category associated with poison exposures among US children <6 years of age. The literature on laundry detergent pod exposure is lacking. Using a national database, this study investigated exposures to laundry detergent pods among children after these products entered the US consumer market in 2012. From 2012-2013, there were 17 230 reports of laundry detergent pod exposures among children <6 years of age. From March 2012 to April 2013, the monthly number of exposures increased by 645.3%. Children <3 years of age accounted for 73.5% of these cases. The major route of exposure was ingestion, accounting for 79.7% of cases. Among exposed children, 4.4% were hospitalized and 7.5% experienced a moderate or major medical outcome. A spectrum of clinical effects from minor to serious was seen with ingestion and ocular exposures. Laundry detergent pods pose a serious poisoning risk to young children. The rapid increase in exposures reflects the increasing presence of laundry detergent pods in the home environment associated with the increasing popularity and use of these products. Pediatricians and other healthcare providers should counsel parents and caregivers about the dangers of detergent pod exposure and the need for safe storage and careful use of these products.		C
Ferguson RW, Mickalide AD. **An In-Depth Look at Keeping Young Children Safe Around Medicine.**	**Subjects:** Young children **Design:** Report **Methods:** Analyzes data from the U.S. Consumer	Accidental medication exposures are a large and growing problem. Based on descriptive data, the authors developed several tips with regards to storage, dosing, and disposal of medicines, as well as safety tips when visiting seniors.	III I	1C

Washington, DC: Safe Kids Worldwide, March 2013.Available from: Safe Kids Worldwide	Product Safety Commission to explore trends in unsupervised accidental medication exposure and dosing errors, and provide greater insight into the risk factors related to these incidents.	**Recommendation:** See report for specific safety tips.		
McGregor T, Parkar M, Rao S. **Evaluation and management of common childhood poisonings.** American Family Physician. 2009; 79: 397-403. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reviews the literature on children evaluated for suspected toxin ingestion, commonly ingested substances and various treatments.	Patients who have ingested toxins and who are presenting with respiratory, circulatory or neurological symptoms should be taken to the nearest ED. According to this study, use of ipecac is no longer recommended for treatment and the use of activated charcoal is discouraged, except if within one hour of ingestion.	III A	

4.1.10 FALLS

Falls (Stairs, Walkers, Furniture, Change Table and Trampoline Use) Recommendations	Strength of Recommendation
1. Assess home for hazards- never leave baby alone on change table or other high surface; use window guards and stair gates. *2. Baby walkers are banned in Canada and should never be used.* *3. Advise against trampoline use at home.* *4. Ensure stability of furniture and TV and counsel parents about the dangers of flat screen televisions, dressers and other furniture and appliances that can fall and crush children.*	*Fair* *Fair* *Fair* *Fair*

Falls (Stairs, Walkers, Furniture, Change Table and Trampoline Use) Resources
1. *Trampoline safety (AAP)*

Falls (stairs, walkers, furniture, change table and trampoline use) References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Kendrick, D., Maula, A., Reading, R., Hindmarch, P., Coupland, C., Watson, M., . . . Deave, T. **Risk and protective factors for falls from furniture in young children: multicenter case-control study**. JAMA Pediatr. 2015; 169(2): 145-153. Available from JAMA Pediatr.	**Subjects:** 0 to 4 years **Design:** Multicenter case-control study **Methods:** UK study in emergency departments (EDs), inpatient wards, and minor injury units with recruitment occurring between 2010-2012. 672 cases and 2 648 controls individually matched for	This study quantified the associations between various risk factors and falls from furniture in children aged 0 to 4 years. A range of modifiable factors were associated with falls from furniture in children within this age range. Compared with parents of control participants, parents of cases were significantly more likely not to use safety gates in the home (adjusted OR [AOR], 1.65; 95% CI, 1.29-2.12) and not to have taught their children rules about climbing on kitchen objects (AOR, 1.58; 95% CI, 1.16-2.15). Additionally, cases were significantly more likely to have been left on raised surfaces (AOR, 1.66; 95% CI, 1.34-2.06), but significantly less likely to have climbed or played on garden furniture (AOR, 0.74;		C

	age (within 4 months of a case's age), sex, and calendar time (within 4 months of a case's injury) participated in this study. The outcome of interest was a fall from furniture in the child's home or garden resulting in hospital admission, ED, or minor injury unit attendance. Falls from play equipment (e.g. trampolines, climbing frames, or slides) were excluded. The exposures of interest were safety behaviors, safety equipment, and home hazards.	95% CI, 0.56-0.97) than control counterparts. Several significant interactions were also observed between age of the child and exposure. Cases aged 0 to 12 months were significantly more likely to have been left on raised surfaces (AOR, 5.62; 95% CI, 3.62-8.72), had their diapers changed on raised surfaces (AOR, 1.89; 95% CI, 1.24-2.88), and been put in car/bouncing seats on raised surfaces (AOR, 2.05; 95% CI, 1.29-3.27) than control participants. Cases 3 years and older were significantly more likely to have played or climbed on furniture (AOR, 9.25; 95% CI, 1.22-70.07) than control participants. These findings can be incorporated into fall-prevention advice for parents.		

Beaudin, M., Maugans, T., St-Vil, D., & Falcone, R. A., Jr. **Inappropriate use of infant seating devices increases risks of injury**. J Pediatr Surg. 2013; 48(5): 1071-1076. Abstract available from: Pubmed.	**Subjects:** Infants <12 months **Design:** Retrospective chart review **Methods:** Reviewed 205 children who presented an ICD-9 code E884.9: "fall from one level to another" in trauma registry between 1991-2010. Fall characterized as fallen from an infant automobile restraining device (infant seat, car seat, "pumpkin seat"), "bouncy" seat, "Bumbo™" seat, baby swing, grocery cart or stroller. Study variables included the following: age at time of injury, gender, device type, restraint use, parental supervision at time of injury, surface-to-surface description (e.g., countertop to floor),	Many injuries from falls in the pediatric population occur as a result of the inappropriate use of seating devices, such as use of car seats outside a motor vehicle. This study looked at the epidemiology and mechanism of injuries following falls sustained by infants <12 months who were seated in a variety of such devices. Of all children under 1 year of age who were admitted after a fall, 19% occurred as a direct result of a seating device. Furthermore, these types of injury also affected a very young cohort of patients, with a mean age of only 3.5 months. This might be attributable to the fact that parents have a false sense of security about leaving young infants in seating devices due to their assumed less developed motor skills that would presumably prevent them from falling off the seat. The most common mechanism of injury was related to a fall from an elevated surface. The fact that more admitted infants fell from an elevated surface most likely reflects the higher force of injury of this mechanism. Additionally, these injuries often occurred despite the reported presence of an adult in the same room, supporting the fact that a few seconds of inattention is sufficient to result in a fall. **Recommendations**: These findings support prevention among parents of young infants who are likely to utilize seating devices outside of the car. Seating devices should always be placed at ground level and not on elevated surfaces, even if the caregiver is present in the same room. Infants should not be left unattended even if placed on the floor as they have the capability of falling out		C

	symptoms, neurological examination, physical injuries, imaging studies, requirement for surgery, disposition (admission or discharge from the emergency room), condition at time of discharge, other related visits to the ED and readmissions. Standard descriptive statistics was performed to describe the demographic and injury-related characteristics of the study group.	of the seat or overturn the seat. They must be restrained at all times when placed in seats. Recalled products should not be used even if still accessible on the market.		
United States Consumer Product Safety Commission. **Instability and Tipover of Appliances, Furniture, and Televisions: Estimated Injuries and Reported Fatalities: 2011 Report**. Published 13 August 2012. Available from: http://www.cpsc.gov/PageFiles/118043/tipover2011.pdf	**Subjects:** All **Design:** Report **Methods:** This report contains information on instability of televisions, furniture, and appliances. An estimate of emergency department-treated instability injuries is presented. This is followed by the counts of reported fatalities. The death incidents are from 2000 through 2010, and the injury estimates are for 2006 through 2010.	Of the estimated annual average of 43,400 emergency department-treated injuries (2008–2010), 25,300 (58%) involved children, under age 18 years, with a large majority of the victims being under 5 years of age. Of the 293 reported fatalities occurring between 2000 and 2010, 245 (84%) involved children, victim ages 1 month to 8 years. ED-treated injuries: 44% involved televisions (or TV + furniture) falling; 52% involved only furniture falling; and 4% involved appliances falling. Reported fatalities: 60% involved televisions falling (36% only TV, 24% TV + furniture); 31% involved only furniture falling; 9% involved appliances falling.	III	C
Council On Sports Medicine And Fitness. **Trampoline**	**Subjects:** Children **Design:** Policy statement	The authors report that although trampoline-related injuries such as sprains, strains, contusions, or other soft tissue injury are	III A	1C

Safety in Childhood and Adolescence. Pediatrics. 2012. Available from: Pediatrics	**Methods:** This policy statement is an update to previous statements, reflecting the current literature on prevalence, patterns, and mechanisms of trampoline-related injuries.	common, more serious injuries such as bone injury can also occur, especially in children younger than 5 years. **Recommendations:** 1) Advise patients and families against recreational trampoline use and explain that current data indicate safety measures have not significantly reduced injury rates and that catastrophic injuries do occur. 2) For parents and families who choose to use a trampoline despite the recommendation, advise on the specific guidelines provided in the Policy Statement.		
Zielinski AE. Rochette LM. Smith GA. **Stair-related injuries to young children treated in US emergency departments, 1999-2008.** Pediatrics. 2012;129(4):721-7. Abstract available from: PubMed	**Subjects:** Children aged <5 years treated in a US emergency department **Design:** Retrospective cohort N= 931,886 children treated from 1999 through 2008 **Methods:** This analysis was performed to characterize the epidemiology, secular trends, and mechanisms of stair-related injuries of children.	The authors observed a significant decrease in the number of stair-related injuries over the study period (1999-2008) as well as an 11.6% decrease in cases/year. However, the authors note that stairs still represent an important source of injury to young children. A significant portion of children with stair-related injuries were reported to have been carried by a caretaker. Other stair-related injuries were reported to be caused by baby-walkers or from playing around the stairs. The authors also found that cases of falls occur when stair gates were either left open or improperly installed and therefore parents should not solely rely upon them. Supervision is advised. **Recommendations:** Advise caretakers to minimize stair use while carrying children and to keep the stairs well-maintained and free of objects that could result in tripping.	III I	1C
Thompson AK, Bertocci G, Rice W, Pierce MC**. Pediatric short-distance household falls: Biomechanics and associated injury severity.** Accid Anal Prev. 2011	**Subjects:** Children 0-4 years **Design:** Observational descriptive **Methods:** Children aged 0-4 years who presented to the Emergency Department with a history	Seventy-nine subjects were enrolled in the study; 15 had no injuries, 45 had minor (AIS 1) injuries, 17 had moderate (AIS 2) injuries, and 2 had serious (AIS 3) injuries. No subjects had injuries classified as AIS 4 or higher, and there were no fatalities. Children with moderate or serious injuries resulting from a short-distance household fall tended to have fallen from greater heights, have greater impact velocities, and have a lower body mass index than those with minor or no injuries.	III` I	C

Jan;43(1):143-50. Abstract available from: PubMed	of a short furniture fall were included in the study. Detailed case-based biomechanical assessments were performed using data collected through medical records, interviews, and fall scene investigations. Injuries were rated using the Abbreviated Injury Scale (AIS). Each case was reviewed by a child abuse expert; cases with a vague or inconsistent history and cases being actively investigated for child abuse were excluded.	**Conclusion:** Children aged 0-4 years involved in a short-distance household fall did not sustain severe or life-threatening injuries, and no children in this study had moderate or serious injuries to multiple body regions.		
Pomerantz WJ, Gittelman MA, Hornung R, Husseinzadeh H. **Falls in children birth to 5 years: Different mechanisms lead to different injuries.** J Trauma Acute Care Surg. 2012 Oct;73(4 Suppl 3):S254-7. Abstract available from: PubMed	**Subjects:** Children < 5 years **Design:** Observational descriptive **Methods:** This study aimed to compare the number of children injured, ages of injured children, and injuries sustained in falls from furniture and falls from stairs in hospitalized children. All records of individuals from 0 year through 4 years, hospitalized at our institution for a fall from	A total of 171 patients were hospitalized for falls from stairs and 318 for falls from furniture. There were no differences between the groups with regard to age, sex, race, type of insurance, and length of stay, Injury Severity Score, or total cost. The most common pieces of furniture from which children fell were beds (33.0%), couches (18.9%), and chairs (17.9%). Children who fell from stairs were significantly more likely to have injuries to their head (64.3% vs. 38.1%); those that fell from furniture were more likely to sustain arm injuries (33.3% vs. 9.9%). There were significantly more skull fractures in those that fell from stairs (39.8% vs. 20.1%) and humerus fractures in those that fell from furniture (30.8% vs. 9.4%) ($p < 0.001$). Falls from furniture increased during the study period, while falls from stairs fell; the difference was not statistically significant, however. **Conclusion:** Falls from furniture and stairs are important causes of morbidity in children and that more anticipatory guidance should	III I	1C

	furniture or stairs between January 1, 1996, and December 31, 2006, were retrospectively reviewed.	be developed and given to families regarding falls from furniture to help prevent these injuries.		
McFaull SR, Frechette M, Skinner R. **Emergency department surveillance of injuries associated with bunk beds: the Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP), 1990–2009.** Chronic Diseases and Injuries in Canada. 2012;33(1). Available from: Public Health Agency of Canada	**Subjects:** All **Design:** National surveillance system **Methods:** CHIRPP is an injury and poisoning surveillance system operating in 11 paediatric and 4 general emergency departments across Canada. Records were extracted using CHIRPP product codes and narratives.	Over the 20-year surveillance period, 6,002 individuals presented to Canadian emergency departments for an injury associated with a bunk bed. Overall, the frequency of bunk bed-related injuries in CHIRPP has remained relatively stable with an average annual percent change of 21.2% (21.8% to 20.5%). Over 90% of upper bunk-related injuries were due to falls and children 3–5 years of age were most frequently injured (471.2/100,000 CHIRPP cases). Children with bunk bed-related injuries continue to present to Canadian emergency departments, many with significant injuries. Injury prevention efforts should focus on children under 6 years of age. **Recommendation:** Children aged less than 6 years should not be allowed on the upper bunk.	II-2 B	1B
Harris VA, Rochette LM, Smith GA. **Pediatric Injuries Attributable to Falls From Windows in the United States in 1990–2008.** Pediatrics. 2011 Sep;128(3):455-62. Abstract available from: PubMed	**Subjects:** Children **Design:** Retrospective cohort **Methods:** By using the National Electronic Injury Surveillance System, emergency department (ED) data for paediatric injury cases associated with window falls in 1990-2008 were reviewed.	An estimated 98,415 children (95% confidence interval [CI]: 82,416-114,419) were treated in US hospital EDs for window fall-related injuries during the 19-year study period (average: 5,180 patients per year [95% CI: 4,828-5,531]). The mean age of children was 5.1 years, and boys accounted for 58.1% of cases. One-fourth (25.4%) of the patients required admission to the hospital. The annual injury rate decreased significantly during the study period because of a decrease in the annual injury rate among 0- to 4-year-old children. Children 0 to 4 years of age were more likely to sustain head injuries (injury proportion ratio [IPR]: 3.22 [95% CI: 2.65-3.91]) and to be hospitalized or to die (IPR: 1.65 [95% CI: 1.38-1.97]) compared with children 5 to 17 years of age. Children who landed on hard surfaces were more likely to sustain head injuries (IPR: 2.05 [95% CI: 1.53-2.74]) and to be hospitalized or to die (IPR: 2.23 [95% CI: 1.57-3.17]) compared with children who landed on cushioning surfaces.	II-2 B	1C 1C

		Conclusion: 1) Prevention measures for young children should aim to prevent falls by reducing the child's opportunity to exit the window, through the use of devices such as window guards or window locks and through placement of furniture away from windows, to decrease access to windows by young children. 2) Prevention measures for all children should address softening the landing surfaces below windows, to help reduce the severity of injury when a fall does occur.		
Kendrick D, Watson MC, Mulvaney CA, Smith SJ, Sutton AJ, Coupland CA, Mason-Jones AJ. **Preventing childhood falls at home: meta-analysis and meta-regression.** Am J Prev Med. 2008 Oct;35(4):370-379. PubMed	**Subjects:** Children **Design:** Meta-analysis **Methods:** A systematic review of literature was conducted up to June 2004 and meta-analysis using individual patient data to evaluate the effect of home-safety interventions on fall-prevention practices and fall-injury rates. Meta-regression examined the effect of interventions by child age, gender, and social variables.	Included were 21 studies, 13 of which contributed to meta-analyses. Home-safety interventions increased stair-gate use (OR=1.26; 95% CI=1.05, 1.51), and there was some evidence of reduced baby-walker use (OR=0.66; 95% CI=0.43, 1.00), but little evidence of increased possession of window locks, screens, or windows with limited opening (OR=1.16, 95% CI=0.84, 1.59) or of nonslip bath mats or decals (OR=1.15; 95% CI=0.51, 2.62). Two studies reported nonsignificant effects on falls (baby-walker–related falls on flat ground [OR=1.35; 95% CI=0.64, 2.83] or down steps or stairs [OR=0.70; 95% CI=0.14, 3.49]) and medically attended falls (OR=0.78; 95% CI=0.61, 1.00). Authors conclude that home-safety education and the provision of safety equipment improved some fall-prevention practices, but the impact on fall-injury rates is unclear. There was some evidence that the effect of home-safety interventions varied by social group. **Recommendation:** Child health and social care providers should continue to provide fall-safety interventions as part of their strategies to improve child health.	II-1 B	1C
Leduc S, Maurice P. **Testimony of the Institut National de Santé Publique du Québec to the Board of Review Inquiring into the Nature and Characteristics**	**Subjects:** Children **Design:** Review **Methods:** Based on a recommendation from Health Canada, "the Governor in Council issued	This review states that baby walkers are dangerous products and should not be sold or used. The authors report that they increase the risk of serious injury or death and also potentially delay psychomotor development. Not only are baby walkers dangerous but they can give parents a false sense of security when their infants are in them.	III A	

of Baby Walkers. October 2006; pp. 1-9. Available from: INSPQ	an Order under section 6 of the *Hazardous Products Act* that prohibited the advertising, sale and importation of baby walkers". This is a review of that ban in light of the current literature.	**Conclusion:** The ban of April 7, 2004 on baby walkers must be maintained.		
American Academy of Pediatrics. Committee on Injury and Poison Prevention. **Falls from heights: windows, roofs, and balconies.** Pediatrics. 2001; 107: 1188-1191. Abstract available from: PubMed	**Subjects:** 0 to 15 years old **Design:** Policy statement **Methods:** Review of the literature to compile a policy statement on the epidemiology of falls from heights. Lists recommendations for preventive strategies for parent counselling.	Preventive strategies for physicians include: parent counselling, community programs, building code changes and legislation. The AAP recommends a variety of tools (e.g. window guards and stops) to prevent accidental falls from windows. Also, parents are recommended not to place furniture on which children could climb near windows or balconies.	III B	
American Academy of Pediatrics. Committee on Injury and Poison Prevention. **Injuries associated with infant walkers.** Pediatrics 2001; 108: 790-792. Available from: http://pediatrics.aappublications.org/cgi/reprint/108/3/790	**Subjects:** Children **Design:** Review **Methods:** Review of the literature on infant walkers and recommendations given by the AAP.	From 1973 to 1998, there were 34 infant walker-related deaths, mainly from falls down the stairs. This review reports that walkers do not help infants learn to walk and can in fact delay normal development. Due to the high risk of injury, the AAP recommends a ban on the manufacture and sale of mobile infant walkers. If parents are determined to use them, they must meet the American Society for Testing and Materials standards.	III B	

Canadian Pediatric Society and the Canadian Academy of Sport Medicine. **Trampoline use in homes and playgrounds.** Paediatric & Child Health. 2007;12(6):501-505. Reaffirmed: Jan 30 2013. Available from: http://www.cps.ca/english/statements/IP/IP07-01.htm PubMed	**Subjects:** Children **Design:** Position statement **Methods:** A literature review was performed using the MEDLINE database from 1966 to 2006. Canadian injury data were provided by the Public Health Agency of Canada.	This statement reviews the incidence, type and circumstance of injuries sustained as a result of using a home trampoline as well as the disposition of children after the injury. Trampoline injuries occur most frequently in children 5 to 14 years old. Fractures of the upper extremities are the most common injuries. **Recommendations:** • Advise against trampoline use for recreational purposes at home by children or adolescents. • Health care professionals should warn parents of the dangers of trampolines as a recreational toy at routine healthcare visits. Parents should be advised to avoid the purchase of trampolines for the home because enclosures and adequate supervision are no guarantee against injury. • Physicians should advocate for legislation to require warnings of trampoline dangers to be put on product labels.	III C	
Chaudhary, S. Figueroa, J. Shaikh, S. Mays, E. W. Bayakly, R. Javed, M. Smith, M. L. Moran, T. P. Rupp, J. Nieb, S., **Pediatric falls ages 0-4: understanding demographics, mechanisms, and injury severities**. Inj Epidemiol. 2018 5(Supp 1).	**Subjects:** children <5 years old **Design:** Retrospective Database Study **Methods:** This retrospective database study used trauma registry data from the lead pediatric trauma system in Georgia. Data were analyzed for all patients <5 years with an international classification of disease, 9th revision, clinical modification (ICD-9 CM) external cause of injury code (E-code) for unintentional falls between 1/1/2013 and 12/31/2015. Age (months) was compared across categories of demographic variables, injury mechanisms, and	**Conclusion:** Pediatric unintentional falls are a significant burden of injury for children <5 years. Future work will use these risk and injury profiles to inform current safety recommendations and develop evidence-based interventions for parents/caregivers and pediatric providers		C

	emergency department (ED) disposition using Kruskal-Wallis ANOVA and the Mann Whitney U test. The relationships between demographic variables, mechanism of injury (MOI), and Injury Severity Score (ISS) were evaluated using multinomial logistic regression.			
Sims, A., Chounthirath, T. Yang, J., Hodges, N. L. Smith, G. A. **Infant Walker-Related Injuries in the United States.** Pediatrics. 2018. 142(4)	**Subjects:** Children <15 months old **Design:** Retrospective Analysis **Methods:** Data Source The National Electronic Injury Surveillance System (NEISS) is managed by the CPSC and collects data on the injuries of patients who are treated in US EDs. The NEISS obtains data from ∼100 hospitals, representing a stratified probability sample of >5300 hospitals with a 24-hour ED and at least 6 beds in the United States and its territories Case Selection Criteria In this study, we retrospectively examined infant walker–related	**Conclusion:** Infant walker–related injuries decreased after the implementation of the federal mandatory safety standard in 2010. This decrease may, in part, be attributable to the standard as well as other factors, such as decreased infant walker use and fewer older infant walkers in homes. Despite the decline in injuries, infant walkers remain an important and preventable source of injury among young children, which supports the position of the AAP to call for a ban on their manufacture		

	injuries among children <15 months old who were treated in US EDs from January 1, 1990, to December 31, 2014. Injuries that involved infant walkers were identified by using the NEISS product code 1508 for "baby walkers and jumpers." Injuries that were not directly related to the infant walker, such as "fell off couch and struck walker" were excluded. products, such as "baby bouncer, " "baby jumper, " "stroller, " or "in			

4.1.11 SAFE SLEEP ENVIRONMENT

Safe Sleep Environment (Sleep Position/Bed Sharing/Room Sharing) Recommendations	Strength of Recommendation
Safe sleeping environment: CPS Position Statement • **Sleep position and SIDS/Positional plagiocephaly**: Healthy infants should be positioned on their backs on a firm surface for every sleep. Their heads should be placed in different positions on alternate days. Sleep positioners should not be used. While awake, infants should have supervised tummy time. Counsel parents on the dangers of other contributory causes of SIDS such as overheating, maternal smoking or second-hand smoke, alcohol or illicit or sedating drug use. • **Bed sharing**: Advise against bed sharing which is associated with an increased risk for SIDS. • **Crib safety/Room sharing**: Infants should sleep in a crib, cradle, or bassinette that meets Health Canada regulations, is located in parents' room for the first 6 months of life, and is without soft objects, loose bedding, or similar items inside.	**Good**

Safe Sleep Environment (Sleep Position/Bed Sharing/Room Sharing) Resources
1. Safe sleeping environment: Joint statement (CPS/CFSIDS/CICH/HC/PHAC) 2. 2016 Task Force on SIDS (AAP)

Safe Sleep Environment (Sleep Position/Bed Sharing/Room Sharing) References

Reference	Methods	Outcomes	CTFPHC	GRADE
Doering, J.J., Ward, T.C., Strook, S., Campbell, J.K., **A Comparison of Infant Sleep Safety Guidelines in Nine Industrialized Countries.** Journal of Community	**Subjects:** Infants **Design:** Comparison Study **Methods:** We defined "highly developed	**Conclusion:** While there is agreement across nine national infant sleep guidelines regarding the importance of the supine sleep position and avoiding smoke exposure, there is much divergence regarding how other categories or potential risk factors are addressed. There have been international efforts to align research priorities around SIDS [2] and		

Health. 2019. 44;81-87.Retrieved from: https://link.springer.com/article/10.1007/s10900-018-0556-3	countries" using the United Nations' definition of "very high human development"[12], which takes into account the indicators of a long and healthy life, education, and standard of living. Since infant health is an important component of life expectancy at birth, this cluster of countries theoretically represents countries having public health infrastructures that are generally supportive of infant health. We conducted an online search of national infant sleep guidelines and compared similarities and differences among the guidelines	to begin to share national guidelines (via ISPID). This paper expands these efforts by identifying areas of agreement and divergence among available national guidelines in an effort to further inform these international efforts. There are multiple opportunities to further extend this work, for example, by countries providing an English-version document on the ISPID website, and to engage in conversations regarding how evidence is translated in each country [7]. Moreover, it can inform future efforts to systematically address these areas within and between countries, perhaps with the goal of increasing areas of agreement based on the most recent evidence		
Gilmour H, Ramage-Morin P, Wong SL. Infant bed sharing in Canada. Health Reports 2019 Jul 17;30(7):13-19		**Abstract:** **Background:** There is debate about the practice of bed sharing, which is defined as sharing a sleep surface with an infant. Most public health guidance in Canada, including the 2011 Joint Statement on Safe Sleep, advises parents against it because of an association with infant injury and death. However, proponents cite potential physical and psychological benefits, and evidence suggests that the risks associated with bed sharing are low in the absence of other risk factors. Until now, little has been known about the prevalence of and reasons for bed		

		sharing in Canada. **Data and methods:** Canadian Community Health Survey data from 2015 and 2016 were used to estimate the prevalence of and reasons for bed sharing by selected characteristics among women aged 15 to 55 who had given birth in the past five years. Multivariate analysis examined factors independently associated with frequent bed sharing. **Results:** An estimated 33% of women reported that their infant had frequently (every day or almost every day) shared a sleep surface with someone else; 27% had bed shared occasionally (once or twice a week, a few times a month or less than once a month) and 40% had never bed shared. Breastfeeding was the most common reason for bed sharing (39%), followed by facilitating the mother's or infant's sleep (29%). In multivariate analysis, age group, marital status, province or territory of residence, region of mother's birth and breastfeeding were significantly associated with frequent bed sharing. **Discussion:** The data indicate that bed sharing is relatively common and suggest that parents are doing it for practical reasons. The results of this study will provide baseline data and inform policies and programs related to safe sleep practices.		
Lagon, E., Moon, R.Y., Colvin, J.D., **Characteristics of Infant Deaths during Sleep While Under Nonparental Supervision.** The Journal of Pediatrics. 2018. 197. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0022347618301 29X?via%3Dihub	**Subjects:** Infants **Design:** Secondary Analysis **Methods:** We conducted a secondary analysis of sleep-related infant deaths from 2004 to 2014 in the National Center for Fatality Review and Prevention Child Death Review Case Reporting System. The main exposure was supervisor at time of death. Primary outcomes included sleep position, location, and objects in the environment. Risk factors	**Conclusions** Infants who died of sleep-related causes under nonparental supervision were more likely to have been placed nonsupine. Among nonparental supervisors, relatives and friends were more likely to use unsafe sleep environments, such as locations other than a crib or bassinet and bed sharing. Pediatricians should educate parents that all caregivers must always follow safe sleep practices.		C

	for parental vs nonparental supervisor were compared using x^2 and multivariable logistic regression models. Risk factors associated with different nonparental supervisors were analyzed using x^2			
Carlin, R.F., Moon, R.Y., **Risk Factors, Protective Factors, and Current Recommendations to Reduce Sudden Infant Death Syndrome: A Review**. 2017. 171(2) Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/27918760	**Subjects:** Infants **Design:** Review	Despite our improved understanding of the pathophysiology of SIDS, additional work focusing on physiologic pathways and genetic features that may increase vulnerability for SIDS is needed. Research on the immature brain and arousal mechanisms has led to new hypotheses and discovery of biological markers believed to contribute to the final pathway of SIDS; however, further research is needed to identify how specific infections and the immune system may affect both neurologic development and arousal mechanisms as well as how ineffective arousal mechanisms can be altered to avert these deaths. Ultimately, a better understanding of the pathophysiology of these systems may aid in not only identifying at-risk infants but also identifying potential biologic targets for SIDS prevention. Currently, the main stay of prevention continues to be a safe sleep environment, as most infants who die suddenly and unexpectedly do so in unsafe sleep environments. Therefore, future research must also focus on the interplay between pathophysiology and known environmental and behavioral risk factors, specifically how environmental exposures, such as sleep position, exposure to smoking, and sleep location, alter typical physiologic responses. Finally, additional research must focus on more effective educational campaigns and strategies. Particular attention should focus on high-risk groups, such as non-Hispanic African American and Native American/Alaskan Native parents, for whom prior campaignshavebeenlesseffective.It is likely that a combination of epidemiologic,physiologic, and genetic research will be needed to identify trends, determine predispositions, and modify both intrinsic and extrinsic risks.		

AAP TASK FORCE ON SUDDEN INFANT DEATH SYNDROME. **SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment**. Pediatrics November 2016, 138 (5) e2016293. Available from: Pediatrics.		**Abstract** Approximately 3500 infants die annually in the United States from sleep-related infant deaths, including sudden infant death syndrome (SIDS; International Classification of Diseases, 10th Revision [ICD-10], R95), ill-defined deaths (ICD-10 R99), and accidental suffocation and strangulation in bed (ICD-10 W75). After an initial decrease in the 1990s, the overall death rate attributable to sleep-related infant deaths has not declined in more recent years. Many of the modifiable and nonmodifiable risk factors for SIDS and other sleep-related infant deaths are strikingly similar. The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating. Additional recommendations for SIDS reduction include the avoidance of exposure to smoke, alcohol, and illicit drugs; breastfeeding; routine immunization; and use of a pacifier. New evidence is presented for skin-to-skin care for newborn infants, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age. The recommendations and strength of evidence for each recommendation are included in this policy statement. The rationale for these recommendations is discussed in detail in the accompanying technical report (www.pediatrics.org/cgi/doi/10.1542/peds.2016-2940).		

Colvin, J. D., Collie-Akers, V., Schunn, C., & Moon, R. Y. **Sleep environment risks for younger and older infants**. Pediatrics. 2014 August; 134(2): e406–e412. Available from Pediatrics.	**Subjects**: Infants < 1 year old **Design:** Cross-sectional study **Methods:** This study compared differences in the sleep environments of younger (birth - 3 months) and older (4 months - 364 days) infants who experienced sleep-related deaths between 2004-2012 through the US National Center for the Review and Prevention of Child Deaths Case Reporting System. A secondary aim of the study was to examine differences in diagnoses for younger and older infants who experienced sleep-related deaths. The main exposure was age and the primary outcomes were bed-sharing, objects in the sleep environment, location (eg, adult bed), and position (eg, prone).	A total of 8 207 deaths were analyzed. Younger children were more likely bed-sharing (73.8% vs 58.9%, P < .001) and sleeping in an adult bed/on a person (51.6% vs 43.8%, P < .001). A higher percentage of older children had an object in the sleep environment (39.4% vs 33.5%, P < .001) and changed position from side/back to prone (18.4% vs 13.8%, P < .001). Risk factors for sleep-related infant deaths may be different for different age groups.		B

Carpenter, R., McGarvey, C., Mitchell, E. A., Tappin, D. M., Vennemann, M. M., Smuk, M., & Carpenter, J. R. **Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies**. BMJ Open, 2013; 3(5). Available from BMJ Open.	**Subjects**: Children **Design:** Case-controlstudy **Methods:** This study combines 5 major SIDS case-control studies, including 1 472 cases and 4 679 controls. The objective of this study was to quantify the relative risks and predicted SIDS rates associated with bed sharing in relation to breastfeeding, smoking, mother's recent alcohol consumption and illegal drug use. 5 datasets were combined, missing data was imputed, and random effects logistic regression was used to control for confounding factors.	This study combines 5 major SIDS case-control studies, making it the largest study of SIDS risk factors with individual level data (UK, Europe, Australia). The objective was to quantify the relative risks and predicted SIDS rates associated with bed sharing in relation to breastfeeding, smoking, mother's recent alcohol consumption and illegal drug use. Frequency of bed sharing during last sleep was compared between babies who died of SIDS and living control infants. In the combined dataset, adjusted odds ratio (aOR) for bed sharing was 2.7 (95% CI 1.4 to 5.3, p=0.0027) for breastfed infants with no other risk factors. Bed sharing risk decreased with increasing infant age. The relative risk associated with bed sharing was increased when the baby was breastfed and neither parent smoked and no other risk factors were present. The average risk is in the first 3 months and is 5.1 (2.3 to 11.4) times greater than if the baby is put to sleep supine on a cot in the parents' room. This increased risk is unlikely to be due to chance (p=0.000059). These findings suggest that bed sharing for sleep even when parents do not smoke or take alcohol or drugs increases the risk of SIDS. A substantial reduction of SIDS rates could be achieved if parents avoided bed sharing.		B

Rechtman, L. R., Colvin, J. D., Blair, P. S., & Moon, R. Y. **Sofas and infant mortality**. Pediatrics, 2014; 134(5): e1293-1300. Available from: Pediatrics.	**Subjects**: Children **Design:** Cross-sectional study **Methods:** Data for infant deaths on sofas was taken from the US National Center for the Review and Prevention of Child Deaths Case Reporting System from 2004-2012. Demographic and environmental data for deaths on sofas were compared with data for sleep-related infant deaths in other locations, using bivariate and multivariable, multinomial logistic regression analyses.	This study assessed factors associated with infant deaths on sofas. 1 024 deaths on sofas made up 12.9% of all sleep-related infant deaths. They were more likely than deaths in other locations to be classified as accidental suffocation or strangulation (adjusted OR [aOR] 1.9; 95% confidence interval [CI], 1.6–2.3) or ill-defined cause of death (aOR 1.2; 95% CI, 1.0–1.5). Infants who died on sofas were less likely to have objects in the environment (aOR 0.6; 95% CI, 0.5–0.7) and more likely to be sharing the surface with another person (aOR 2.4; 95% CI, 1.9–3.0), to be found on the side (aOR 1.9; 95% CI, 1.4–2.4), to be found in a new sleep location (aOR 6.5; 95% CI, 5.2–8.2), and to have had prenatal smoke exposure (aOR 1.4; 95% CI, 1.2–1.6). Sofas are hazardous sleep surfaces for infants. Deaths on sofas are associated with non-supine placement, being found on the side position, surface sharing, changing sleep location, and experiencing prenatal tobacco exposure.		C
Shapiro-Mendoza, C. K., Colson, E. R., Willinger, M., Rybin, D. V., Camperlengo, L., & Corwin, M. J. **Trends in infant bedding use: National Infant Sleep Position study, 1993-2010**. Pediatrics, 2015; 135(1): 10-17. doi:10.1542/peds.2014-1793.	**Subjects**: Children **Design:** Cross-sectional study **Methods:** Used data from the NISP (National Infant Sleep Position, cross-sectional telephone survey) Study to estimate the prevalence of reported use of certain types of bedding and examine trends from 1993-2010, and characteristics associated with bedding use. The main outcome	Despite a substantial decline in reported use of bedding from 1993 to 2010, this potentially hazardous practice remains common, with almost 50% of US caregivers reportedly placing their infants to sleep with some type of bedding. Depending on sociodemographic characteristics, this practice ranged from 46% to 77% during 2007 to 2010. Bedding use was most prevalent among infants sleeping in adult beds (71.5%), placed to sleep on their sides (66.1%), and sharing a sleep surface (70.0%). **Conclusion**: The use of certain types of bedding in the infant sleep environment is a modifiable risk factor for SIDS and unintentional sleep-related suffocation. Despite AAP recommendations, the use of bedding over and under the infant for sleep seems to have remained a common practice. Understanding trends and		B

	measured was reported usual use of certain types of bedding under the infant or covering the infant while sleeping in the last 2 weeks. Data from 2007–2010 was examined in conjunction with other unsafe sleep practices: proportion of infants using bedding over or under them by sleep location, usual sleep position, and whether the infant was in bed alone. The independent association of bedding use with various potential confounders was also examined. Crude ORs and adjusted ORs (aOR) and 95% confidence intervals (CIs) were calculated using multivariable logistic regression.	characteristics associated with bedding use is important for tailoring prevention strategies to reach those at highest risk.		
Joint statement on safe sleep: preventing sudden infant deaths in Canada. December 2012. Available from: http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_0-2/sids/pdf/jsss-ecss2011-eng.pdf	**Subjects**: Infants **Design:** joint statement **Methods:** The Public Health Agency of Canada produced this document for health practitioners so they may provide parents and caregivers with information and support to prevent deaths due to SIDS	A joint statement developed by North American experts in the field of SIDS, the CPS, the Canadian Foundation for the Study of Infant Deaths, the Canadian Institute of Child Health, Health Canada, and the Public Health Agency of Canada with input from provincial/territorial, national, and regional public health stakeholders. **Conclusion**: 1) Infants placed on their backs to sleep, for every sleep, have a reduced risk of SIDS.		

	and unsafe sleeping practices. Parents and all caregivers are encouraged to practice the principles of safe sleep at home, in child care settings, and when travelling.	2) Preventing exposure to tobacco smoke, before and after birth, reduces the risk of SIDS. 3) The safest place for an infant to sleep is in a crib, cradle, or bassinet that meets current Canadian regulations. 4) Infants who share a room with a parent or caregiver have a lower risk of SIDS. 5) Breastfeeding provides a protective effect against SIDS.		
Vennemann MM. Hense HW. Bajanowski T. Blair PS. Complojer C. Moon RY. Kiechl-Kohlendorfer U. **Bed sharing and the risk of sudden infant death syndrome: can we resolve the debate?** Journal of Pediatrics. 2012;160(1):44-8.e2. Abstract available from: PubMed	**Subjects:** Infants **Design:** Meta-analysis **Methods:** PubMed and Medline searches were conducted up to December 2009 for case-control studies about SIDS and bed sharing.	The authors included eleven case-control in their meta-analysis, consisting of 2,464 cases and 6,495 controls, where 710 cases (28.8%) and 863 controls (13.3%) bed shared. Analyses were stratified according to parental smoking status , age of infant at the time of last sleep regardless of smoking status (12 week cut-off), and bed sharing as a usual habit versus bed sharing not usual but in the last night. ORs for bed sharing and SIDS were 2.89 (95% CI, 1.99-4.18) overall, 6.27 (95% CI, 3.94-9.99) for maternal smoking compared to 1.66 (95% CI, 0.91-3.01) for non-smoking mothers, and 10.37 (95% CI, 4.44-24.21) as compared to 1.02 (95% CI, 0.49-2.12 for bed sharing with infants aged <12 weeks versus ≥ 12 weeks. **Conclusion:** Bed sharing is a risk factor for SIDS and is especially enhanced in smoking parents and in very young infants.	II-2 A	1B

Vennemann MM, Bajanowski T, Brinkmann B, Jorch G, Sauerland C, Mitchell EA and the GeSID Study Group. **Sleep environment risk factors for sudden infant death syndrome: The German sudden infant death syndrome study.** Pediatrics. 2009; 123: 1162-1170 PubMed	**Subjects:** Infants **Design:** Population-based case-control study **Methods:** Cases of SIDS (n=333) were collected from 1998 to 2001 from all over Germany. Controls (n=998) were matched for age, region, gender and sleep time and recruited from the same vital registry as the cases.	This case-control study found that the risk of SIDS is significantly higher when the infant's last sleep was not in the parental home as well as when he/she is sleeping in the living room compared to the parents' bedroom. They also found that sleeping prone, bedsharing, sleeping prone on sheepskin and duvets are associated with increased risk of SIDS. This study supports the statement from the AAP and their recommendations for safe sleeping environments. Novel risk factors include sleeping outside the parents' home, sleeping in the living room, and sleeping prone on sheepskin (high risk).	II-2 A	
Horsley T, Clifford T, Barrowman N, Bennett S, Yazdi F, Sampson M, Moher D, Dingwall O, Schachter H, Côté A. **Benefits and harms associated with the practice of bed sharing: a systematic review**. Arch Pediatr Adolesc Med. 2007 Mar;161(3):237-45. Abstract available from: PubMed	**Subjects:** Children 0 to 2 years **Design:** systematic review **Methods:** Searched MEDLINE, CINAHL, Healthstar, PsycINFO, the Cochrane Library, Turning Research Into Practice, and Allied and Alternative Medicine databases between January 1993 and January 2005 to identify investigating the practice of bed sharing (defined as a child sharing a sleep surface with another individual) and associated benefits and harms.	Evidence from 40 observational studies included consistently suggests that there may be an association between bed sharing and sudden infant death syndrome (SIDS) among smokers (however defined), but the evidence is not as consistent among non-smokers. This does not mean that no association between bed sharing and SIDS exists among non-smokers, but that existing data do not convincingly establish such an association. Data also suggest that bed sharing may be more strongly associated with SIDS in younger infants. A positive association between bed sharing and breastfeeding was identified. Current data could not establish causality. It is possible that women who are most likely to practice prolonged breastfeeding also prefer to bed share. **Conclusion:** Bed sharing may be associated with SIDS, particularly among smokers and in younger infants.	II-3 C	2C

4.1.12 POSITIONAL PLAGIOCEPHALY

Positional Plagiocephaly Recommendations	Strength of Recommendation
1. While supine for sleep, the orientation of the infant's head should be varied to prevent positional plagiocephaly. Sleep positioners should not be used. 2. After umbilical cord stump has detached, infants should have supervised tummy time while awake.	Consensus **Good**

Positional Plagiocephaly Resources
1. Positional plagiocephaly (PCH)

Positional Plagiocephaly References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Cummings, C. **Positional plagiocephaly**. Paediatr Child Health. 2011; 16(8): 493-496. Reaffirmed: Feb 1 2016. Available from http://www.cps.ca/en/documents/position/positional-plagiocephaly.	**Subjects:** Infants **Design:** Practice point **Methods:** This practice point describes the incidence and causes of positional plagiocephaly (PP), its differentiation from craniosynostosis, the prevention of plagiocephaly, available treatment methods and the usefulness of these interventions, and provides a summary of recommendations.	The incidence of PP is striking at 6 weeks of age, increases to a maximum at 4 months, and then slowly decreases over 2 years. Factors increasing the risk of PP are male sex, firstborn, limited passive neck rotation at birth (congenital torticollis), supine sleeping position at birth and at 6 weeks, only bottle feeding, awake 'tummy time' fewer than 3 times per day, and lower activity level with slower achievement of milestones. Sleeping with the head to the same side and positional preference when sleeping are also associated with the development of PP. The CPS provides the following **recommendations** for the prevention of plagiocephaly: - Prevention of plagiocephaly begins with positioning of the head to encourage lying on each side in the supine position. More effort may be required for the child with a strong positional preference to lie more on one side of the head. - Prone position during awake time (tummy time) for 10 min to 15 min at least three times per day reduces the development of plagiocephaly. - Evaluation for craniosynostosis, congenital torticollis and cervical spine abnormalities should be part of the examination of a child with plagiocephaly. To read CPS recommendations for the treatment of plagiocephaly, refer to the practice point.	II-2, II-2, III A, A, A	

Mawji, A., Vollman, A. R., Fung, T., Hatfield, J., McNeil, D. A., & Sauve, R. **Risk factors for positional plagiocephaly and appropriate time frames for prevention messaging**. Paediatr Child Health. 2014; 19(8): 423-427. Available from Paediatrics and Child Health.	**Subjects:** 7-14 week old infants **Design:** Prospective cohort study **Methods:** 440 infants from well-child clinics at 4 community health centers in Calgary, AB were assessed by the primary author and a registered nurse research assistant using Argenta's plagiocephaly assessment tool. Data were collected from July - September 2010 via a questionnaire surveying 6 modifiable and 7 non-modifiable risk factors completed by parents. Multivariable logistic regression analysis was used to identify risk factors predictive of positional plagiocephaly (PP).	This Canadian study set out to determine potential risk factors for developing PP in infants 7 to 12 weeks of age. The incidence of PP was estimated to be 46.6%. 5 factors in the adjusted multivariable model were found to be associated with plagiocephaly: supine sleep positioning, sex, delivery type, and right- and left-sided head positional preference. In comparison to infants who did not sleep supine, infants who slept supine had 2.7 times the odds of developing PP (OR 2.67, 95% CI 1.58 - 4.51; P<0.001). Male infants had 1.55 times the odds of developing PP (OR 1.55, 95% CI 1.00 - 2.38; P=0.05). Compared with infants delivered vaginally with no assistance, infants born of a vacuum/forceps assisted delivery were almost twice as likely to develop PP (OR 1.88, 95% CI 1.02 - 3.49; P=0.04). Finally, compared with infants who did not have a head positional preference, infants with either a right-sided head positional preference or a left-sided head positional preference had >4 times the odds of developing PP [right (OR 4.66, 95% CI 2.85 - 7.58; P<0.001), left (OR 4.21, 95% CI 2.45 - 7.25; P<0.001)]. **Conclusion:** Prevention and anticipatory guidance advising parents to vary infants' head positions needs to be communicated well before the two-month well-child visit. This may be emphasized for parents of male infants and infants who have had assisted deliveries.		C

Task Force on Sudden Infant Death Syndrome**. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment.** Pediatrics. 2016. 138 (5) Retrieved from: https://pediatrics.aappublications.org/content/138/5/e20162938	**Subjects:** Infants **Design:** Policy Statement **Methods:** The recommendations and strength of evidence for each recommendation are included in this policy statement. The rationale for these recommendations is discussed in detail in the accompanying technical report	The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating. Additional recommendations for SIDS reduction include the avoidance of exposure to smoke, alcohol, and illicit drugs; breastfeeding; routine immunization; and use of a pacifier. New evidence is presented for skin-to-skin care for newborn infants, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age.		
Joint statement on safe sleep: preventing sudden infant deaths in Canada. December 2012. Available from: http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_0-2/sids/pdf/jsss-ecss2011-eng.pdf	**Subjects**: Infants **Design:** Joint statement **Methods:** The Public Health Agency of Canada produced this document for health practitioners so they may provide parents and caregivers with information and support to prevent deaths due to SIDS and unsafe sleeping practices. Parents and all caregivers are encouraged to practice the principles of safe sleep at home, in child care settings, and when travelling.	On plagiocephaly or *flat heat.* **Recommendation:** Infants will benefit from supervised *tummy time*, when they are awake, several times every day, to counteract any effects of regular back sleeping on muscle development or the chance of developing plagiocephaly, commonly referred to as *flat head.*.	III A	1C
Laughlin J, Luerssen TG, Dias MS; Committee on	**Subjects:** Infants **Design:** Clinical report	In most cases, the diagnosis and successful management of positional skull deformity can be assumed by the pediatrician or	III I	C

Practice and Ambulatory Medicine, Section on Neurological Surgery. **Prevention and management of positional skull deformities in infants.** Pediatrics. 2011 Dec;128(6):1236-41. PubMed	**Methods:** This report provides guidance for the prevention, diagnosis, and management of positional skull deformity in an otherwise normal infant without evidence of associated anomalies, syndromes, or spinal disease.	other primary health care clinician. This management includes examination for and counseling regarding positional skull deformity in the newborn period and at health supervision visits during infancy, as well as monitoring for improvement or progression. For the mild-to-moderate deformity, positioning and observation is the recommended treatment. Both positional changes and molding helmets are options for the infant with severe deformity. Cranial orthoses should be reserved for severe cases of deformity or for the infant whose deformity does not improve after 6 months of age. Referral to a pediatric neurosurgeon with expertise in craniofacial malformations, a craniofacial surgeon, or a craniofacial team should be considered if there is progression or lack of improvement after a trial of mechanical adjustments or suspicion of craniosynostosis. **Conclusion:** Aside from potentially preventing positional skull deformity, routine awake tummy time has been shown to enhance infant motor developmental scores during the first 15 months of life. **Recommendations:** 1) To prevent the deformity, parents should be counselled during the newborn period (by 2–4 weeks of age) when the skull is maximally deformable. 2) Parents should be instructed to lay the infant down to sleep in the supine position, alternating positions (ie, left and right occiputs). 3) When awake and being observed, the infant should spend time in the prone position for at least 30 to 60 minutes/day. 4) The infant should spend minimal time in car seats (when not a passenger in a vehicle) or other seating that maintains supine positioning.		

4.1.13 CRIB SAFETY

Crib Safety Recommendations	Strength of Recommendation
1. Infants should sleep in a crib, cradle or bassinette (without soft objects, loose bedding, and similar items), that meets current Canada Health regulations in parents' room for the first 6 months of life. Health Canada.	**Good**

Crib Safety References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Health Canada. **Crib Safety Tips for Parents and Caregivers.** June 2012. Available from: Health Canada	**Subjects:** Infants **Design:** Consumer product safety document **Methods:** Crib safety tips for parents and caregivers published online by Health Canada.	This consumer product safety sheet states that cribs are the safest place for babies to sleep in if they meet Canada's current safety regulations. Toddler bed or standard bed should be used for babies that could possibly climb out of the crib on their own or if they are taller than 90 cm (35 inches). The safety tips include using a recent crib with its original parts (<10 years), a firm mattress tight against all sides of the crib and in good condition and more. Refer to website for specific safety tips.	III I	
Cyr. C. **Preventing choking and suffocation in children**. Pediatrics and Child Health. 2012. 17(2) Available at: https://www.cps.ca/en/documents/position/preventing-choking-suffocation-children	**Design:** Position Statement **Methods:** The present statement reviews definitions, epidemiology and effective prevention strategies for these injuries. Recommendations that combine approaches for improving safety, including research, surveillance, legislation and standards, product design and education, are made. Paediatric health care providers should be encouraging parents and other caregivers to learn CPR	See Position Statement for specific recommendations		

	and choking first aid, as well as offering anticipatory, age-appropriate guidance to prevent these injuries, at regular health visits			
Moon RY, Kotch L, Aird L. **State child care regulations regarding infant sleep environment since the healthy child care America-Back to Sleep campaign.** Pediatrics. 2006; 118: 73-83. Abstract available from: PubMed	**Subjects:** Infants **Design:** Review **Methods:** Reviewed the regulations in 50 states pertaining to SIDS, infant sleep position, crib safety, bedding safety, smoking and provision of information about sleep positioning policies and arrangements to parents before the infant is enrolled in child care.	Eighty-one out of 101 state regulations have ≥ 1 crib safety standard. The review reports that the most common regulations pertain to the distance between slates and the firmness and fit of the mattress. The AAP recommends the use of cribs, bassinets or cradles that conform to the safety standards of the Consumer Product Safety Commission.	III A	

4.1.14 SWADDLING

Swaddling Recommendations	Strength of Recommendation
1. Proper swaddling of the infant may promote longer sleep periods but could be associated with adverse events (hyperthermia, SIDS, or development of hip dysplasia) if misapplied. A swaddled infant must always be placed supine with free movement of hips and legs, and the head uncovered. Swaddling is contraindicated once baby shows signs of attempting to roll.	Consensus

Swaddling Resources
1. Risks and Benefits of Swaddling (AJMCN)

Swaddling References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Nelson, A.M., Risks and Benefits of Swaddling Healthy Infants: An Integrative Review. The American Journal of Maternal/Child Nursing. 2017. 42(4):216-225. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28394766	**Subjects:** Infants **Design:** Review **Methods:** MEDLINE (1960–May 13, 2016) and CINAHL (1963–May 13, 2016) searches were conducted, relevant articles retrieved, and citation lists reviewed for other references.	**Results:** Swaddling calms infants and promotes sleep, but it is equally or less effective than other nonpharmacological methods in managing pain. There may be a slight risk for sudden infant death syndrome associated with supine swaddling, although the impact of confounding variables is unclear. Early skin-to-skin contact supports early breastfeeding, but swaddling does not have a negative impact on breastfeeding long term. Swaddling tightly around the hips is strongly associated with developmental dysplasia of the hip. More research is needed on the impact of swaddling on pain in term infants, infant vital signs, arousal thresholds, and a possible association between swaddling, vitamin D defi ciency, and acute lower respiratory tract infection.		

Kelly, B.A., Irigoyen, M.M., Pomerantz, S.C., Mondesir, M., Isaza-Brando, N., **Swaddling and Infant Sleeping Practices.** Journal of Community Health. 2017. 42(10):10-14. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/27393144	**Subjects:** Mothers/Infants **Design:** Comparison Study **Methods:** From November 2009 through January 2010, we surveyed a convenience sample of mothers of infants 1–3 months of age at a pediatric ambulatory center at an academic medical center that serves a minority, low income population. Inclusion criteria were gestational age equal to or greater than 35 weeks, born at the medical center, and discharged from the nursery. All postpartum women at the medical center received routine education on infant safe sleeping practices, including one-to-one education by a registered nurse, review of safe sleeping practices by a pediatric provider, and a back-to-sleep brochure	**Conclusions** Minority communities experience higher rates of SUID, primarily due to unsafe infant sleeping practices. A postpartum swaddling educational intervention in a minority, urban community increased the use of swaddling but had a limited impact on safe sleeping practices. We found significantly less bedsharing but no significant difference in the use of ‘‘back to sleep.’’ A concerning finding was that even after an postpartum swaddling educational intervention, nearly one in five babies did not sleep on their back, and one in six babies was bedsharing. This high prevalence of unsafe practices shows the need for continued efforts to encourage safe infant sleeping practices in minority communities. Ongoing studies are needed to monitor the safety and effectiveness of swaddling as a tool to promote safe sleeping in infants.		C
Task Force on Sudden Infant Death Syndrome**. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping**	**Subjects:** Infants **Design:** Policy Statement **Methods:** The recommendations and strength of evidence	The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating. Additional recommendations for SIDS reduction include		

Environment. Pediatrics. 2016. 138 (5) Retrieved from: https://pediatrics.aappublications.org/content/138/5/e20162938	for each recommendation are included in this policy statement. The rationale for these recommendations is discussed in detail in the accompanying technical report	the avoidance of exposure to smoke, alcohol, and illicit drugs; breastfeeding; routine immunization; and use of a pacifier. New evidence is presented for skin-to-skin care for newborn infants, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age.		
Pease AS, Fleming PJ, Hauck FR, Moon RY, Horne RSC, L'Hoir MP, Posonby A-L, Blair PS. Swaddling and the Risk of Sudden Infant Death Syndrome: A Meta-analysis. Pediatrics 2016; 137 (6): e20153275. Available from: Pediatrics.	**Subjects:** infants in studies examining swaddling and SIDS **Design:** Individual-level meta-analysis **Methods:** data on sleeping position and age provided by authors of included studies looking at SIDS for infants swaddled for sleep. Observational studies that measured swaddling for last or reference sleep were included.	Four studies met inclusion criteria. There was significant heterogeneity among studies. Overall age-adjusted pooled odds ratio (OR) (random effects) for swaddling in all 4 studies was 1.58 (95% confidence interval [CI], 0.97–2.58). Removing the most recent study reduced the heterogeneity (I2 = 28.2%; P = .25) and provided a pooled OR (using a fixed effects model) of 1.38 (95% CI, 1.05–1.80). Swaddling risk varied according to position placed for sleep; the risk was highest for prone sleeping (OR, 12.99 [95% CI, 4.14–40.77]), followed by side sleeping (OR, 3.16 [95% CI, 2.08–4.81]) and supine sleeping (OR, 1.93 [95% CI, 1.27–2.93]). Limited evidence suggested swaddling risk increased with infant age and was associated with a twofold risk for infants aged >6 months. Limitation: Heterogeneity among the few studies available, imprecise definitions of swaddling, and difficulties controlling for further known risks make interpretation difficult. Conclusion: Current advice to avoid front or side positions for sleep especially applies to infants who are swaddled. Consideration should be given to an age after which swaddling should be discouraged.		

Pediatric Orthopedic Society of North America. **Swaddling and Developmental Hip Dysplasia Position Statement.** 2015 Available at: https://posna.org/POSNA/media/Documents/Position%20Statements/SwaddlingPositionStatementApril2015.pdf	**Subjects:** Infants **Design:** Position Statement	Since tight swaddling can stress the infant's hips, leading to instability, dysplasia and even hip dislocation, it is important for parents to be aware of proper swaddling methods. Caution when swaddling has been recommended to allow the hips to move freely to avoid increasing the risk of developmental dysplasia, especially in the first few months of life (1,2,3,6). The infant hips should have freedom of flexion and abduction motion during swaddling. The knees should also be maintained in slight flexion. Some commercial products may hold the hips in too much extension. If there is a question about the safety of a device or other questions about swaddling, we encourage that the parent discuss this with child's pediatrician or health care provider.		
McDonnell, E., & Moon, R. Y. (2014). Infant deaths and injuries associated with wearable blankets, swaddle wraps, and swaddling. *The Journal of Pediatrics*, *164*(5), 1152-1156. Available from : https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3992172/	**Subjects:** Infants **Design:** Retrospective review **Methods:** review of infant deaths, injuries, and potential injuries involving wearable blankets, swaddle wraps, and swaddling occurring between September 2004 and July 2012 as reported to the Consumer Product Safety Commission (CPSC).	A total of 36 cases were reviewed. There were 5 cases (including 1 death, 2 injuries, and 2 potential injuries) involving wearable blankets, 18 cases (including 8 deaths and 10 potential injuries) involving swaddle wraps, 1 case (resulting in death) involving an unspecified product (either a swaddle wrap or wearable blanket), and 12 cases (all resulting in death) involving infants swaddled in ordinary blankets. **Conclusion:** Reports of sudden unexpected death in swaddled infants are rare. Risks can be reduced by placing infants supine and discontinuing swaddling as soon as an infant's earliest attempts to roll are observed. Risks can be further reduced by removing soft bedding and bumper pads from the sleep environment. When using commercial swaddle wraps, fasteners must be securely attached.		C
Manaseki-Holland S, Spier E, Bavuusuren B, Bayandorj T, Sprachman S, Marshall T. **Effects of traditional swaddling on development: a randomized controlled**	**Subjects:** Healthy newborns **Design:** Randomized controlled trial **Methods:** This trial aimed to test whether infants not	No significant between-group differences were found in mean scaled mental and psychomotor developmental scores. The unadjusted mean difference between the groups was -0.69 (95% confidence interval [CI]: -2.59 to 1.19) for psychomotor and -0.42 (95% CI: -1.68 to 0.84) for mental scores in favour of the swaddling group. A subgroup analysis of the compliant sample produced	I C	A

trial. Pediatrics. 2010 Dec;126(6):e1485-92. Abstract available from: PubMed	swaddled or swaddled tightly in a traditional setting have significantly different scores on a development scale. 1,279 newborns in Mongolia were allocated at birth to traditional swaddling or nonswaddling. The families received 7 months of home visits to collect data and monitor compliance. At 11 to 17 months of age, the Bayley Scales of Infant Development (II) was administered to 1,100 children.	similar results. BSID-II-scaled psychomotor and mental scores were 99.98 (95% CI: 99.03-100.92) and 105.52 (95% CI: 104.89-106.14), respectively. Background characteristics were balanced across the groups. The Mongolian infants in this trial had scaled BSID-II mental and psychomotor scores comparable to United States norms. **Conclusion:** In the Mongolian context, prolonged swaddling in the first year of life did not have any significant impact on children's early mental or psychomotor development.		

4.1.15 FIREARM SAFETY/REMOVAL/STORAGE

Firearm Safety/Removal/Storage Recommendation	Strength of Recommendation
1. **Advise on removal of firearms from home or safe storage to decrease the risk of unintentional firearm injury, suicide, or homicide.**	**Good**

Firearm Safety/Removal/Storage Resources
1. Prevention of firearms injuries (CPS)

Firearm Safety/Removal/Storage References

Reference	Methods	Outcomes	CTFPHC	GRADE
Canadian Paediatric Society. The prevention of firearm injuries in Canadian youth. Posted Feb 16, 2018. Available from: Canadian Paediatric Society Available at: https://www.cps.ca/en/documents/position/the-prevention-of-firearm-injuries-in-canadian-youth	**Subjects:** Children **Design:** Policy statement **Methods:** Reviewed the literature on youth and firearm safety from Canada and the United States. Mainly focuses on older children and adolescents, however there have been incidents involving children as young as 3 years old.	The CPS statement reports that the presence of a firearm in the home increases the risk of domestic homicide, suicide and unintentional injury as compared to homes without a firearm and that non-powder firearms are also dangerous, especially for younger children. The Canadian Firearms Act states that firearms in the home have to be stored unloaded, in a locked container, separate from ammunition. Education programs for children have shown no benefit in preventing injury and death. **Recommendations:** Health care providers can help reduce risk for firearm-related injuries and deaths by using the following best practices: • Counsel families that firearms should not be present in homes or environments in which children and adolescents live and play. When a firearm is present, it must be stored according to the regulations of Canada's Firearms Act: unloaded, locked and separate from its ammunition.		

		• Ask routinely about the presence of a firearm in the home and inform parents of the risks of home ownership if one is present. Highlight the developmental characteristics that make children and youth particularly vulnerable to death by firearm. • Screen for the presence of a firearm in the home as part of routine safety assessment for all children or youth struggling with or at risk of mood disorders, substance abuse issues or self-harming behaviours (including a history of suicide attempt). In such cases, a strong recommendation must be made for the removal of any firearms that are present. • Inform parents that nonpowder firearms (e.g., air guns and BB guns) are dangerous weapons; children and adolescents must never use these weapons unless they are supervised closely by an adult. Inform parents that paintball and airsoft guns must be used only in supervised arenas with proper safety gear. • When assessing children with injuries caused by nonpowder firearms, be aware that the pellets can cause significant internal injury. • When there is concern regarding intimate partner or family violence, inquire about the presence of a firearm in the home and if one is present, recommend its removal.		

Dowd MD. Sege RD. Council on Injury, Violence, and Poison Prevention Executive Committee. American Academy of Pediatrics. **Firearm-Related Injuries Affecting the Pediatric Population.** Pediatrics. 2012;130(5):e1416-23. Abstract available from: Pediatrics	**Subjects:** Children and adolescents **Design:** Policy statement **Methods:** Review of the literature on firearms related injuries in children.	The AAP makes several recommendations, which reaffirm and expand on the 1992 and the 2000 policy statements. The primary prevention of firearm-related injuries or deaths is essential. Strategies include trigger locks, lock boxes, personalized safety mechanisms, and trigger pressures that are too high for young children. Authors cite two randomized trials where brief physician counselling directed at parents, combined with distribution of gunlocks, and safe storage campaign with gun safe distribution, are two effective interventions to limit access to guns in household with children. **Recommendations:** 1) The most effective measure is the absence of guns from homes and communities. Child health care providers counsel on the danger of allowing children to have access to guns and educate parents on how to limit access by unauthorized users.	I, II-2, II-3, III A	1A 1A
Laraque D, and the Committee on Injury, Violence and Poison Prevention. American Academy of Pediatrics. **Injury risk of nonpowder guns**. Pediatrics. 2004; 114: 1357-1361. Reaffirmed February 2012. Abstract available from: PubMed	**Subjects:** Children and adolescents **Design:** Technical report review **Methods:** Review of the literature on non-powder guns which include BB guns, pellet guns, air rifles and paintball guns. Launched projectiles can be made of lead, copper, brass, steel or paint.	From 1990 to 2000, 32 deaths occurred in children <15 years old. Overall, non-powder guns are associated with serious injury, permanent disability and death. They are weapons and should never be characterized as toys. This review reports that injuries resulting from these guns should receive medical attention similar to firearm-related injuries.	III A	

4.2 BEHAVIOUR AND FAMILY ISSUES

4.2.1 CRYING/COLIC

Crying Recommendations	Strength of Recommendation
1. Excessive crying may be caused by behavioural or physical factors or be the upper limit of the normal spectrum. Caregiver frustration with infant crying can lead to child maltreatment/inflicted injury (head injury, fractures, bruising). The Period of Purple Crying. See Prevention of child maltreatment.	Consensus

Crying Resources
1. Disruptive Behaviour (CPS/CACAP)
2. The Period of Purple Crying

Crying/Colic References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Public Health Agency of Canada and Canadian Paediatric Society. Joint Statement on Traumatic Head Injury due to Child Maltreatment (THI-CM): An update to the Joint Statement on Shaken Baby Syndrome. July 2020. Available at: https://www.canada.ca/en/public-health/services/health-promotion/childhood-adolescence/publications/joint-statement-traumatic-head-		Foundation statements i. Terms and definitions • THI-CM is defined broadly to include traumatic injury to the head (skull and/or brain and/or intracranial structures), which may also be accompanied by injury to the face, scalp, eye, neck or spine, as a result of the external application of force from child maltreatment. • THI-CM is the preferred term in Canada for research, public health, policy and prevention initiatives. • For clinicians recording a diagnosis in the health record, Traumatic Head Injury (THI) can be used along with a list of key medical findings (e.g.: scalp hematoma, skull		

injury-child-maltreatment.html		fracture, subdural hemorrhage). • The diagnosis of THI can be followed by a statement of concern for THI-CM as a possible cause alongside other relevant differential diagnoses (traumatic and/or medical). THI-CM should not be communicated as a definitive diagnosis based solely on initial medical information. • The determination of and use of the term, THI-CM, as a final opinion in an individual case should be made based on consideration of the combined information from the medical, child welfare and/or legal sectors. Recommendations 1. Adopt standardized terminology and definitions of THI-CM and its associated injuries to facilitate clear communication across sectors, which will allow for consistent identification of THI-CM for research and quality assurance purposes. 2. Professionals and professional organizations in relevant sectors recognize the child's health and well-being as central to the process, and activities of their work in THI-CM, and they use practices that minimize harm to the child. 3. Continue to develop, rigorously evaluate and prioritize THI-CM prevention programs. 4. Encourage further research in THI-CM and maltreatment. This could include scientific research, program evaluation and/or legal analysis, within or across sectors. 5. Adequately educate and train professionals working in the field of THI-CM and child maltreatment in order for them to fulfill their professional roles and responsibilities. 6. Professionals working in the field of THI-CM develop		

		collaborations and participate in multi-sectoral training to ensure adequate understanding of the roles and responsibilities of professionals in other relevant sectors. 7. Use and adapt the content of this joint statement on THI-CM across sectors to inform the practices and activities in clinical services, research, legal practice, policy development, public education, prevention and health promotion on the topic of THI-CM.		
Ong, TG. Gordon, M. Banks, SSC., Thomas, MR. Akobeng, AK. **Probiotics to prevent infantile colic**. Cochrane Database of Systematic Reviews. 2019, Issue 3. Art. No.: CD012473 Retrived From: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD012473.pub2/epdf/full	**Subjects:** Infants **Design:** Systematic Review **Methods:** In January 2018 we searched CENTRAL, MEDLINE, Embase, PsycINFO, CINAHL, 10 other databases and two trials registers. In addition, we handsearched the abstracts of relevant meetings, searched reference lists, ran citation searches of included studies, and contacted authors and experts in the field, including the manufacturers of probiotics, to identify unpublished trials.	**Author's Conclusions** **Implications for practice** There is limited evidence that prophylactic probiotics are more effective in preventing infantile colic than placebo or no intervention. There is some evidence that they may reduce key outcomes, such as crying time and evidence demonstrating a lack of adverse effects. The overall certainty of the evidence and strength of these conclusions is extremely limited due to sparse data, heterogeneity and risk of bias in the studies. Given this current synthesis, it is not possible to advise a change in practice. While the evidence is limited, it is important to note that these agents are available directly to families without physician involvement in many countries. Therefore, these findings may be important to discuss with families, to allow appropriate interpretation. **Implications for research** Given the concept above regarding the wide availability of many of these agents direct to families, there is an urgent need to recognise the increasing interest in this area and respond with appropriate research that can truly inform and guide evidence-based practice. Future studies need to use the full range of outcome measures relevant to, and presented in, this synthesis of the existing evidence consistently. Studies investigating the potential to reduce the onset of new infantile colic should		

		always report this as one of their outcomes and be clear on the definition used to allow appropriate comparison with previous studies. It may be prudent to report the definition of colic using more than one diagnostic system to resolve this concern. Reporting of all adverse effects, those needing withdrawal, serious adverse effects and particularly long-term safety follow-up are vital to meaningfully move the evidence base forward. Future studies focusing on specific patient groups, such as infants with known aberrant gut flora, and specific probiotic strains are also needed. Wider research investigating predictive factors for the onset of colic would allow targeted prophylactic use.		
Gradisar M, Jackson Spurrier NJ, Gibson J, Whitham J, Williams AS, Dolby T, Kennaway DJ. Behavioral Interventions for Infant Sleep Problems: A Randomized Controlled Trial. Pediatrics 2016;137 (6): e20 151486. Available from: Pediatrics.	**Subjects:** infants 6-16 months **Design:** RCT **Methods:** Infants randomized to graduated extinction (n=14), bedtime fading (n=15), or sleep education control (n=14). Outcomes measured at 12 months included included parent-reported sleep diaries, infant actigraphy, infant stress (cortisol levels), maternal mood and stress reports, child behaviour and parent-child attachment.	**Conclusion:** Both graduated extinction and bedtime fading provide significant sleep benefits above control, with no adverse stress responses or long-term effects on parent-child attachment or child emotions and behavior.		B

Gieruszczak-Białek, D., Konarska, Z., Skórka, A., Vandenplas, Y., & Szajewska, H. (2015). No effect of proton pump inhibitors on crying and irritability in infants: systematic review of randomized controlled trials. *The Journal of pediatrics*, *166*(3), 767-770. Pubmed.	**Subjects:** Infants **Design:** Systematic Review **Methods:** In this systematic review, MEDLINE, EMBASE, and the Cochrane Central Register of Controlled trials (CENTRAL) databases, with no language restriction, as well as 2 registries for clinical trials, were searched in July 2014 for randomized controlled trials (RCTs) that compared the effectiveness of PPIs with placebo or no intervention. Participants had to be infants with GER/GERD but otherwise healthy. The studies were recorded only if they reported outcomes related to crying/irritability such as the duration and/or number of episodes of crying and/or irritability, as assessed by the investigators. The secondary outcomes were adverse effects.	176 articles were screened through the database searches. 5 RCTs were included in the review. All trials were reported to be double-blind. Four RCTs reported continuous data for the effect of use of PPIs on crying/irritability. None of them found a significant difference between the experimental and control study groups. **Conclusion:** The limited data available suggest that PPIs are not effective for the management of crying/irritability in infants.		

Chau, K., Lau, E., Greenberg, S., Jacobson, S., Yazdani-Brojeni, P., Verma, N., & Koren, G. (2015). Probiotics for infantile colic: A randomized, double-blind, placebo-controlled trial investigating Lactobacillus reuteri DSM 17938.The Journal of Pediatrics, 166(1), 74-78.	**Subjects:** Infants **Design:** Randomized, double-blind, placebo controlled trial **Methods:** 52 infants with colic, according to modified Wessel criteria, were assigned at random to receive L reuteri DSM 17938 (n = 24) or placebo (n = 28) for 21 days. Daily crying and fussing times were recorded in a structured diary, and maternal questionnaires were completed to monitor changes in infant colic symptoms and adverse events. The study's primary outcome was defined as a reduction in the duration of average crying and fussing times, from baseline (day 0) to end of treatment (day 21), to <3 hours per day. The secondary outcome measure was the number of participants who responded to treatment on days 7, 14, and 21.	Total average crying and fussing times throughout the study (from baseline to day 21) were significantly shorter among infants with colic in the probiotic group compared with infants in the placebo group (P = .028) (relative risk, 0.78; 95% CI, 0.58-0.98). Infants given L reuteri DSM 17938 showed a significant reduction in daily crying and fussing times at the end of treatment period compared with those receiving placebo (P = .045). On day 21, a significantly higher proportion of infants in the L reuteri DSM 17938 group responded to treatment with a ≥50% crying time reduction compared with infants given placebo (P = .035; relative risk, 3.3; 95% CI, 1.55-7.03). **Conclusion:** Findings from this study support the beneficial effects of administering L reuteri DSM 17938 to treat infantile colic in breastfed Canadian infants with colic, as was previously reported in other geographical regions. Of particular importance, our study provides evidence from North America that supplementation of probiotics in early infancy is effective in managing colic symptoms.		2B

Sung, V., Collett, S., de Gooyer, T., Hiscock, H., Tang, M., & Wake, M. (2013). Probiotics to prevent or treat excessive infant crying: systematic review and meta-analysis. *JAMA pediatrics*, *167*(12), 1150-1157. Pubmed.	**Subjects:** Infants **Design:** Systematic Review **Methods:** Searches of the databases MEDLINE, EMBASE, and the Cochrane Library, including the Cochrane Central Register of Controlled Trials, were completed in June 2012. The systematic review included randomized clinical trials involving infants who were younger than 3 months at the commencement of oral probiotic supplementation vs placebo or standard care or no care. Studies were included that investigated the effectiveness of any probiotic given to either mothers or infants in both term and preterm infants. The primary outcome was infant crying/distress, measured as duration or the number of episodes,	All 12 of the included studies were randomized clinical trials. Five trials examined the effectiveness of probiotics in the management of infant colic, the effectiveness of probiotics in the prevention of infant crying. The most common outcome reported was daily infant crying time (mean or median duration), which was the primary outcome in 3 trials and a secondary outcome in 6 trials. **Conclusion:** Even though the use of a specific strain of probiotic (*L reuteri*) in breastfed term infants with colic is promising, there is still insufficient evidence to support the general use of probiotics in all infants with colic or to recommend its use in preventing colic.		

	or the diagnosis of "infant colic," defined by the modified Wessel criteria of crying/ fussing for 3 hours or more of the day for 3 days or more per week for 1 week or more.			
Dobson D, Lucassen PL, Miller JJ, Vlieger AM, Prescott P, Lewith G. **Manipulative therapies for infantile colic.** Cochrane Database Syst Rev. 2012 Dec 12;12:CD004796. Abstract available from: PubMed	**Subjects:** Infants **Design:** Cochrane review **Methods:** Searched electronic databases to identify and evaluate the results of randomized trials designed to address efficacy or effectiveness of manipulative therapies (specifically, chiropractic, osteopathy and cranial manipulation) forinfantile colic in infants less than six months of age.	Authors identified six studies for inclusion with a total of 325 infants. Of the six included studies, five were suggestive of a beneficial effect and one found no evidence that manipulative therapies had any beneficial effect on the natural course of infantile colic. Tests for heterogeneity imply that there may be some underlying difference between this study and the other five. Five studies measured daily hours of crying and these data were combined, suggesting that manipulative therapies had a significant effect on infant colic - reducing average crying time by one hour and 12 minutes per day (mean difference (MD) -1.20; 95% confidence interval (CI) -1.89 to -0.51). This conclusion is sustainedeven when considering only studies with a low risk of selection bias (sequence generation and allocation concealment) (MD -1.24; 95% CI -2.16 to -0.33); those with a low risk of attrition bias (MD - 1.95; 95% CI -2.96 to -0.94), or only those studies that have been published in the peer-reviewed literature (MD -1.01; 95% CI -1.78 to -0.24). However, when combining only those studies with a low risk of performance bias (parental 'blinding'), the improvement in daily crying hours was not statistically significant (MD -0.57; 95% CI -2.24 to 1.09).One study considered whether the reduction in crying time was clinically significant. This found that a greater proportion of parents of infants receiving a manipulative therapy reported clinically significant improvements than did parents of those receiving no treatment (reduction in crying to less than two hours: odds ratio (OR) 6.33; 95% CI 1.54 to	II-1 C	B

		26.00; more than 30% reduction in crying: OR 3.70; 95% CI 1.15 to 11.86).Analysis of data from three studies that measured 'full recovery' from colic as reported by parents found that manipulative therapies did not result in significantly higher proportions of parents reporting recovery (OR 11.12; 95% CI 0.46 to 267.52).One study measured infant sleeping time and found manipulative therapy resulted in statistically significant improvement (MD 1.17; 95% CI 0.22 to 2.12).The quality of the studies was variable. There was a generally low risk of selection bias but only two of the six studies were evaluated as being at low risk of performance bias, three at low risk of detection bias and one at low risk of attrition bias. One of the studies recorded adverse events and none were encountered. The authors conclude that the studies included in this meta- analysis were generally small and methodologically prone to bias, which makes it impossible to arrive at a definitive conclusion about the effectiveness of manipulative therapies for infantile colic. The majority of the included trials appeared to indicate that the parents of infants receiving manipulative therapies reported fewer hours crying per day than parents whose infants did not, based on contemporaneous crying diaries, and this difference was statistically significant. The trials also indicate that a greater proportion of those parents reported improvements that were clinically significant. However, most studies had a high risk of performance bias due to the fact that the assessors (parents) were not blind to who had received the intervention. When combining only those trials with a low risk of such performance bias, the results did not reach statistical significance. **No definitive conclusion.**		

Douglas P, Hill P. **Managing infants who cry excessively in the first few months of life**. BMJ. 2011 Dec 15;343:d7772. Abstract available from: PubMed	**Subjects:** Infants **Design:** Clinical review **Methods:** The authors searched in PubMed, Medline, CINHAL and the Cochrane Database for Systematic Reviews for systematic reviews, trials and cohort studies on the management of term infants who cry excessively in the first few months of life. They employed meta-narrative mapping to synthesize the evidence and did not assess the quality of the evidence. One of the authors also interviewed 24 experts in infant cry-fuss behaviour from the disciplines of paediatrics, general practice, perinatal psychiatry, midwifery, community child health, speech pathology, lactation, social work, psychology, occupational therapy, and physiotherapy.	Based on their review of the literature, the authors map the possible causes of excessive infant crying and provide a practical guide intended for paediatricians, family physicians and other child health providers to assess and manage the crying baby. The assessment suggested includes specific questions to obtain history of feeding and elimination and simple instructions for the physical examination. Several management strategies that may be effective in otherwise healthy babies are listed and briefly explained. These include advice on breastfeeding, dealing with maternal mental health, cow's milk allergy, advice about sleep, and sensory integration. The recommendation made deals with the development of a clinical approach to excessive crying.	III	

Blunden SL, Thompson KR, Dawson D. **Behavioural sleep treatments and night time crying in infants: challenging status quo.** Sleep Med Rev. 2011;15(5):335-337. PubMed	**Background:** This paper focuses on the behavioural techniques by which parents are trained and instructed to teach their child to sleep alone, sometimes known as extinction methods. Some behavioural extinction treatments necessitate a parent leaving an infant to cry for extended periods unattended, a practice reportedly difficult for parents. Despite parent's anxieties and the potential stress to the infant, the pursuit of those behavioural sleep treatments are advocated by many psychologists and clinicians as acceptable and necessary interventions. **Subjects:** Infants **Design:** Theoretical review **Methods:** The central debate in this paper is if and why an infant's nocturnal cries should be ignored.	Behavioural techniques could prevent parents from responding consistently and sensitively to their child, thereby leading to long-term adverse impacts on child-parent bonding, child stress regulation, mental health, and emotional development. These concerns originated with pure extinction ("crying-it-out"), which is not usually recommended nowadays because of the distress it causes parents and infants. However, the concerns have extended to extinction derivatives like controlled comforting and "camping out".	III I	
Hemmi MH, Wolke D, Schneider S. **Associations between problems with crying, sleeping and/or/feeding in infancy and long-term**	**Subjects:** Children with regulatory problems **Design:** Systematic review and meta-analysis **Methods**: Authors performed a	The weighted mean effect size for the main regulatory problems-behavioural problems association was 0.41 (95% CI 0.28 to 0.54), indicating that children with previous regulatory problems have more behavioural problems than controls. Externalising and ADHD problems were the strongest outcome of any regulatory problem, indicated by the highest fail-safe N and lowest correlation of	II-2, II-3 I	C

behavioural outcomes in childhood: a meta-analysis. Arch Dis Child. 2011;96:622-629.	systematic review of the literature and a quantitative meta-analysis of 22 longitudinal studies from 1987 to 2006 that statistically tested the association between infant regulatory problems and childhood internalising, externalising and attention-deficit/hyperactivity disorder (ADHD) problem.	sample size to effect size. Meta-analyses of variance revealed no significant moderating influences of regulatory problem comorbidity (I(2)=44.0, p>0.05), type (I(2)=41.8, p>0.05) or duration (I(2)=44.0, p>0.05). However, cumulative problems and clinical referral increased the risk of behavioural problems. **Conclusion:** Children with previous regulatory problems have more behavioural problems than controls, particularly in multi-problem families.		
Canadian Pediatric Society. (2008). Multidisciplinary guidelines on the identification, investigation and management of suspected abusive head trauma. Last updated Jan 2013. Retrieved from: http://www.cps.ca/uploads/documents/AHT.pdf	**Subjects:** Infants **Design:** Multidisciplinary guidelines to equip the health sector, law enforcement, child protection, and other involved disciplines or sectors with a tool to identify, investigate, and initially manage cases of suspected Abusive Head Trauma	Abusive Head Trauma (AHT) is a specific form of traumatic brain injury and is medically defined by the constellation of symptoms, physical signs, laboratory, imaging and pathologic findings that are a consequence of violent shaking, impact or a combination of the two. The identification of traumatic brain injury relies on medical evaluation of the child and is a medical diagnosis. Clinical and historical elements of the injury may lead to a clinical determination of Abusive Head Trauma. When Abusive Head Trauma is suspected, and even if not yet confirmed, it is mandatory to provide early notification to child protection so that they can begin their investigation by gathering appropriate background information. A finding of traumatic retinoschisis is strongly suggestive of AHT. In the absence of a history of major accidental trauma or an explanatory medical condition, a child with diffuse multilayered retinal hemorrhages and subdural hematoma must be presumed to have suffered Abusive Head Trauma.		

4.2.2 HEALTHY SLEEP HABITS

Healthy Sleep Habits Recommendation	Strength of Recommendation
1. Normal sleep (quality and quantity for age) is associated with typical development and leads to better health outcomes. Sleeping behaviour (Encyclopedia on Early Childhood Development)	Consensus
2. Recommended sleep duration per 24 hrs: 12-14 hrs (infants 4–12 months); 11-14 hrs (1–2 yrs); 10-13 hrs (3–5 yrs); 9-12 hrs (6–12 yrs); 8-10 hrs (13–18 yrs). Turn off computer/TV screens 60 minutes before bedtime. No computer/TV screens in bedroom. Recommended amount of sleep (American Academy of Sleep Medicine)	Consensus

Healthy Sleep Habits Recommendations				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Paul, I. M. Hohman, E. E. Loken, E. Savage, J. S. Anzman-Frasca, S. Carper, P. Marini, M. E. Birch, L. L. **Mother-Infant Room-Sharing and Sleep Outcomes in the INSIGHT Study.** Pediatrics. 2017. 140(1)	**Subjects:** Infants **Design: Obesity Prevention Trial** **Methods:** The Intervention Nurses Start Infants Growing on Healthy Trajectories study is an obesity prevention trial comparing a responsive parenting intervention with a safety control among primiparous mother-infant dyads. Mothers completed the Brief Infant Sleep Questionnaire at 4, 9, 12, and 30 months. Reported sleep duration and overnight behaviors, adjusted for intervention group, were compared among early independent sleepers(own room <4 motnhs), later independent sleepers(own room between 4 and 9 months) and room sharers at 9 months.	**Conclusion:** While substantial progress has been made over the past several decades to improve the safety of infant sleep, the AAP recommendation that parents is inconsistent with the epidemiology of SIDS, is incongruent with our understanding of socioemotional development in the second half of the first year, and has the potential for unintended consequences for infants and families. Our findings showing poorer sleep-related outcomes and more unsafe sleep practices among dyads who room-share beyond early infancy suggest that the AAP should reconsider and revise the recommendation pending evidence to support room-sharing through the age of 1 year.		B
Paul, I. M. Savage, J. S. Anzman-Frasca, S. Marini, M. E. Mindell, J. A. Birch, L. L. **INSIGHT Responsive Parenting Intervention and Infant Sleep**. Pediatrics. 2016. 138(1)	**Subjects:** mother-newborn dyads **Design:** Randomized Trial **Methods:** The Intervention Nurses Start Infants Growing on Healthy	**Conclusion** These findings reveal that sleep related behaviors are modifiable during infancy and that those in the RP intervention had longer nighttime sleep duration. Clinicians can inform parents that simple strategies, including a consistent bedtime by 8 PM and allowing infants to self-soothe to sleep without being held, rocked, or fed, are associated with		B

	Trajectories (INSIGHT) study is a randomized trial **comparing** a RP intervention with a safety control. Primiparous mother-newborn dyads were randomized after childbirth, and research nurses delivered intervention content at home visits at infant ages 3, 16, 28, and 40 weeks and at a research center visit at 1 year. The RP sleep component included developmentally appropriate messages about bedtime routines, sleep location and behaviors, and responses to wakings. Portions of the Brief Infant Sleep Questionnaire were administered 2, 8, and 52 weeks after birth with expanded sleep-related data collection at 16 and 40 weeks.	significantly longer nighttime sleep durations, fewer nighttime wakings and feeds, and less time awake at night. RP, which has been associated with other positive developmental outcomes, 42 shows promise for promoting good sleep hygiene and the primary prevention of sleep problems, which could affect related health and wellness outcomes for infants and families.		
Allen, S. L., Howlett, M. D. Coulombe, J. A., Corkum, P. V. **ABCs of SLEEPING: A review of the evidence behind pediatric sleep practice recommendations.** Sleep Medicine Reviews. 2016	**Subjects:** 1 to 12 years of age **Design:** Review **Methods:** Four key electronic databases were searched in February and March of 2014 to identify all published articles that incuded the concepts of	**Conclusion:** A growing body of research provides at least preliminary support for the majority of recommendations that are commonly made to families regarding healthy sleep practices. However, the level of support identified was not equivalent for all recommendations. Rather the level support varied for recommendations within and across the different areas of sleep practices outlined by the ABCs of SLEEPING mnemonic. More robust investigations are needed to better understand the extent to which each of the sleep practices examined in this review		

	children AND sleep, AND/OR insomnia, AND/OR bedtime. Keywords were chosen to capture the population of interest and sleep, the major topic of interest.	contributes to the onset and maintenance of children's sleep problems.		
Bathory, E., Tomopoulos, S. **Sleep Regulation, Physiology and Development, Sleep Duration and Patterns, and Sleep Hygiene in Infants, Toddlers, and Preschool-Age Children**. Current Problems in Pediatric & Adolescent Health Care. 2017.	**Subjects**: Children under 5 years of age. **Design:** Review	**Conclusion:** There are many aspects of sleep that have significant effects on child and family health and well-being. Pediatricians report little formal training in sleep medicine, yet patients frequently report infant and child sleep problems. Basic physiology and development of sleep patterns, normative sleep durations and the many influencing factors are important to understanding and diagnosing child sleep problems. Pediatricians should discuss sleep hygiene and early adoption of healthy sleep habits during routine anticipatory guidance in an effort to shape long term healthy child sleep patterns and prevent sleep problems.		
Carter, B. Rees, P. Hale, L. Bhattacharjee, D. Paradkar, M. S. **Association Between Portable Screen-Based Media Device Access or Use and Sleep Outcomes: A Systematic Review and Meta-analysis.** JAMA Pediatrics	**Subjects:** Children **Design:** Systematic Review and Meta-analysis **Methods:** A search strategy consisting of gray literature and 24 Medical Subject Headings was developed in Ovid MEDLINE and adapted for other databases between January 1,2011, and June15,2015. Searches of the published literature were conducted across 12 databases. No language restriction was applied.	**Conclusion:** Media device access and use at bedtime are significantly associated with detrimental sleep outcomes and lead to poor health outcomes. We recommend that interventions to minimize device access and use need to be developed and evaluated. Interventions should include a multidisciplinary approach from teachers and health care professionals to empower parents to minimize the deleterious influence on child health		
Paruthi, S., Brooks, L. J. D'Ambrosio, C., Hall, W. A. Kotagal, S., Lloyd, R. M. Malow, B. A., Maski, K. Nichols, C., Quan, S. F. Rosen, C. L., Troester, M. M.	**Subjects:** children aged 0–18 years **Design:** Consensus Statement **Methods:** The American Academy of Sleep Medicine (AASM) Sleep	**Conclusion:** The 13-member panel used a modified RAND Appropriateness Method to generate consensus recommendations for the amount of sleep to promote optimal health in children. Multiple rounds of evidence review, discussion and voting were conducted to arrive at the final recommendations. Additional research on the role of sleep duration at		

Wise, M. S. **Consensus Statement of the American Academy of Sleep Medicine on the Recommended Amount of Sleep for Healthy Children: Methodology and Discussion.** Journal of Clinical Sleep Medicine. 2016; 12(11): 1549-1561	Duration Consensus Conference used a modified RAND Appropriateness Method (RAM)4 to establish consensus for the amount of sleep needed to promote optimal health in children and teenagers.	different stages in a child's growth and development will help increase the awareness of the importance of sleep and lead to improved health and well-being for children and families.		
Paruthi, S., Brooks, L. J. D'Ambrosio, C., Hall, W. A. Kotagal, S., Lloyd, R. M. Malow, B. A., Maski, K. Nichols, C., Quan, S. F. Rosen, C. L., Troester, M. M. **Wise, M. S. Recommended Amount of Sleep for Pediatric Populations: A Consensus Statement of the American Academy of Sleep Medicine.** Journal of Clinical Sleep Medicine. 2016: 12(6); 785-786	**Subjects:** children aged 0–18 years **Design:** Consensus Statement **Methods**: A panel of 13 experts in sleep medicine and research used a modified RAND Appropriateness Method1 to develop recommendations regarding the sleep duration range that promotes optimal health in children aged 0–18 years. The expert panel reviewed published scientific evidence addressing the relationship between sleep duration and health using a broad set of National Library of Medicine Medical Subject Headings (MeSH) terms and no date restrictions, which resulted in a total of 864 scientific articles. The process was further	**Consensus Recommendations:** • Infants* 4 months to 12 months should sleep 12 to 16 hours per 24 hours (including naps) on a regular basis to promote optimal health. • Children 1 to 2 years of age should sleep 11 to 14 hours per 24 hours (including naps) on a regular basis to promote optimal health. • Children 3 to 5 years of age should sleep 10 to 13 hours per 24 hours (including naps) on a regular basis to promote optimal health. • Children 6 to 12 years of age should sleep 9 to 12 hours per 24 hours on a regular basis to promote optimal health. • Teenagers 13 to 18 years of age should sleep 8 to 10 hours per 24 hours on a regular basis to promote optimal health. ◦ Sleeping the number of recommended hours on a regular basis is associated with better health outcomes including: improved attention, behavior, learning, memory, emotional regulation, quality of life, and mental and physical health. ◦ Regularly sleeping fewer than the number of recommended hours is associated with attention, behavior, and learning problems. Insufficient sleep also increases the risk of accidents, injuries, hypertension, obesity, diabetes, and depression. Insufficient sleep in teenagers is associated with increased risk of self-harm, suicidal thoughts, and suicide attempts. ◦ Regularly sleeping more than the recommended hours may be associated with adverse health outcomes such as hypertension, diabetes, obesity, and mental health problems. ◦ Parents who are concerned that their child is sleeping too little or too much should consult their healthcare provider for evaluation of a possible sleep disorder**.**		

	guided by the Oxford grading system.2 The panel focused on seven health categories with the best available evidence in relation to sleep duration: general health, cardiovascular health, metabolic health, mental health, immunologic function, developmental health, and human performance. Consistent with the RAND Appropriateness Method, multiple rounds of evidence review, discussion, and voting were conducted to arrive at the final recommendations. The process to develop these recommendations was conducted over a 10-month period and concluded with a meeting held February 19–21, 2016 in Chicago, Illinois.			

Hirshkowitz, M., Whiton, K., Albert, S. M., Alessi, C., Bruni, O., DonCarlos, L., ...& Neubauer, D. N. (2015). National Sleep Foundation's sleep time duration recommendations: methodology and results summary. *Sleep Health*, *1*(1), 40-43. Available from: Sleep Health.	**Subjects:** All age groups **Design:** The NSF conducted a systematic literature review, convened an expert panel, and used quantitative techniques to summarize expert opinion concerning recommended sleep durations **Methods:** The National Sleep Foundation convened an 18-member multidisciplinary expert panel, representing 12 stakeholder organizations, to evaluate scientific literature concerning sleep duration recommendations. Expert recommendations for sufficient sleep durations across the lifespan were determined using the RAND/UCLA Appropriateness Method.	**Recommendations:** The panel agreed that, for healthy individuals with normal sleep, the appropriate sleep duration for newborns is between 14 and 17 hours, infants between 12 and 15 hours, toddlers between 11 and 14 hours, preschoolers between 10 and 13 hours, and school-aged children between 9 and 11 hours.		

Gruber R, Weiss S, Frappier JY, Rourke L, Brouillette R, Carrey N, & Wise MS. Position Statement on Pediatric Sleep for Psychiatrists. J Can Acad Child Adolesc Psychiatry. 2014; 23(3): 174–195. Available from: Pubmed	**Subjects:** Children and adolescents (0-19 years) **Design:** Position Statement from Canadian Sleep Society **Methods:** This statement represents the outcome of a Canadian Institute of Health Research funded workshop, which was attended by over 30 thought leaders in the areas of pediatric sleep, psychology, pediatrics, and education.	**Recommendations:** 1) Screen for the presence of pediatric sleep deprivation and disorders; 2) Evaluate sleep disorders and deprivation and search for causes starting with an appropriate history and physical examination; 3) Determine when investigations such as sleep study need to be conducted; 4) Offer intervention and counseling; 5) Make appropriate referrals for sleep disorders that require more specialized care.		
Bryanton J, Beck CT, Montelpare W. **Postnatal parental education for optimizing infant general health and parent-infant relationships.** Cochrane Database of Systematic Reviews. 2013;28;(11):CD004068. Available from: Cochrane Reviews		**Abstract** **Background:** Many learning needs arise in the early postpartum period, and it is important to examine interventions used to educate new parents about caring for their newborns during this time. **Objectives:** The primary objective was to assess the effects of structured postnatal education delivered to an individual or group related to infant general health or care and parent-infant relationships. **Search methods:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 March 2013). **Selection criteria:** We included randomized controlled trials of any structured postnatal education provided to individual parents or groups of parents within the first two months post-birth related to the health or care of an infant or parent-infant relationships. **Data collection and analysis:** Two review authors (JB, CTB) assessed trial quality and extracted data from published reports. **Main results:** Of the 27 trials (3949 mothers and 579 fathers) that		

		met the inclusion criteria, only 15 (2922 mothers and 388 fathers) reported useable data. Educational interventions included: five on infant sleep enhancement, 12 on infant behaviour, three on general post-birth health, three on general infant care, and four on infant safety. Details of the randomization procedures, allocation concealment, blinding, and participant loss were often not reported. Of the outcomes analyzed, only 13 were measured similarly enough by more than one study to be combined in meta-analyses. Of these 13 meta-analyses, only four were found to have a low enough level of heterogeneity to provide an overall estimate of effect. Education about sleep enhancement resulted in a mean difference of 29 more night-time minutes of infant sleep in 24 hours at six weeks of age (95% confidence interval (CI) 18.53 to 39.73) than usual care. However, it had no significant effect on the mean difference in minutes of crying time in 24 hours at six weeks and 12 weeks of age. Education related to infant behaviour increased maternal knowledge of infant behaviour by a mean difference of 2.85 points (95% CI 1.78 to 3.91). **Authors' conclusions:** The benefits of educational programs to participants and their newborns remain unclear. Education related to sleep enhancement appears to increase infant sleep but appears to have no effect on infant crying time. Education about infant behaviour potentially enhances mothers' knowledge; however more and larger, well-designed studies are needed to confirm these findings.		
Galland BC, Taylor BJ, Elder DE, Herbison P. **Normal sleep patterns in infants and children: a systematic review of observational studies.** Sleep Med Rev. 2012 Jun;16(3):213-22. Abstract available from: PubMed	**Subjects:** Infants and children 0-12 years **Design:** Systematic review of observational studies **Methods:** Reviewed the scientific literature for longitudinal and cross-sectional data on normal sleep patterns in infants and children.	Mean and variability data for sleep duration, number of night wakings, sleep latency, longest sleep period overnight, and number of daytime naps were extracted from questionnaire or diary data from 34 eligible studies. The best-fit (R(2)=0.89) equation for hours over the 0-12 year age range was 10.49-5.56×[(age/10)^0.5-0.71]. Night waking data provided 4 age-bands up to 2 years ranging from 0 to 3.4 wakes per night for infants (0-2 months), to 0-2.5 per night (1-2 year-olds). Sleep latency data were sparse but estimated to be stable across 0-6 years. **Conclusion:** Reference values (means) and ranges (±1.96 SD) for	III	

		sleep duration (hours) were: infant, 12.8 (9.7-15.9) and toddler/preschool, 11.9 (9.9-13.8).		
Ednick M, Cohen AP, McPhail GL, Beebe D, Simakajornboon N, Amin RS. **A review of the effects of sleep during the first year of life on cognitive, psychomotor, and temperament development.** Sleep. 2009;32(11):1449-1458. PubMed	**Subjects:** Infants **Design:** Review of the literature **Methods:** Assessed relevant published literature to determine what is currently known of the effects of sleep during infancy on cognitive, psychomotor, and	It is impossible to conclude that a causal relationship exists between infant sleep and cognitive, psychomotor, and temperament development due to important heterogeneity between studies. For mental development, the 13 studies included reported low to moderate significant correlations between various sleep characteristics and mental development scores. For psychomotor development, the 3 of the 5 studies included reported no significant association between sleep and motor development; one study showed that on day 1 on life, increased mean sleep period and decreased sleep-wake transition were predictive of lower motor scores and increased amount of quiet sleep was predictive of lower motor scores; another study found that infants who had more wakefulness at birth and those who showed declining rates in their out of crib time, performed better on psychomotor scales. For temperament development, significant correlations were found between various measures of sleep and temperament at different time points. **Conclusion:** Early screening of sleep-related issues may be a useful tool to guide targeted prevention and early intervention.	II-3 C	C

4.2.3 NIGHT WAKING

Night Waking Recommendations	Strength of Recommendation
1. Night waking: occurs in 20% of infants and toddlers who do not require night feeding. Counseling around positive bedtime routines (including training the child to fall asleep alone), removing nighttime positive reinforcers, keeping morning awakening time consistent, and rewarding good sleep behaviour has been shown to reduce the prevalence of night waking, especially when this counseling begins in the first 3 weeks of life.	**Good**

Night Waking References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Garrison MM, Christakis DA. **The impact of a healthy media use intervention on sleep in preschool children.** Pediatrics. 2012;130(3):1-8. Pediatrics	**Subjects:** families of children aged 3 to 5 years **Design:** randomized controlled trial **Methods:** this RCT evaluated the influence of an intervention based on social cognitive theory that encouraged families to replace violent or age-inappropriate media content with quality educational and prosocial content, through an initial home visit and follow-up telephone calls over 6 months. In the intervention group, parents were also encouraged to engage in co-viewing and to discuss	This article focuses on sleep outcomes; however, the primary outcomes of the trial were decreased aggressive behaviour and increased prosocial behaviours. Among the 565 children analyzed, the most common sleep problem was delayed sleep-onset latency (38%). Children in the intervention group had significantly lower odds of "any sleep problem" at follow-up in the repeated-measures analysis (odds ratio = 0.36; 95% confidence interval: 0.16 to 0.83), with a trend toward a decrease in intervention effect over time (P = .07). Although there was no significant effect modification detected by baseline sleep or behaviour problems, gender, or low-income status, there was a trend (P = .096) toward an increased effect among those with high levels of violence exposure at baseline. **Conclusion:** The significant effects of a healthy media use intervention on child sleep problems in the context of a randomized controlled trial suggest that the previously reported relationship between media use and child sleep problems is indeed causal in nature.	I A	1A

	media content with their children, because co-viewing can increase parent awareness of the media content consumed. Representative recommended shows included *Curious George, Sesame Street,* and *Dora the Explorer.* Sleep measures were derived from the Child Sleep Habits Questionnaire and collected at 6, 12, and 18 months after baseline.	**Recommendation:** Clinicians and parents should be mindful that healthy media use choices could be a valuable strategy in treating and preventing child sleep problems.		
Mindell JA, Kuhn B, Lewin DS, Meltzer LJ, Sadeh A; American Academy of Sleep Medicine. **Behavioral treatment of bedtime problems and night wakings in infants and young children.** Sleep. 2006;29(10):1263-1276. Abstract available from: PubMed	**Subjects:** Young children **Design:** Review **Methods:** A task force appointed by the American Academy of Sleep Medicine reviewed the evidence regarding the efficacy of behavioral treatments for bedtime problems and night wakings in young children. Treatment studies selected for review were identified through PsycLIT and MEDLINE searches (1970-2005).	52 intervention studies were reviewed in which nearly half of the subject pool (n=1,135) participated in the methodologically strongest studies employing a randomized controlled trial design. Interventions for bedtime problems and night wakings consist primarily of time-limited parent training strategies that incorporate behaviorally-based interventions, founded on principles of learning and behavior (e.g., reinforcement, extinction, shaping). Parent training typically involves a therapist "coaching" the parents to become the active agents of change to address their child's problematic sleep patterns, habits, or sleep-related behaviors. Among the many forms of behavioral health services for young children, no other treatment has been more thoroughly investigated or widely applied as parent management training. The findings indicate that behavioral therapies produce reliable and durable changes. Across all studies, 94% report that behavioral interventions were efficacious, with over 80% of children treated demonstrating clinically significant improvement that was maintained for 3 to 6 months. In particular, empirical evidence from controlled group studies utilizing Sackett criteria for evidence-based	I, II-1, II-2. II-3 A	1A

		treatment provides strong support for unmodified extinction and preventive parent education. **Conclusion:** Evidence supports the use of unmodified extinction, graduated extinction, bedtime fading/positive routines, scheduled awakenings, and preventive parent education.		

4.2.4 DISCIPLINE/PARENTING EDUCATION PROGRAMS/PARENTING SKILLS

Discipline/Parenting Education Programs/Parenting Skills Recommendations	Strength of Recommendation
1. Inform parents that warm, responsive, flexible & consistent discipline techniques are associated with positive child outcomes. Over reactive, inconsistent, cold & coercive techniques are associated with negative child outcomes. Use of any physical punishment including spanking should be discouraged in all ages.	**Good**
2. Refer parents of children at risk of, or showing signs of, behavioral or conduct problems to structured parenting programs which have been shown to increase positive parenting, improve child compliance, and reduce general behavior problems. Access community resources to determine the most appropriate and available research-structured programs. (eg. The Incredible Years®, Triple P®, Strongest Families).	**Good**

Discipline/Parenting Education Programs/Parenting Skills Resources
1. Evidence-based programs for parents, children and teachers: The Incredible Years®
2. Parenting courses:Triple P®, Strongest Families
3. Encyclopedia on Early Childhood Development: EECD Parenting Skills
4. Effective Discipline for Children
5. Supporting Positive Parenting (CPS)

Discipline/Parenting Education Programs/Parenting Skills References

Reference	Methods	Outcomes	CTFPHC	GRADE
Robin C. Williams, Anne Biscaro; Jean Clinton; Canadian Paediatric Society, Early Years Task Force. Relationships matter: How clinicians can support positive parenting in the early years. Paediatr Child Health 2019 24(5):340–347.		**Abstract** A secure attachment relationship with at least one healthy adult is essential for a child to develop optimal coping abilities. Primary care providers like paediatricians and family physicians can help by supporting parents in practice settings. Every clinician encounter is an opportunity to ask parents about children's relationships and their behaviour, daily routines, and overall family function. This statement, which focuses on children aged 0 to 6 years, describes basic principles in support of positive parenting and recommends in-office practices to promote secure parent–child relationships, engage families and build		

		trust with parents. Crying, sleep, and difficult behaviours are described as opportunities for clinicians to provide anticipatory, responsive guidance to parents.		
Barlow J, Bergman H, Kornør H, Wei Y, Bennett C. **Group-based parent training programmes for improving emotional and behavioural adjustment in young children.** Cochrane Database of Systematic Reviews 2016, 8 Available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6797064/	**Subjects:** Parents and Young Children **Design:** Systematic Review **Methods:** In July 2015 we searched CENTRAL (the Cochrane Library), Ovid MEDLINE, Embase (Ovid), and 10 other databases. We also searched two trial registers and handsearched reference lists of included studies and relevant systematic reviews.	**Conclusions** The findings of this review, which relate to the broad group of universal and at-risk (targeted) children and parents, provide tentative support for the use of group-based parenting programmes to improve the overall emotional and behavioural adjustment of children with a maximum mean age of three years and 11 months, in the short-term. There is, however, a need for more research regarding the role that these programmes might play in the primary prevention of both emotional and behavioural problems, and their long-term effectiveness.		
Shah, R., Kennedy, S., Clark, M. D., Bauer, S. C., & Schwartz, A. (2016). Primary Care–Based Interventions to Promote Positive Parenting Behaviors: A Meta-analysis. *Pediatrics*, *137*(5), e20153393.	**Subjects:** Children 0-36 months **Design:** Meta-analysis **Methods:** A systematic review of the literature for articles published from January 1, 1980, to September 1, 2015, was conducted and reported according to the Preferred Reporting Items for Systematic Reviews and MetaAnalysis guidelines. A literature search was conducted by a clinical librarian (MDC) by using PubMed, Excerpta Medica dataBASE,PsycINFO, and Cumulative Index to Nursing and Allied Health Literature. This review	Thirteen studies evaluated 6 different interventions delivered in the primary care clinic to enhance parenting. results demonstrated a significant positive aggregate effect for primary care–delivered interventions on parent-child interactions (Fig 2; summary SMD 0.29, 95% confidence interval [CI] 0.06–0.52, P < .0001). In SMD summary effects, statistically significant positive effects were found for primary care–based interventions and participation in cognitively stimulating activities (Fig 3; summary SMD 0.34, 95% CI 0.03–0.54, P < .001). Positive significant effects were also found for studies that used dichotomous outcomes (Fig 4; summary OR 0.13, 95% CI 0.01–0.25, P < .0001). Substantial heterogeneity was evident in all meta-analyses. Compared with mothers who did not receive the intervention, intervention mothers had higher ratings for physical involvement and closeness on a self-report measure (P = .035); however, no significant differences were found when maternal-infant interactions were measured by using items drawn from the Home Observation for Measurement Inventory **Conclusion:** Developing theory-based interventions in the pediatric		

	focused on preventive primary care–based interventions in the United States aimed at enhancing parenting practices that promote early child development among parents of children younger than 36 months	setting offers a promising opportunity with a universal approach to enhance parenting behaviors and support early child development, particularly for the millions of children who live in poverty and face well-documented developmental disparities as a result.		
Walton K, Filion J, Gross D, Simpson JR, Hou S & Jess Haines J (2015). Parents and Tots Together: Pilot randomized controlled trial of a family-based obesity prevention intervention in Canada. *Canadian Journal of Public Health*, *106*(8), E555. Available from: PubMed.	**Subjects:** Parents of preschoolers (2-5 years old) **Design:** Pilot randomized controlled trial **Methods:** A pilot RCT of the Parents and Tots (PTT) program was conducted with 48 parents who received either the PTT intervention (n = 27) or an attention-matched control home safety intervention (n = 21). Participants were recruited from three Ontario Early Years centres (OEYCs): community centres that provide programming, education and support to families with young children. Children's body mass index (BMI) was assessed at baseline, after intervention (end of 9-week	Compared with control families, PTT parents reported less parental stress at post-intervention (β = -20.67, 95% confidence interval [CI] - 31.67, -9.62, p = 0.001) and 9-month follow-up (β = 15.83, 95% CI - 29.57, -2.07, p = 0.02), and more self-efficacy in managing their child when the child's behaviour became aggressive (biting, hitting, pushing) (post intervention: β = 0.32, 95% CI 0.04, 0.61, p = 0.03; 9-month follow-up: β = 0.16, 95% CI 0.002, 0.33, p = 0.05). PTT parents also reported greater parental warmth at post-intervention (β = 2.59, 95% CI 0.59, 4.59, p = 0.01) and 9-month follow-up (β = 2.04, 95% CI 0.48, 3.59, p = 0.01). At post-intervention, PTT parents reported a larger decrease in their use of food as a reward as compared with parents in the control arm (β = -0.50, 95% CI -0.90, -0.11, p = 0.01). However, this difference was not sustained at 9-month follow-up. An intervention effect for parental ability to follow through on discipline or for self efficacy in knowing the child's satiety cues were not observed. **Conclusion:** PTT and the RCT design were feasible and acceptable among Canadian parents. Six months after a 9-week intervention, PTT had had a significant impact on general parenting behaviours, although no significant improvements in weight and weight related behaviours were obtained. Future interventions that embed weight-related behaviours into a general parenting context should include greater emphasis on weight-related topics to promote and sustain behaviour change among parents of preschoolers.		1B

	intervention) and at 9-month follow-up. As well, at each time point, parents completed surveys assessing stress and self-efficacy related to parenting, children's sleep, activity, TV viewing and diet.			
Sanders, M. R., Kirby, J. N., Tellegen, C. L., & Day, J. J. (2014). The Triple P-Positive Parenting Program: A systematic review and meta-analysis of a multi- level system of parenting support. *Clinical psychology review*, *34*(4), 337-357.		**Abstract:** This systematic review and meta-analysis examined the effects of the multilevel Triple P-Positive Parenting Program system on a broad range of child, parent and family outcomes. Multiple search strategies identified 116 eligible studies conducted over a 33-year period, with 101 studies comprising 16,099 families analyzed quantitatively. Moderator analyses were conducted using structural equation modeling. Risk of bias within and across studies was assessed. Significant short-term effects were found for: children's social, emotional and behavioral outcomes (d = 0.473); parenting practices (d = 0.578); parenting satisfaction and efficacy (d = 0.519); parental adjustment (d = 0.340); parental relationship (d = 0.225) and child observational data (d = 0.501). Significant effects were found for all outcomes at long-term including parent observational data (d = 0.249). Moderator analyses found that study approach, study power, Triple P level, and severity of initial child problems produced significant effects in multiple moderator models when controlling for other significant moderators. Several putative moderators did not have significant effects after controlling for other significant moderators. The positive results for each level of the Triple P system provide empirical support for a blending of universal and targeted parenting interventions to promote child, parent and family wellbeing.		

Glascoe, F. P., & Trimm, F. (2014). Brief approaches to developmental-behavioral promotion in primary care: updates on methods and technology. https://doi.org/10.1542/peds.2013-1859.. Available from Pediatrics.	**Subjects:** Children **Design:** Review **Methods:** A total of 239 articles and 52 Web sites on parent/patient education were reviewed for this study.	Outlines communication skills, instructional methods, and resource options that enable clinicians to best assist families with developmental-behavioural promotion Discuss methods clinicians can use across well-baby visits: facilitating parent-provider communication and creating "teachable moments;" methods in parent/patient education (verbal advice, written info, etc); multimedia methods for parent education (videos, interactive tech, etc.) 6 tables—Overall goals for dev-beh promotion across well visits (table 1); facilitating parent-provider collaboration and defining "teachable moment" (table 2); methods for improving recall of spoken directives (table 3); effective use of written info (table 4), developmental-behavioural promotion resources for professionals (table 5); developmental-behavioural promotion resources for parents and patients (table 6)		
Bryanton J[1], Beck CT, Montelpare W., **Postnatal parental education for optimizing infant general health and parent-infant relationships.** Cochrane Database Syst Rev. 2013 Nov 28;(11):CD004068. doi: 10.1002/14651858.CD004068.pub4. Available at: https://www.ncbi.nlm.nih.gov/pubmed/24284872	**Subjects:** Parents/Infants **Design:** Systematic Review **Methods:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (31 March 2013).	**CONCLUSIONS:** The benefits of educational programs to participants and their newborns remain unclear. Education related to sleep enhancement appears to increase infant sleep but appears to have no effect on infant crying time. Education about infant behaviour potentially enhances mothers' knowledge; however more and larger, well-designed studies are needed to confirm these findings.		
Furlong, M., McGilloway, S., Bywater, T., Hutchings, J., Smith, S. M., & Donnelly, M. (2013). Cochrane Review: Behavioural and cognitive-	**Subjects:** Children aged 3- 12 years **Design:** Cochrane Review **Methods:** The following databases	This review includes 13 trials (10 RCTs and three quasi-randomised trials), as well as two economic evaluations based on two of the trials. Overall, there were 1078 participants (646 in the intervention group; 432 in the control group). The results indicate that parent training produced a statistically significant reduction in child		

behavioural group-based parenting programmes for early-onset conduct problems in children aged 3 to 12 years (Review). *Evidence-Based Child Health: A Cochrane Review Journal*, *8*(2), 318-692. Available from PubMed.	were searched between 23 and 31 January 2011: CENTRAL (2011, Issue 1), MEDLINE (1950 to current), EMBASE (1980 to current), CINAHL (1982 to current), PsycINFO(1872 to current), Social Science Citation Index (1956 to current), ASSIA (1987 to current), ERIC (1966 to current), Sociological Abstracts (1963 to current), Academic Search Premier (1970 to current), Econlit (1969 to current), PEDE (1980 to current), Dissertations and Theses Abstracts (1980 to present), NHS EED (searched 31 January 2011), HEED (searched 31 January 2011), DARE (searched 31 January 2011), HTA (searched 31 January 2011), mRCT (searched 29 January 2011). The following parent training websites were searched on 31 January 2011: Triple P Library, Incredible Years Library and Parent Management Training. The	conduct problems, whether assessed by parents (standardised mean difference (SMD) -0.53; 95% confidence interval (CI) -0.72 to -0.34) or independently assessed (SMD -0.44; 95% CI -0.77 to - 0.11). The intervention led to statistically significant improvements in parental mental health (SMD -0.36; 95% CI -0.52 to -0.20) and positive parenting skills, based on both parent reports (SMD -0.53; 95% CI -0.90 to -0.16) and independent reports (SMD - 0.47; 95% CI -0.65 to -0.29). Parent training also produced a statistically significant reduction in negative or harsh parenting practices according to both parent reports (SMD -0.77; 95% CI -0.96 to -0.59) and independent assessments (SMD -0.42; 95% CI -0.67 to -0.16). Moreover, the intervention demonstrated evidence of cost-effectiveness. When compared to a waiting list control group, there was a cost of approximately $2500 (GBP 1712; EUR 2217) per family to bring the average child with clinical levels of conduct problems into the non-clinical range. **Conclusion:** Behavioural and cognitive-behavioural group-based parenting interventions are effective and cost-effective for improving child conduct problems, parental mental health and parenting skills in the short term. The cost of programme delivery was modest when compared with the long-term health, social, educational and legal costs associated with childhood conduct problems. Further research is needed on the long-term assessment of outcomes.		

	reference lists of studies and reviews were also searched.			
Comer JS, Chow C, Chan PT, Cooper-Vince C, Wilson LA. **Psychosocial treatment efficacy for disruptive behavior problems in very young children: a meta-analytic examination.** J Am Acad Child Adolesc Psychiatry. 2013 Jan;52(1):26-36.	**Subjects:** Children D**esign:** Meta-analysis **Methods:** We used random-effects meta-analytic procedures to empirically evaluate the overall effect of psychosocial treatments on early disruptive behavior problems, as well as potential moderators of treatment response. Thirty-six controlled trials, evaluating 3,042 children, met selection criteria (mean sample age, 4.7 years; 72.0% male; 33.1% minority youth).	Psychosocial treatments collectively demonstrated a large and sustained effect on early disruptive behavior problems (Hedges' g = 0.82), with the largest effects associated with behavioral treatments (Hedges' g = 0.88), samples with higher proportions of older and male youth, and comparisons against treatment as usual (Hedges' g = 1.17). Across trials, effects were largest for general externalizing problems (Hedges' g = 0.90) and problems of oppositionality and noncompliance (Hedges' g = 0.76), and were weakest, relatively speaking, for problems of impulsivity and hyperactivity (Hedges' g = 0.61). **Conclusion:** Psychosocial treatment options for early disruptive behaviour problems, especially behavioural methods which target child problems indirectly by reshaping parenting practices, may have large positive effects.	II-1 A	B

Shelleby EC, Shaw DS, Cheong J, Chang H, Gardner F, Dishion TJ, Wilson MN. Behavioral control in at-risk toddlers: the influence of the family check-up. J Clin Child Adolesc Psychol. 2012 May;41(3):288-301. Abstract available from: PubMed	**Subjects: Primary caregiver-child dyads. Children were at risk for externalizing problems on the basis of child, family, and sociodemographic factors.** **Design: RCT Methods: This study examined the role of** **behavioural control on children's early behaviour problems by examining whether increases in parental positive behaviour support brought about by a family-centered intervention were associated with greater child behavioural control. The sample included 713 at-risk children and their primary caregivers who were randomly assigned to the intervention or control group.**	Results indicated that the intervention improved parental positive behaviour support and reduced growth of child behaviour problems. One dimension of positive behaviour support, proactive parenting, was modestly associated with behavioural control at age 3, which in turn was significantly associated with growth in behaviour problems from ages 2 to 4, with greater behavioural control related to lower levels of growth in behaviour problems. Results provide support for the notion that proactive parenting is an important factor in the development of children's behavioural control and that behavioural control plays an important role in the growth of behaviour problems. Conclusion: A parenting intervention to increase proactive parenting may have benefits on child behaviour problems.	I B	B

Landry SH, Smith KE, Swank PR, Zucker T, Crawford AD, Solari EF. The effects of a responsive parenting intervention on parent-child interactions during shared book reading. **Dev Psychol. 2012 Jul;48(4):969-86. Abstract available from: PubMed**	**Subjects:** Mothers from low-income backgrounds and their infant **Design:** RCT **Methods:** This study examined whether the Play and Learning Strategies (PALS) intervention that targets global parenting techniques by facilitating a range of responsive behaviours in everyday activities can also support mothers' use of more effective shared book reading behaviours and children's engagement and use of language. Four groups of randomized mothers and their children (PALS I-II, PALS I-DAS II, DAS I-PALS II, DAS I-II) were observed in shared reading interactions during the toddler-preschool period and coded for (a) mother's affective and cognitive-linguistic supports and (b) child's responses to maternal requests and initiations.	The efficacy of PALS was previously demonstrated for improving mother and child behaviours within play contexts, everyday activities, and standardized measures of child language. Authors hypothesized that PALS effects would generalize to influence maternal and child behaviours during a shared reading task even though this situation was not a specific focus of the intervention and that this would be similar for children who varied in biological risk. Participation in at least PALS II was expected to have a positive effect due to children's increased capacity to engage in book reading at this age. Support was found for significant changes in observed maternal and child behaviours and evidence of mediation was found for the intervention to affect children's behaviours through change in maternal responsiveness behaviours. These results add to other studies supporting the importance of targeting a broad range of responsive behaviours across theoretical frameworks in interventions to facilitate children's development. **Conclusion:** An intervention that targets global parenting techniques may be effective in supporting mothers' use of more effective shared book reading behaviours.	I B	B

Price, A. M., Wake, M. Ukoumunne, O. C., Hiscock, H. Five-year follow-up of harms and benefits of behavioral infant sleep intervention: randomized trial. Pediatrics. 2012. 130(4); 643-651	**Subjects: children with parent-reported sleep problems at age 7 months Design: Randomized Trial Methods: Three hundred twenty-six children (173 intervention) with parent-reported sleep problems at age 7 months were selected from a population sample of 692 infants recruited from well-child centers. The study was a 5-year follow-up of a population-based cluster-randomized trial. Allocation was concealed and researchers (but not parents) were blinded to group allocation. Behavioral techniques were delivered over 1 to 3 individual nurse consultations at infant age 8 to 10 months, versus usual care. The main outcomes measured were (1) child mental health, sleep, psychosocial functioning, stress regulation; (2) child-parent relationship; and (3) maternal mental health and parenting styles.**	Conclusion: The intervention achieved all of its original aims (better infant sleep and lower maternal depression and health care costs in the short- to medium term). The 6-year-old findings indicate that there were no marked long-term (at least to 5 years' post intervention) harms or benefits. We therefore conclude that parents can feel confident using, and health professionals can feel confident offering, behavioral techniques such as controlled comforting and camping out for managing infant sleep.		A

Fergusson D, Stanley L, Horwood J. **Preliminary data on the efficacy of the Incredible Years Basic Parent Programme (IYBPP) in New Zealand.** Australian and New Zealand Journal of Psychiatry. 2009; 43:76-79. Abstract available from: PubMed	**Subjects:** 2½ to 8 years old **Design:** Non-randomized controlled trial **Methods:** Participants attended IYBPP session. Data was gathered from parents using self-completed questionnaires. Outcomes included pre-test-post-test comparisons and parental satisfaction.	Based on preliminary data (from agency records rather than based on a systematic research design) the results of the pre-test-post-test comparisons are positive. There was significant improvement in test scores at post-test assessment. Effect sizes were in the range of moderate to large. Parents' responses to the program were positive overall. This study found that there seem to be improvements in scores after a minimum of 9 sessions of the IYBPP. A more rigorous evaluation of the IYBPP is needed.	II-1 B	
Jones K, Daley D, Hutchings J, Bywater T, Eames C. **Efficacy of the Incredible Years programme as an early intervention for children with conduct problems and ADHD: long-term follow-up**. Child: care, health and development. 2008;34(3):380-390. Abstract available from: PubMed	**Subjects:** 3 to 5 years old **Design:** RCT **Methods:** Participants for this study were drawn from an existing sample of 133 families from an on-going RCT, 79 were eligible for inclusion. Fifty were randomized into intervention and 29 into control group. The intervention received the Incredible Years parenting programme (a 2-hour session once a week for 12 weeks)	In the short-term, mean scores on the Conners rating scale decreased from 20.56 to 14.6. 52% of children in the intervention group showed improvements compared to 21% in the control group. These results remained stable over time. There was a significant reduction in ADHD symptoms at post-intervention assessment. Intervention gains were maintained for at least a year after the programme's completion. According to the authors, these results show good potential for the Incredible Years Parenting Program.	I B	

Melhuish E, Belsky J, Leyland AH, Barnes J, and the National Evaluation of Sure Start Research Team. **Effects of fully-established Sure Start Local Programmes on 3-year-old children and their families living in England: a quasi-experimental observational study.** Lancet. 2008;372 :1641-1647. Abstract available from: PubMed	**Subjects:** 3 years old **Design:** Quasi-randomized controlled trial **Methods:** Children were randomly selected from the Millennium Cohort study and compared to controls. All participants were from low socioeconomic status (SES) families. The authors looked at 14 outcomes.	In this trial, five of the 14 outcomes showed beneficial effects of the SSLP intervention: better social development, more positive social behaviour, greater independence, less negative parenting and a better home-learning environment. Overall, children in the intervention group had more benefits than those in the control group. This study showed the effects of SSLP to be positive with no adverse effects. According to this study, early interventions may improve the life course of many children living in low SES families.	II-1 B	
Canadian Paediatric Society. **Effective discipline for children.** Paediatric & Child Health. 2004; 9(1): 37-41. Reaffirmed January 2013. Available from: PMC	**Subjects:** Children **Design:** Position statement **Methods:** Review of evidence for effective discipline of children, role of the physician, developmental considerations, forms of discipline, setting rules and applying consequences.	The CPS recommends that physicians should ask non-judgmentally about discipline techniques used in the home and should counsel parents on forms appropriate to the child's developmental level. Discipline is about changing behaviour and not punishing the child. Spanking and other forms of physical punishment are associated with negative child outcomes therefore the CPS strongly discourages spanking.	III B	
Minkovitz CS, Hughart N, Strobino D, Scharfstein D, Grason H, Hou W, et al. **A practice-based intervention to enhance quality of care in the first 3 years of life: the Healthy Steps for Young Children Program.** JAMA 2003;290(23):3081-91. Abstract available from: http://www.ncbi.nlm.nih.g	**Subjects:** 0 to 3 years old **Design:** Prospective controlled clinical trial **Methods:** Children enrolled at birth and followed up until 3 years old. There were 6 randomization sites and 9 quasi-randomized sites (pediatric practices) across the US. The intervention	In total 5565 families were enrolled, 88% completed interviews at 2 to 4 months and 67.2% completed interviews at 30 and 33 months. There were 4 main domains to determine quality care: effectiveness, patient-centeredness, timeliness and efficiency. Measures included: discussing more than 6 anticipatory guidance topics, being highly satisfied with care provided, receiving timely well-child visits and vaccinations and remaining at the practice for 20 months or longer. Overall, families that participated in the Healthy Steps Program had greater odds of receiving 4 or more Healthy Steps related services compared to controls. Parenting skills also improved with reduced odds of severe discipline (slapping or	II-1 B	

ov/pubmed/14679271	(Healthy Steps Program) included incorporating developmental specialists and enhanced developmental services into pediatric care. The control group was given standard pediatric care.	spanking with object). Possible limitations are that parents that completed the 30 to 33 month interview were more socially advantaged than the average enrolled population. This would lead to an overestimation if families lost to follow up would require more intensive interventions.		

4.2.5 FAMILY HEALTHY ACTIVE LIVING/SEDENTARY BEHAVIOUR/SCREEN TIME

Family Healthy Active Living/Sedentary Behaviour/Screen Time Recommendations	Strength of Recommendation
1. Encourage increased physical activity, with parents as role models, through interactive floor-based play for infants and a variety of activities for young children, and decreased sedentary pastimes. ***2.*** *Counsel on appropriate media use; for children <2 years, screen time (eg, TV, computer, electronic games) is not recommended except for video-chatting; for children 2-4 years, screen time should be limited to <1 h/day; less is better; educational and prosocial programming is better.*	**Good** *Fair*

Family Healthy Active Living/Sedentary Behaviour/Screen Time Resources
1. The Canadian Physical Activity Guidelines and Canadian Sedentary Behaviour Guidelines **2.** Healthy active living: Physical activity guidelines for children and adolescents (Canadian Paediatric Society) **3.** Screen time and young children (CPS)

Family Healthy Active Living/Sedentary Behaviour/Screen Time References

Reference	Methods	Outcomes	CTFPHC	GRADE
Viner R, Davie M, Firth A. Royal College of Paediatrics and Child Health. The health impacts of screen time: a guide for clinicians and parents. January 2019. Available at: Royal College of Paediatrics and Child Health		See guideline for details.		

Screen time and young children: Promoting health and development in a digital world CPS Digital Health Task Force. Paediatr Child Health 2017;22(8):461–468. Available from CPS.	Position statement	Recommendations: ***Minimize* screen time:** • Screen time for children younger than 2 years is not recommended. • For children 2 to 5 years, limit routine or regular screen time to less than 1 hour per day. • Ensure that sedentary screen time is not a routine part of child care for children younger than 5 years. • Maintain daily 'screen-free' times, especially for family meals and book-sharing. • Avoid screens for at least 1 hour before bedtime, given the potential for melatonin-suppressing effects. ***Mitigate*** (reduce) the ***risks*** associated with screen time: • Be present and engaged when screens are used and, whenever possible, co-view with children. • Be aware of content and prioritize educational, age- appropriate and interactive programming. • Use parenting strategies that teach self-regulation, calming and limit-setting. As a family, ***be mindful*** about the use of screen time: 1. Conduct a self-assessment of current screen habits and develop a family media plan for when, how and where screens may (and may not) be used. 2. Help children recognize and question advertising messages, stereotyping and other problematic content. 3. Remember: too much screen time means lost opportunities for teaching and learning. 4. Be reassured that there is no evidence to support introducing technology at an early age. ***Adults should model healthy screen use*:** • Choose healthy alternatives, such as reading, outdoor play and creative, hands-on activities. • Turn off their devices at home during family time. • Turn off screens when not in use and avoid background TV.		

Anderson, D.R., Subrahmanyam, K. and on behalf of the Cognitive Impacts of Digital Media Workgroup. **Digital Screen Media and Cognitive Development.** Pediatrics. 2017. 140(s2). Retrieved From: https://pediatrics.aappublications.org/content/140/Supplement_2/S57	**Design:**In this article, we examine the impact of digital screen devices, including television, on cognitive development	**RECOMMENDATIONS** **Clinicians and Providers** •Clinicians and providers should talk to parents about limiting television exposure (especially background television) before the age of 2 years; • Clinicians and providers should counsel parents about the impact of their own media use, including smartphones and tablets, on their interactions with their infants and toddlers; and • Clinicians and providers should talk to parents about providing their children with media diets that are rich in educational content while discouraging heavy screen media use, especially when children are beginning to learn to read. In this regard, parents should read to their children and encourage reading by their children. **Policy Makers** •Policy makers should encourage and support research on developing content for new digital media. **Educators** •Early childhood educators should be encouraged to interact with toddlers and touch screen devices (including e-books) in much the same way they are encouraged to use and interact with children		
American Academy of Pediatrics Council on Communications and Media. **Media and Young Minds**. Pediatrics. 2016 138(5) Available from: https://pediatrics.aappublications.org/content/pediatrics/138/5/e20162591.full.pdf	**Subjects:** Children 0-5 years **Design:** Policy Statement **Methods:** This policy statement reviews the existing literature on television, videos, and mobile/ interactive technologies; their potential for educational benefi t; and related health concerns for young children (0 to 5 years of age). The statement also highlights areas in which pediatric providers can offer specific guidance to families in managing their young children's media use, not	**RECOMMENDATIONS** **Pediatricians** • Start the conversation early. Ask parents of infants and young children about family media use, their children's use habits, and media use locations. • Help families develop a Family Media Use Plan (www. healthychildren. org/ MediaUsePlan) with specific guidelines for each child and parent. • Educate parents about brain development in the early years and the importance of hands-on, unstructured, and social play to build language, cognitive, and social-emotional skills. • For children younger than 18 months, discourage use of screen media other than video-chatting. • For parents of children 18 to 24 months of age who want to introduce digital media, advise that they choose high-quality programming/apps and use them together with children, because this is how toddlers learn best. Letting children use media by themselves should be avoided. • Guide parents to resources for finding quality products (eg, Common Sense Media, PBS Kids, Sesame Workshop). • In children older than 2 years, limit media to 1 hour or less per day of high-quality programming. Recommend shared use between parent and child to promote enhanced learning, greater		

	only in terms of content or time limits, but also emphasizing the importance of parent– child shared media use and allowing the child time to take part in other developmentally healthy activities.	interaction, and limit setting. • Recommend no screens during meals and for 1 hour before bedtime. • Problem-solve with parents facing challenges, such as setting limits, finding alternate activities, and calming children. **Families** • Avoid digital media use (except video-chatting) in children younger than 18 to 24 months. • For children ages 18 to 24 months of age, if you want to introduce digital media, choose high-quality programming and use media together with your child. Avoid solo media use in this age group. • Do not feel pressured to introduce technology early; interfaces are so intuitive that children will figure them out quickly once they start using them at home or in school. • For children 2 to 5 years of age, limit screen use to 1 hour per day of high-quality programming, coview with your children, help children understand what they are seeing, and help them apply what they learn to the world around them • Avoid fast-paced programs (young children do not understand them as well), apps with lots of distracting content, and any violent content. • Turn off televisions and other devices when not in use. • Avoid using media as the only way to calm your child. Although there are intermittent times (eg, medical procedures, airplane flights) when media is useful as a soothing strategy, there is concern that using media as strategy to calm could lead to problems with limit setting or the inability of children to develop their own emotion regulation. Ask your pediatrician for help if needed. • Monitor children's media content and what apps are used or downloaded. Test apps before the child uses them, play together, and ask the child what he or she thinks about the app. • Keep bedrooms, mealtimes, and parent–child playtimes screen free for children and parents. Parents can set a "do not disturb" option on their phones during these times. • No screens 1 hour before bedtime, and remove devices from bedrooms before bed. • Consult the American Academy of Pediatrics Family Media Use Plan, available at: www. healthychildren. org/ MediaUsePlan. **Industry** • Work with developmental psychologists and educators to create design interfaces that are appropriate to child developmental abilities, that are not distracting, and that promote shared parent– child media use and application of skills to the real world. Cease making apps		

		for children younger than 18 months until evidence of benefit is demonstrated. • Formally and scientifically evaluate products before making educational claims. • Make high-quality products accessible and affordable to low income families and in multiple languages. • Eliminate advertising and unhealthy messages on apps. Children at this age cannot differentiate between advertisements and factual information, and therefore, advertising to them is unethical. • Help parents to set limits by stopping auto-advance of videos as the default setting. Develop systems embedded in devices that can help parents monitor and limit media use.		
Radesky, J.S., Christakis, D.A. **Increased Screen Time: Implications for Early Childhood Development and Behaviour.** Pediatric Clinics of North America, 2016;63(5), 827-839	**Subjects:** School Aged Children(0-8 years) **Design:** Review **Methods:** In this article, the authors review the evidence of how young children learn through digital media in different domains of child development and learning as well as school-aged children)approximately 0-8 years of age), when lifelong media habits are established, before children are usually using social media, and when parents play the largest role in determining children's media use habits.	**Recommendations** • Do not allow screen media during family meals, bedtime (turn off 1 hour before bed), or playtime (unless playing on the device together). • Watch and play with digital media together. • Help the child apply any knowledge gained from apps or TV programs to the rest of their life. • Check out which apps the child is downloading and uninstall those that are violent or inappropriate. • Suggest resources, such as www.commonsensemedia.org, Sesame Workshop, or PBS Kids, which all provide good guidance for parents. • Ensure adequate time in physical activity, hands-on play, social play, and sleep. • Create an American Academy of Pediatrics' Family Media Use Plan that fits with your family's goals and needs.		

Downing, K. L., Hnatiuk, J., & Hesketh, K. D. (2015). Prevalence of sedentary behavior in children under 2 years: A systematic review. *Preventive medicine*, *78*, 105-114. Available from: PubMed.	**Subjects:** Children <2 years **Design:** Systematic review **Methods:** Medline, PsycINFO, SPORTDiscus, and Education Research Complete electronic databases were searched, as were reference lists of included articles and the authors' own collections. Inclusion criteria were: published in a peer-reviewed English language journal; mean age of children <2 years; and a reported measure of the prevalence of sedentary behavior.	The aim of this systematic review was to determine the prevalence of sedentary behavior in children <2 years Estimates of young children's screen time ranged from 36.6 to 330.9 min/day. The proportion of children meeting the zero screen time recommendation ranged from 2.3% to 83.0%. **Conclusion:** Substantial variability exists in current estimates of the levels of screen exposure in children under the age of 2 years, with little information available on non–screen-based sedentary behaviors. It is difficult, therefore, to determine the true prevalence of sedentary behavior in this age group. However, the results of this review suggest that the majority of young children are already engaging in high levels of television viewing, and that the majority are exceeding current screen time recommendations.		

Kuzik, N., Clark, D., Ogden, N., Harber, V., & Carson, V. (2015). Physical activity and sedentary behaviour of toddlers and preschoolers in child care centres in Alberta, Canada. *Can J Public Health*, *106*(4), e178-e183. Available from PubMed.	**Subjects:** Toddlers and preschoolers (19-60 months) **Design:** Descriptive study **Methods:** 8 child care centres (of the 12 that were eligible for the study) agreed to participate. All parents of children aged 19 to 60 months who attended the centre full time received a questionnaire package. Of the 270 eligible children, 145 (54%) had a parent agree to their child's participation by returning a signed consent form and completed questionnaire. The questionnaire assessed demographics and children's physical activity and sedentary behaviour outside of child care. Calibrated waist-mounted accelerometers were positioned on the child's hip. Four children were over 60 months of age, 19 had invalid	This study represents baseline data from the Supporting Active Living Behaviours in Alberta Child Care Settings study, which is examining the effects of revised Alberta Child Care Accreditation Standards. Minutes/hour spent in sedentary behaviour, light physical activity (LPA) and moderate-to-vigorous (MVPA) were 16.9, 18.4, and 4.2 respectively. Frequency/hour of sedentary bouts lasting 1-4, 5-9, 10-14 and ≥ 15 minutes were 6.7, 0.9, 0.4, and 0.3 respectively. Preschoolers participated in less sedentary behaviour and more LPA and MVPA, and had fewer sedentary bouts lasting 10-14 and ≥ 15 minutes compared to toddlers ($p < 0.05$). **Conclusion:** Children aged 19-60 months from licensed Alberta child care centres spent the majority of their time in child care engaging in sedentary behaviour and LPA. However, these children most frequently accumulated their sedentary behaviour in bouts lasting 1-4 minutes. These findings suggest interventions are needed to increase MVPA and decrease total sedentary behaviour within child care centres for toddlers and preschoolers, while continuing to promote short sedentary bouts.		2B

	accelerometer wear time, and 8 had faulty monitors and were excluded, leaving a sample of 114 children. Data were collected between September and November, 2013.			
Christakis DA, Garrison MM, Herrenkohl T, Haggerty K, Rivara FP, Zhou C, Liekweg K. **Modifying Media Content for Preschool Children: A Randomized Controlled Trial.** Pediatrics. 2013 Feb 18. Available from: Pediatrics	**Subjects:** Preschool children **Design:** Randomized control trial **Methods:** Authors devised a media diet intervention wherein parents were assisted in substituting high quality prosocial and educational programming for aggression-laden programming without trying to reduce total screen time. The control group received a nutritional intervention designed to promote healthier eating habits. 565 parents of preschool-aged children ages 3 to 5 years were recruited from community pediatric practices.	Outcomes were derived from the Social Competence and Behavior Evaluation at 6 and 12 months. At 6 months, the overall mean Social Competence and Behavior Evaluation score was 2.11 points better (95% confidence interval [CI]: 0.78–3.44) in the intervention group as compared with the controls, and similar effects were observed for the externalizing subscale (0.68 [95% CI: 0.06–1.30]) and the social competence subscale (1.04 [95% CI: 0.34–1.74]). The effect for the internalizing subscale was in a positive direction but was not statistically significant (0.42 [95% CI: 20.14 to 0.99]). Although the effect sizes did not noticeably decay at 12 months, the effect on the externalizing subscale was no longer statistically significant (P = .05). In a stratified analysis of the effect on the overall scores, low-income boys appeared to derive the greatest benefit (6.48 [95% CI: 1.60–11.37]). **Conclusion:** An intervention to modify the viewing habits / content of preschool-aged children can significantly enhance their overall social and emotional competence and that low-income boys may derive the greatest benefits.	I A	A
S Lipnowski, CMA LeBlanc; Canadian Paediatric Society, Healthy Active Living and Sports Medicine	**Subjects:** Children and adolescents **Design:** Position statement	A systematic review by Timmons et al. showed that physical activity (PA) improves motor skills, body composition and aspects of metabolic health and social development in children younger than five years of age. Based on evidence from two systematic reviews	I, II-1, II-2, II-3 B B	1A, B, C 1A, B, C

Committee. **Healthy active living: Physical activity guidelines for children and adolescents.** Paediatr Child Health. 2012;17(4):209-10. Abstract available from: PubMed	**Methods:** This position statement aims to provide child health care providers with counselling and advocacy strategies to promote physical activity and reduce sedentary time.	(Timmons et al. and LeBlanc et al.), the authors developed sedentary and physical activity guidelines for infants, toddlers and preschoolers. **Recommendations:** 1) Caregivers should minimize the time infants (<1 yr of age), toddlers (1-2 yrs) and preschoolers (3-4 yrs) spend being sedentary during waking hours, including prolonged sitting or being restrained (eg, in a stroller, high chair) for >1 h at a time. 2) For children <2 years, screen time (eg, TV, computer, electronic games) is not recommended. 3) For children 2-4 years, screen time should be limited to <1 h/day; less is better. 4) Infants (<1 yr of age) should be physically active several times daily – particularly through interactive floor-based play. 5) Toddlers (1-2 yrs) and preschoolers (3-4 yrs) should accumulate at least 180 min of physical activity at any intensity spread throughout the day, including: a variety of activities in different environments, activities that develop movement skills, and progression toward at least 60 min of energetic play by 5 yrs of age. 6) More daily physical activity provides greater benefits.		
Timmons BW, LeBlanc AG, Carson V, Connor Gorber S, Dillman C, Janssen I, Kho ME, Spence JC, Stearns J, Tremblay MS. **Systematic review of the relationship between physical activity and health indicators in the early years (ages 0-4 years).** Appl Physiol Nutr Metab. 2012;37: 773–792. Available from: NRC Research Press	**Subjects:** Children aged 0-4 years **Design:** Systematic review **Methods:** Searched all major electronic bibliographic databases (Medline, EMBASE, PsychInfo, EBSCO SportDiscus, Cochrane Central Database), personal libraries and government documents for studies examining the relationship between	This review included 18 studies, including trials (randomized and non randomized) and prospective cohort studies, comprising of 12,742 participants. Health indicators chosen by an expert committee included the following: adiposity (n=11), bone and skeletal health (n=2), motor skill development (n=4), psychosocial health (n=3), cognitive development (n=1), and cardiometabolic health indicators (n=3). For different indicators or combination of, this review found low, moderate and high quality evidence suggesting benefits of increased or higher physical activity in infants, toddlers and preschool children. Although the quality of the evidence was heterogeneous among studies, the authors found no serious inconsistencies. The available evidence is insufficient to prescribe the amount of physical activity needed to achieve these	I, II-1, II-2 A, B	1A, B, C

	physical activity and specified health indicators during the early years (ages 0–4 years). The quality of the evidence was assessed using GRADE.	benefits. The authors also considered potential harmful effects of physical activity.		
LeBlanc AG, Spence JC, Carson V, Connor Gorber S, Dillman C, Janssen I, Kho ME, Stearns J, Timmons BW, Tremblay MS. **Systematic review of the relationship between sedentary behaviours and health indicators in the early years (ages 0-4 years).** Appl Physiol Nutr Metab. 2012;37: 773–792. Available from: Full article	**Subjects:** Children aged 0-4 years **Design:** Systematic review **Methods:** Searched all major electronic bibliographic databases (Medline, EMBASE, PsychInfo, EBSCO SportDiscus, Cochrane Central Database), personal libraries and government documents for studies examining the relationship between sedentary behaviours and specified health indicators during the early years (ages 0–4 years). The quality of the evidence was evaluated using GRADE.	This review included 21 unique studies, mostly of prospective cohort design, comprising of 22,417 participants. Health indicators chosen by an expert committee included the following: adiposity (n=11), bone and skeletal health, motor skill development, psychosocial health (n=6), cognitive development (n=8), and cardiometabolic health indicators. Results suggested that increased television viewing is associated with unfavourable measures of adiposity and decreased scores on measures of psychosocial health and cognitive development. The overall quality of the evidence was graded as low to moderate. The authors also note that a dose–response relationship was observed between increased time spent watching television and decreased psychosocial health or cognitive development.	II-2, II-3 A, B	1A, B
Tremblay MS, LeBlanc AG, Carson V, Choquette L, Connor Gorber S, Dillman C, et al. **Canadian physical activity guidelines for the early years (aged 0-4 years).** Appl Physiol Nutr	**Subjects:** 0-4 years old **Design**: National guidelines **Methods:** The Canadian Society developed these national guidelines for Exercise Physiology in partnership with various	The recommendations of this group are largely based on evidence obtained from a systematic review by Timmons et al. The guidelines are the same as those reported in the CPS position statement.		

Metab. 2012;37:345-56. Available from: NRC Research Press	experts and stakeholders. The guideline development process was informed by the Appraisal of Guidelines for Research Evaluation (AGREE) II instrument and the evidence assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system.			
Tremblay MS, LeBlanc AG, Carson V, Choquette L, Connor Gorber S, Dillman C, et al. **Canadian sedentary behaviour guidelines for the early years (aged 0-4 years).** Appl Physiol. Nutr Metab. 2012;37:370-80. Available from: NRC Research Press	**Subjects:** 0-4 years old **Design:** National guidelines **Methods:** The Canadian Society developed these national guidelines for Exercise Physiology in partnership with various experts and stakeholders. The guideline development process was informed by the Appraisal of Guidelines for Research Evaluation (AGREE) II instrument and the evidence assessed using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) system.	The recommendations of this group are largely based on evidence obtained from a systematic review by LeBlanc et al.. The guidelines are the same as those reported in the CPS position statement.		

4.2.6 HIGH RISK INFANTS/CHILDREN/PARENTS/CAREGIVERS/FAMILIES

4.2.6.1 MATERNAL DEPRESSION

High Risk Infants/Children/Parents/Caregivers/Families : Maternal Depression Recommendations	Strength of Recommendation
1. Maternal depression - Physicians should have a high awareness of maternal depression, which is a risk factor for the socio-emotional and cognitive development of children. Although less studied, paternal factors may compound the maternal-infant issues.	**Good**

High Risk Infants/Children/Parents/Caregivers/Families : Maternal Depression Resources
1. Maternal Depression and Child Development (CPS)

Maternal Depression References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Baker R, Kendrick D, Tata LJ, Orton E. Association between maternal depression and anxiety episodes and rates of childhood injuries: a cohort study from England. Injury Prevention. 2017;23(6):396-402. http://injuryprevention.bmj.com/content/early/2017/02/23/injuryprev-2016-042294		Abstract **Background** Maternal depression is common and associated with several child health outcomes. The impact on childhood injuries is underexplored, with existing studies relying on maternal reporting of injury occurrences. Using population healthcare databases from England, we assessed the association between maternal depression and/or anxiety episodes and rates of child poisonings, fractures, burns and serious injuries. **Methods** We conducted a prospective cohort study of 207 048 mother-child pairs with linked primary care and hospitalisation data from the Clinical Practice Research Datalink and Hospital Episode Statistics, 1998–2013. Episodes of maternal depression and/or anxiety were identified using diagnoses, prescriptions and hospitalisations, with the child's follow-up time divided into exposed and unexposed		

		periods. Adjusted IRRs (aIRR) for child injury during maternal mental health episodes were estimated using Poisson regression. **Results** 54 702 children (26.4%) were exposed to maternal depression and/or anxiety when aged 0–4 years. During follow-up, 2614 poisonings, 6088 fractures and 4201 burns occurred. Child poisoning rates increased during episodes of maternal depression (aIRR 1.52, 95% CI 1.31 to 1.76), depression with anxiety (2.30, 1.93 to 2.75) and anxiety alone (1.63, 1.09 to 2.43). Similarly, rates of burns (1.53, 1.29 to 1.81) and fractures (1.24, 1.06 to 1.44) were greatest during depression with anxiety episodes. There was no association between maternal depression and/or anxiety and serious child injuries. **Conclusions** Maternal depression and/or anxiety episodes were associated with increased rates of child poisonings, fractures and burns. While mechanisms are unclear, prompt identification and treatment of maternal depression and/or anxiety and provision of safety advice (eg, safe medication storage) may reduce child injury risk.		
Canadian Pediatric Society. Psychosocial Paediatrics Committee. **Maternal depression and child development.** Paediatr Child Health. 2004;9(8):575-583. Reaffirmed 2015. Abstract available from: PubMed	**Subjects:** Mothers and children **Design:** Position statement **Methods:** Review of the current knowledge and literature on the consequences of maternal depression on children. Performed a literature search on MEDLINE over the past 15 years. Included mainly longitudinal prospective cohort studies.	There is a negative impact of maternal depression on a child's cognitive development. The CPS suggests screening for postpartum depression at 2-, 6- and 12-month well-baby care visits. There is fair evidence against routine testing for maternal depression, however, it is strongly suggested that physicians maintain a high degree of clinical suspicion for depression among their patients. The CPS also recommends that patients with symptoms should be referred to psychiatric services.	III A	

4.2.6.2 ETHANOL IN PREGNANCY/FASD	
High Risk Infants/Children/Parents/Caregivers/Families : Ethanol in Pregnancy/FAS Recommendations	**Strength of Recommendation**
1. Abstinence from alcohol during pregnancy is recommended.	**Good**

High Risk Infants/Children/Parents/Caregivers/Families : Ethanol in Pregnancy/FAS Resources
1. Fetal Alcohol Specrum Disorder (AAP)

Ethanol in Pregnancy/FAS References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Canadian Paediatric Society, First Nations, Inuit and Métis Health Committee. **Fetal alcohol syndrome.** Paediatrics & Child Health. 2002; 7(3): 161-74. Updated 2010. Reaffirmed 2016. Available from: CPS.	**Subjects:** Children and mothers **Design:** CPS position statement **Methods:** This review addresses FAS prevention, diagnosis, early identification and management for health care professionals.	Recent studies suggest the incidence of FAS to be between 2.8/1000 and 4.8/1000 live births, and the incidence of a combination of FAS and ARND (alcohol-related neurodevelopmental defects) to be at least 9.1/1000 live births. Although all races are susceptible, FAS is disproportionately higher among in select First Nations and Inuit communities in Canada. Maternal age and the amount of alcohol consumed were directly related to cognitive defects in a group of alcohol-exposed infants. Functionally significant defects were seen primarily in infants whose mothers drank more than five drinks per occasion on an average of at least once a week.		

		Conclusion: Medical practitioners should recommend abstinence starting with the first prenatal visit. Prompt referral for alcohol treatment is recommended for pregnant individuals who are unable to stop drinking alcohol. Intervention focuses on optimizing development, managing behavioural difficulties and providing appropriate school programming. **Recommendations:** Primary prevention of FAS should involve school-based educational programs; early recognition; treatment of at-risk women; and community-sponsored, culturally-centred programs. Health care providers should ask women about their drinking habits, whether or not they are pregnant. If behavioural or physical abnormalities consistent with FAS are identified, intervention should begin without delay, even before a definitive diagnosis is made		

Cook, J. L., Green, C. R., Lilley, C. M., Anderson, S. M., Baldwin, M. E., Chudley, A. E., ... & Mallon, B. F. **Fetal alcohol spectrum disorder: a guideline for diagnosis across the lifespan.** CMAJ 2016; 188(3): 191-197. Available from: CMAJ.	**Subjects:** Mothers and children **Design:** Guideline **Methods:** The guideline was developed according to the Appraisal of Guidelines, Research and Evalua-tion (AGREE II) framework. Literature review conducted using relevant reports published from 2005 to September 2014 from the following databases: Pub-Med, PsychLIT, Medscape, MEDLINE, theCanadian Institutes of Health Research funding database and the Cochrane Library.	This guideline provides recommendations for diagnosis of fetal alcohol spectrum disorder (FASD) including screening, referral and support, medical assessment, sentinel facial features, neurodevelopmental assessment, nomenclature and diagnostic criteria, members of the diagnostic team, special considerations in neurodevelopmental assessment of infants and young children, management and follow-up. Full list of recommendations can be found in Table 1, part 1 and 2. The article also provides a diagnostic algorithm for FASD.		
Williams, J. F., & Smith, V. C. (2015). **Fetal alcohol spectrum disorders. Pediatrics,** 136(5), e1395-e1406. Available from: Pediatrics.	**Subjects:** Children **Design:** Clinical report from AAP **Methods:** This report was produced by the American Academy of Pediatrics	This clinical report from the AAP reviewed several issues related to fetal alcohol spectrum disorders (FASD). It highlighted the epidemiology, the diagnosis of FASD, the medical, behavioral and cognitive problems, the secondary and co-occuring conditions, the treatment, the economic effects as well as the role of the pediatrician and the medical home. Alcohol-related birth defects and developmental disabilities are completely preventable when pregnant women abstain from alcohol use. Neurocognitive and behavioral problems resulting from prenatal alcohol exposure are lifelong. Early recognition, diagnosis, and therapy for any condition along the FASD continuum can result in improved outcomes. During pregnancy: no amount of alcohol intake should be considered safe; there is no safe trimester to drink alcohol; all forms of alcohol, such as beer, wine, and liquor, pose similar risk; and binge drinking poses dose-related risk to the developing fetus.		

Lucas, B. R., Latimer, J., Pinto, R. Z., Ferreira, M. L., Doney, R., Lau, M., ... & Elliott, E. J. **Gross motor deficits in children prenatally exposed to alcohol**: a meta-analysis. Pediatrics 2014; 134(1): e192-e209. Available from: Pediatrics.	**Subjects:** Children 0 - ≤18 years **Design:** Systematic review with meta-analysis **Methods:** A systematic review of observational studies with meta-analysis to define and measure the effects of prenatal alcohol exposure (PAE) on gross motor (GM) proficiency, was conducted guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement. A search was conducted of the following: Medline, Embase, Allied and Comple-mentary Medicine Database, Cumulative Index to Nursing and Allied Health Literature, PsycINFO, PEDro, and Google Scholar.Exclusion	The search recovered 2881 articles of which 14 met the systematic review inclusion criteria. The subjects' mean age ranged from3 days to 13 years. The meta-analysis pooled results (n= 10) revealed a significant association between a diagnosis of FASD or moderate to heavy PAE and GM impairment (odds ratio: 2.9; 95% confidence interval: 2.1–4.0). GM deficits were found in balance, coordination, and ball skills. There was insufficient data to determine prevalence. **Conclusion**: In children with an FASD diagnosis or those exposed to moderate to heavy levels of alcohol prenatally, the odds of GM impairment are tripled. It was demonstrated that higher pooled impairment effect in children with an FASD diagnosis (OR: 3.0 [95% CI: 2.0–4.4]) compared with the moderate to heavy or binge drinking PAE exposure (OR: 1.1 [95% CI 0.4–2.7])		

	criteria: GM function not evaluated, outcome self-reported by the mother, subjects with genetic or other motor disorder in conjunction with an FASD.			
O'Leary CM, Jacoby PJ, Bartu A, D'Antoine H, Bower C. **Maternal Alcohol Use and Sudden Infant Death Syndrome and Infant Mortality Excluding SIDS.** Pediatrics. 2013;131;e770. Available from: Pediatrics	**Subjects:** Mothers and newborns **Design:** Cohort study **Methods:** To assess the risk of SIDS associated with maternal alcohol-use disorder, mothers exposed (n = 21.841) were frequency matched with mothers without an alcohol diagnosis (n = 56.054).	The highest risk of SIDS occurred when a maternal alcohol diagnosis was recorded during pregnancy (adjusted Hazards Ratio (aHR) 6.92, 95% CI 4.02–11.90) or within 1 year postpregnancy (aHR 8.61, 95% CI 5.04–14.69). An alcohol diagnosis recorded during pregnancy more than doubled the risk of infant deaths (excluding SIDS) (aHR 2.35, 95% CI 1.45–3.83). Maternal alcohol-use disorder is attributable for at least 16.41% (95% CI 9.73%–23.69%) of SIDS and 3.40% (95% CI 2.28%–4.67%) of infant deaths not classified as SIDS. **Conclusion:** At least 16.4% of SIDS and 3.4% of infant deaths not classified as SIDS are attributable to maternal alcohol use. Maternal alcohol-use disorder increases the risk of infant mortality through direct effects on the foetus and indirectly through environmental risk factors.	II-2 A	B
Foltran F, Gregori D, Franchin L, Verduci E, Giovannini M. **Effect of alcohol consumption in prenatal life, childhood, and adolescence on child development.** Nutrition Reviews. 2011;69(11):642-59. Abstract available from: PubMed	**Subjects:** Mothers and infants **Design:** Review **Methods:** This report reviews existing evidence on the short- and long-term adverse effects of alcohol consumption in children and adolescents, and consider the following periods of exposure: prenatal life, childhood, and adolescence.	The authors present summaries of studies from systematic reviews and meta-analyses on the effects of prenatal drinking and different alcohol consumption patterns (low, low to moderate, moderate) in infants, children and adolescent. The findings of the few human studies point to a negative effect of prenatal drinking on several outcomes in the child, including FASD and neurodevelopmental outcomes. Some studies fail to generate evident adverse effects of low prenatal ethanol exposure in the offspring, but these should be interpreted with caution as some negative effects might not be noticed for many years. **Recommendation:** Abstinence from alcohol during pregnancy is recommended.	II-2 A	1C

4.2.6.3 ADOPTION/FOSTER CARE

High Risk Infants/Children/Parents/Caregivers/Families : Adoption/Foster Care Recommendations	Strength of Recommendation
1. Children newly adopted or entering foster care are a high-risk population requiring special needs for health supervision.	Consensus

High Risk Infants/Children/Parents/Caregivers/Families : Adoption/Foster Care Resources
1. Foster Care (CPS)
2. International Adoption (CPS Caring for Kids New to Canada) International Adoption: Preparing to adopt | International Adoption: Enhancing attachment

Adoption/Foster Care References				
Reference	**Meds**	**Outcomes**	**CTFPHC**	**GRADE**

Canadian Pediatric Society. **Special considerations for the health supervision of children and youth in foster care.** 2008. Reaffirmed 2016. Available from: CPS.	**Subjects:** Children in foster care **Design:** Position Statement **Methods:** PubMed searches for relevant articles from 1997-2007 were done. Keywords included: foster, care and health, children 0-18. Hand-searches of references from relevant studies were also conducted. In addition, resource material was sought from the Child Welfare League of Canada, Centres of Excellence for Child Welfare, Health Canada, Statistics Canada, Government of Canada and First Nations Child & Family Caring Society of Canada.	"Children entering foster care are a high risk population requiring special needs for health supervision." The CPS recommends the physicians should recognize that children and adolescents in foster care usually have a higher incidence of special needs (medical conditions, mental health disorders and developmental delays). An initial medical assessment (physical examination) and screening tests (if indicated) of children entering foster care should be done. Pediatricians should be aware of community resources to assist fostering caregivers. There is a high incidence of children with developmental delays, children who are HIV-positive and those who have had substance abuse exposure (eg, fetal alcohol spectrum disorder). Table 1 in statement has reference to organizations with contacts and websites.	III	

Szilagyi, M. A., Rosen, D. S., Rubin, D., Zlotnik, S., Harmon, D., Jaudes, P., ... & Sagor, L. (2015). Health care issues for children and adolescents in foster care and kinship care. Pediatrics,136 (4), e1142-e1166.	**Subjects:** Children and adolescents 0-21 years old **Design:** Policy statement **Methods:** Policy statement released by the American Academy of Pediatrics on foster care in the United States. It discusses the role pediatricians have in ensuring the wellbeing of children in out-of-home care through the provision of high quality health services, health care coordination and advocacy on their behalves.	The AAP recommends an initial health screening within 72 hours of placement. However, younger or preverbal children, any child who is a suspected victim of abuse, or any child with a chronic medical or developmental condition should be seen within 24 hours. Ideally, children should have at least 3 health encounters over the first 3 months of foster care, as they adjust to their new circumstances. In addition to the initial health screen, experts recommend a comprehensive evaluation of each child's medical, dental, mental health, developmental, and educational needs within 30 days, resulting in a health plan that is shared with caregivers and child welfare professionals and integrated into the child's permanency plan. Thereafter, children in foster care, as children with special health care needs, should be closely monitored.		

Winokur, M., Holtan, A., & Batchelder, K. E. (2014). Kinship care for the safety, permanency, and well-being of children removed from the home for maltreatment. Available from: Cochrane Database of Systematic Reviews. .	**Subjects:** Children and youth <18 years old **Design:** Controlled experimental and quasi-experimental studies, in which children placed in kinship care are compared cross-sectionally or longitudinally with children placed in foster care. **Methods:** The types of eligible quasi-experimental designs include studies that employ matching, covariates, or ex post facto comparisons of children in kinship care and foster care. Studies that compare kinship care to more restrictive out-of home settings (e.g., residential treatment centres) were not considered for this review. Eligible studies must analyse child welfare outcomes in the well-being, permanency, or safety domains. Primary outcomes for the review are behavioural development, mental health, placement stability, and permanency. Secondary outcomes include educational	**Conclusion:** children in kinship foster care experience fewer behavioural problems, fewer mental health disorders, better well-being, and less placement disruption than do children in non-kinship foster care. For permanency, there was no difference on reunification rates, although children in non-kinship foster care were more likely to be adopted, while children in kinship foster care were more likely to be in guardianship. Lastly, children in non-kinship foster care were more likely to utilise mental health services. Major limitation: quality of included studies (poor methods)- specifically lack of confidence concerning comparability of groups (differences between children who enter kinship care and those who enter non-kinship care) and lack of control over contaminating events involving family preservation; also kinship care is often done in private and out of control of welfare agencies—therefore research concepts/terminology etc. may not always be appropriate for kinship care placements.		

	attainment, family relations, service utilisation, and re-abuse.			
Jones VF. Committee On Early Childhood, Adoption, And Dependent Care. **Comprehensive health evaluation of the newly adopted child.** Pediatrics. 2012;129(1):e214-23. Abstract available from: Pediatrics	**Subject:** Adopted children **Design:** Clinical report **Methods**: This report was produced by the Committee on Early Childhood, Adoption, and Dependent Care.	Adopted children often have multiple health care needs. This report offers practical guidance to paediatricians and other child healthcare providers in performing a comprehensive health evaluation of the newly adopted child. Topics covered include: the pre-adoption visit, the initial history and medical records, the initial physical examination, referral for diagnostic testing, immunizations, chronic health concerns, hearing and vision screening, dental, age determination, developmental screening, mental health review, issues of adjustment, kinship-specific issues, role of adoption medical specialist and financial considerations. Authors also specify that although the initial health evaluation of an adopted child should be comprehensive in nature, it can span over several visits. **Recommendation:** In the context of adoption, the paediatrician should perform a comprehensive evaluation, which should include child's medical history, complete physical examination, and results of necessary diagnostic testing.	III	1C
Jones VF. Schulte EE. Committee on Early Childhood. Council on Foster Care, Adoption, and Kinship Care. **The pediatrician's role in supporting adoptive families.** Pediatrics. 2012;130(4):e1040-9. Abstract available from: Pediatrics	**Subjects:** Adopted children **Design:** Clinical report **Methods**: This report is a joint effort by the AAP's Committee on Early Childhood and the Council on Foster Care, Adoption, and Kinship Care Executive Committee.	In order to provide optimal health care to adopted children, this report is intended for paediatricians to better understand their unique medical, developmental, mental health, and behavioural needs. The authors argue that adoptive families are changing, with an increasing number of domestic adoptions and a decreasing number of international adoptions, as well as a greater diversity seen in adoptive parents (gay or lesbians, older parents, single parent, relatives). Several issues are addressed but this report serves as a guide and no official recommendation was made. For specific recommendations, see AAP's clinical report Comprehensive health evaluation of the newly adopted child.	III	C
Leve LD, Harold GT, Chamberlain P, Landsverk	**Subjects:** Children **Design:** Systematic review	Although the development of evidence-based interventions that improve outcomes for foster children has lagged behind the	I A	A

JA, Fisher PA, Vostanis P. Practitioner review: **Children in foster care-vulnerabilities and evidence-based interventions that promote resilience processes.** J Child Psychol Psychiatry. 2012 Dec;53(12):1197-211. Abstract available from: PubMed	**Methods:** Based on a systematic search of the PsycINFO database (to March 2012), eight efficacious evidence-based interventions for foster families are summarized.	delivery of interventions in other service sectors (e.g., mental health and educational sectors), several interventions across childhood and adolescence offer promise. Service system constraints offer both challenges and opportunities for more routine implementation of evidence-based interventions. **Conclusion:** Specifically on early childhood, three independent interventions for young foster children demonstrate that, when foster caregivers are given appropriate support and training, children can develop healthy emotion and behaviour regulation and positive, secure social relationships.		
Macdonald GM, Turner W. **Treatment foster care for improving outcomes in children and young people.** Cochrane Database Syst Rev. 2008 Jan 23;(1):CD005649. Abstract available from: PubMed	**Subjects:** children who require out-of-home placement **Design:** Cochrane review **Methods:** Electronic databases were searched to identify randomized studies assessing the impact of treatment foster care (TFC), a foster family-based intervention, on psychosocial and behavioural outcomes, delinquency, placement stability, and discharge status for children and adolescents who require out-of-home placement.	Treatment foster care (TFC) is a foster family-based intervention that aims to provide young people (and, where appropriate, their families) with a tailored programme designed to effect positive changes in their lives. TFC was designed specifically to cater for the needs of children whose difficulties or circumstances place them at risk of multiple placements and/or more restrictive placements such as hospital or secure residential or youth justice settings. Five studies including 390 participants were included in this review. Data suggest that treatment foster care may be a useful intervention for children and young people with complex emotional, psychological and behavioural need, who are at risk of placements in non-family settings that restrict their liberty and opportunities for social inclusion. **Conclusion:** Children and young people at risk of placement in settings that restrict their liberty and who are at risk of a range of adverse outcomes may benefit from a foster family-based intervention designed specifically to cater their needs.	I B	B

4.2.6.4 IMMIGRANTS/REFUGEES

High Risk Infants/Children/Parents/Caregivers/Families : Immigrants/Refugees Resources

1. **Caring for Kids New To Canada**
2. **Canadian Collaboration for Immigrant and Refugee Health**
3. **Cross-cultural communication (CPS)**

4.2.6.5 ABORIGINAL CHILDREN

High Risk Infants/Children/Parents/Caregivers/Families : Aboriginal Children References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Greenwood ML, de Leeuw SN. **Social determinants of health and the future well-being of Aboriginal children in Canada** Paediatrics & Child Health. 2012 Aug-Sep; 17(7): 381–384. Available from: PubMed	**Subjects:** Aboriginal children (First Nations, Inuit, Métis) **Design:** commentary **Methods:** NA	Addressing persistent and current Aboriginal health inequities is vital to the success of our future nations and requires considering both the contexts in which disparities exist and innovative and culturally appropriate means of rectifying those inequities. This article contextualizes Aboriginal children's health disparities, considers 'determinants' of health as opposed to biomedical explanations of ill health and concludes with ways to intervene in health inequities. Applying a social determinants of health framework to health inequities experienced by Aboriginal children can create change.		
Ladha,Tehseen, Zubairi Mohammad, Hunter, Andrea, Audcent, Tobey Johnstone, Julie, Global Child and Youth Health Section Executive, **Cross-cultural communication: Tools for working with families and children.** Canadian Paediatric Society. Paediatr Child Health 2018;23(1):66–69 Available at	**Subjects:** Paediatric patients with ethnically diverse backgrounds or immigrant status. **Design:** Practice Point **Context:** Canada has a long-standing history of immigration and ethnic diversity [1]. In addition to a diverse range of Indigenous populations, there are more than 200 distinct ethnic origins represented in Canada and	**THE LEARN MODEL FOR CROSS-CULTURAL COMMUNICATION** **Listen:** Assess each patient's understanding of their health condition, its causes and potential treatments. Elicit expectations for the encounter, and bring an attitude of curiosity and humility to promote trust and understanding. **Explain:** Convey your own perceptions of the health condition, keeping in mind that patients may understand health or illness differently, based on culture or ethnic background. **Acknowledge:** Be respectful when discussing the differences between their views and your own. Point out areas of agreement as well as difference, and try to determine whether disparate belief systems may lead to a therapeutic dilemma. **Recommend:** Develop and propose a treatment plan to the patient and their family.		

https://www.cps.ca/en/documents/position/cross-cultural-communication	more than 50,000 newcomer children and youth arrive every year [2]–[4]. Culture—which may include language, values, beliefs and behaviours in any community—can also shape interactions between families and health care providers. Physicians need to be aware of the personal values they bring to the patient–provider relationship as well as how a patient's culture may be impacting their health or management of an illness [5]. Ineffective cross-cultural communication can affect patient outcomes adversely through misdiagnosis, repeated hospital admissions or lower treatment adherence [5]. By applying the LEARN model to three patient vignettes, this practice point provides a practical framework for patient interactions [6].	**Negotiate:** Reach an agreement on the treatment plan in partnership with the patient and family, incorporating culturally relevant approaches that fit with the patient's perceptions of health and healing. PRACTICE POINTS TO REMEMBER • Try to identify influential cultural differences in yourself and your patients. Be self-aware of biases and values that you may be bringing to medical encounters. • Use a trained interpreter rather than a family member to translate, when needed. • Build awareness of differences in communication style (e.g., verbal and nonverbal) that may influence care. • Consider the role of silences in each patient encounter. They may represent discomfort with a topic or uncertainty about a question being asked. Paying attention to nonverbal cues can help determine whether a differential power relationship is hindering communication. • Building trust and understanding helps empower families and optimize patient care. • Booking longer and repeat visits with the same interpreter can forge trust and understanding around child and youth health issues and management plans. • Devise a tailored treatment plan that involves the patient's immediate family, extended family or other community members, as appropriate. • Recognize that a 'high-context' communication style may be a family's cultural norm and stay attuned to tone, body language and other nonverbal cues. • Recognize that diversity exists within ethnic and cultural groups as much as between groups, and avoid generalizing or stereotyping cross-cultural encounters. • Assess the literacy levels of patients or families and adjust the use of written materials accordingly.		

4.2.6.6 SOCIAL DETERMINANTS OF HEALTH

High Risk Infants/Children/Parents/Caregivers/Families : Social Determinants of Health Recommendations	Strength of Recommendation
1. Inquiry about the impact of poverty: "In the past 12 months did you worry that your food would run out before you got money to buy more, OR did the food not last and you didn't have money to get more?"	**Good**

High Risk Infants/Children/Parents/Caregivers/Families : Social Determinants of Health Resources
1.Food Insecurity (Pediatrics) 2. CLEAR tool kit 3. Poverty Tool (OCFP) 4. Social determinants of health (CFPC) 5. Infrastructure to address SDH (PCH)

High Risk Infants/Children/Parents/Caregivers/Families : Social Determinants of Health References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Pinto, A.D., Bloch, G., **Framework for building primary care capacity to address the social determinants of health.** Canadian Family Physician November 2017, 63 (11) e476-e482; Retrieved from: https://www.cfp.ca/content/63/11/e476	**Subjects: Primary Care providers** **Design: Framework**	**Conclusion** Primary care providers are well situated to address SDOH. This article provides a framework that can assist every large primary care organization in establishing a similar committee dedicated to SDOH, which could help build a network across Canada to share lessons learned and support joint advocacy**.**		
Palakshappa, Deepak Vasan Aditi , Khan, Saba, Seifu, Leah, Feudtner, Chris and Fiks, Alexander G. **Clinicians' Perceptions of Screening for Food Insecurity in Suburban Pediatric Practice.** Pediatrics. 2017. 140(1)	**Subjects:** Children **Design:** Mixed Methods **Methods:** We conducted a mixed methods study that implemented FI screening in 6 suburban pediatric primary care practices. We included all children presenting for either a 2-, 15-, or 36-month well-child visit (N = 5645). Families who screened positive were eligible to be referred to our community partner that worked to connect families to the Supplemental Nutrition	**Conclusions:** With a call from national organizations to address families' unmet social needs in all practices, this study of 6 suburban pediatric practices that screened >4000 children found that it was feasible and acceptable for clinicians to screen for FI. Clinicians felt it added minimal time, and most clinicians reported positive experiences with families. Nonetheless, the referral method used in this study was ineffective in assisting families in obtaining benefits. Other approaches to connect families to local resources may be needed to maximize the effectiveness of FI screening	C	

	Assistance Program. We conducted focus groups with clinicians			
Gottlieb, L. M. Hessler, D. Long, D., Laves, E., Burns, A. R. Amaya, A., Sweeney, P. Schudel, C., Adler, N. E. **Effects of Social Needs Screening and In-Person Service Navigation on Child Health: A Randomized Clinical Trial.** JAMA Pediatr. 2016. 170(11)	**Subjects:** Children and their caregivers **Design:** Randomized Clinical Trial **Methods**: A computer program determined the study randomization schedule within each clinic setting, with day as the unit of randomization and each calendar month as the randomization block. Navigators were not masked to study arm because of this randomization method. They approached families between 9 AM and 8PM and administered a 10-minute baseline survey with eligible, consenting participants. The survey included questions about household demographics and perceived social, legal, and mental health needs, as well as current benefits program enrollment and child global health. To avoid interference with clinical activities, medical staff (D.L.,E.L.,and other non authors) could	**Conclusions** This large randomized clinical trial of pediatric primary and urgent care–based social determinants of health interventions foundasignificantlygreaterdecreaseinsocialneedsandimprovementi nparent-reportedchildhealthinfamiliesinanin-person navigation intervention arm compared with the active control arm providing written resource information. These findings extend previous work documenting the associations between social adversities experienced in childhood and health outcomes, as well as on process outcomes related to social interventions. National pediatrics organizations have called for new delivery models that incorporate social interventions. Few pediatric patient caregivers and families are now screened for socialrisksinhealthcaresystemsorreceivehelpinaddressingidentifieds ocialneeds.21 While more work documenting health and health care use effects of social determinants of health interventions is needed to guide investments in this area, the finding that the low-intensity interventions under taken in this study can affect child health outcomes underlines the value of such programs.		B

	interrupt survey administration, as needed, for clinical care; if interrupted, the caregiver could resume the survey immediately after the clinical encounter. Families identifying mental health needs for adult household members who experienced violence we re-referred to social work or other appropriate behavioral health professionals.			
Pascoe, J. M., Wood, D. L. Duffee, J. H., Kuo, A. Committee On Psychosocial Aspects Of, Child Family, Health Council On Community, Pediatrics **Mediators and Adverse Effects of Child Poverty in the United States.** Pediatrics**.** 2016. 137(4)	**Subjects:** Children **Design:** Technical Report **Methods:** This technical report draws on research from a number of disciplines, including physiology, sociology, psychology, economics, and epidemiology, to describe the present state of knowledge regarding poverty's negative impact on children's health and development. Children inherit not only their parents' genes but also the family ecology and its social milieu. Thus, parenting skills, housing, neighborhood, schools, and other factors (eg, medical care) all have complex	**CONCLUSIONS** Knowledge about the effects of poverty on children and their development has increased dramatically since Brooks-Gunn and Duncan's often cited (over 65 000 citations) landmark study in 1997.154 In the 21st century, Sir Michael Marmot has emerged as a global leader in studying the social determinants of health. Since 2005, Marmot has led the World Health Organization's Commission on Social Determinants of Health.155 His 2009 article published in the Journal of the American Medical Association156 noted that a global mortality gradient exists among poor and rich countries. Evidence supports the hypothesis that the slope of a health gradient is not fixed but responds to political, social, and economic changes.157 Research is rapidly accumulating that refines our understanding of the mediators of poverty's adverse effects on children and adults and informs the implementation of effective interventions to ameliorate poverty's adverse effects.158 For example, recent research has strongly suggested that stress related to child poverty may be buffered by parent engagement and good relational health. The AAP policy statement that accompanies this technical report describes specific recommendations and population health strategies that could attenuate the adverse effects of child poverty		

	relations to each other and influence how each child's genetic canvas is expressed. Accompanying this technical report is a policy statement that describes specific actions that pediatricians and other child advocates can take to attenuate the negative effects of the mediators identified in this technical report and improve the well-being of our nation's children and their families.	and address many of the mediators of poverty that affect child health and development. Addressing the immediate needs of our youngest and poorest citizens is both the right thing to do for our children and an economically sound strategy for the future		
Page-Reeves J, Kaufman W, Bleecker M, Norris J, McCalmont K, et al. Addressing Social Determinants of Health in a Clinic Setting: The WellRx Pilot in Albuquerque, New Mexico. J Am Board Fam Med May-June 2016 vol. 29 no. 3 414-418		**Abstract** Although it is known that the social determinants of health have a larger influence on health outcomes than health care, there currently is no structured way for primary care providers to identify and address nonmedical social needs experienced by patients seen in a clinic setting. We developed and piloted WellRx, an 11-question instrument used to screen 3048 patients for social determinants in 3 family medicine clinics over a 90-day period. Results showed that 46% of patients screened positive for at least 1 area of social need, and 63% of those had multiple needs. Most of these needs were previously unknown to the clinicians. Medical assistants and community health workers then offered to connect patients with appropriate services and resources to address the identified needs. The WellRx pilot demonstrated that it is feasible for a clinic to implement such an assessment system, that the assessment can reveal important information, and that having information about patients' social needs improves provider ease of practice. Demonstrated feasibility and favorable outcomes led to institutionalization of the WellRx process at a university teaching hospital and influenced the state department of health to require managed care organizations to have community health workers		

		available to care for Medicaid patients.		
AAP Council on Community Pediatrics. Poverty and child health in the United States. Pediatrics 2016;137(4);e20160339. Available from: Pediatrics.	**Subjects:** children **Design:** Position statement **Methods:** Report produced by AAP Council on Community Pediatrics.	Almost 50% of young children in the US live in or near poverty. Poverty and related social determinants of health can lead to adverse health outcomes in childhood and across the life course, negatively affecting physical health, socioemotional development, and educational achievement. AAP advocates for programs and policies that have been shown to improve the quality of life and health outcomes for children and families living in poverty. With an awareness and understanding of the effects of poverty on children, pediatricians and other pediatric health practitioners in a family-centered medical home can assess the financial stability of families, link families to resources, and coordinate care with community partners. Further research, advocacy, and continuing education will improve the ability of pediatricians to address the social determinants of health when caring for children who live in poverty. Accompanying this policy statement is a technical report that describes current knowledge on child poverty and the mechanisms by which poverty influences the health and well-being of children		
Fazalullasha F, Taras J, Morinis J, Levin L, Karmali K, Neilson B, Muskat B, Bloch G, Chan K, MaDonald M, Makin S, Ford-Jones L. **From office tools to community supports: The need for infrastructure to address the social determinants of health in**	**Subjects:** Children **Design:** Expert commentary **Methods:** The authors review novel initiatives for addressing social determinants of health, and provide recommendations for addressing social	Barriers exist that limit the paediatrician's ability to properly address these issues. Barriers include a lack of clinical time, resources, training and education with regard to the social determinants of health; awareness of community resources; and case management capacity. This article suggests screening questions linked to community resources. Simple interventions, such as routine referral to early-year centres and selected referral to public health home-visiting programs, may help to address populations with the greatest needs.		

paediatric practice. Paediatr Child Health. 2014 Apr; 19(4): 195–199. Available from: Paediatrics & Child Health	determinants of health in the practice setting			
Garg A, Toy S, Tripodis, Y, Silverstein M, Freeman E. **Addressing social determinants of health at well child care visits: A cluster RCT.** Pediatrics 2014; 135(2): e296-e304. Available from Pediatrics.	**Subjects:** Families of infants ≤6 months old **Design:** cluster RCT **Methods:** mothers of healthy infants recruited from 8 urban community health centres, in which 4 WE CARE clinics randomized to intervention (self-report screening instrument to assess needs for child care, education, employment, food security, household heat, housing, referred to resources, and followed-up by telephone) and 4 randomized to usual care.	Three hundred thirty-six mothers were enrolled in the study (168 per arm). The majority of families had household incomes < $20 000 (57%), and 68% had ≥ 2 unmet basic needs. More WE CARE mothers received ≥ 1 referral at the index visit (70% vs 8%; adjusted odds ratio [aOR] = 29.6; 95% confidence interval [CI], 14.7–59.6). At the 12-month visit, more WE CARE mothers had enrolled in a new community resource (39% vs 24%; aOR = 2.1; 95% CI, 1.2–3.7). WE CARE mothers had greater odds of being employed (aOR = 44.4; 95% CI, 9.8–201.4). WE CARE children had greater odds of being in child care (aOR = 6.3; 95% CI, 1.5–26.0). WE CARE families had greater odds of receiving fuel assistance (aOR = 11.9; 95% CI, 1.7–82.9) and lower odds of being in a homeless shelter (aOR = 0.2; 95% CI, 0.1–0.9). **Conclusion:** Systematically screening and referring for social determinants during well child care can lead to the receipt of more community resources for families.		1A
Bric V, Eberdt C, Kaczorowski J. Development of a tool to identify poverty in a family practice setting: a pilot study. International J of Family Med 2011. Available from Int J Fam Med.	**Subjects**: Urban and rural primary care patients in family practices in British Columbia **Design:** Cross-section survey **Methods:** development and field-testing of questions to use as poverty case-finding tool	Total of 156 questionnaires were completed by a convenience sample. 35% of respondents were below the “poverty line” low-income cut-off (LICO). The question “Do you (ever) have difficulty making ends meet at the end of the month?” was identified as a good predictor of poverty (sensitivity 98%; specificity 40%; OR 32.3, 95% CI 5.4–191.5). Multivariate analysis identified a 3-item case-finding tool including 2 additional questions about food and housing security (sensitivity 64.3%; specificity 94.4%; OR 30.2, 95% CI 10.3–88.1). 85% of below-LICO respondents felt that poverty screening		1C

	to assist primary care providers in identifying poverty in coinical practice. Questionnaires sent out to subjects.	was important and 67% felt comfortable speaking to their family physician about poverty. **Conclusion:** Asking patients directly about poverty may help identify patients with increased needs in primary care.		
Andermann, Anne. Addressing the social causes of poor health is integral to practising good medicine. *CMAJ*, December 13, 2011, 183(18):2196.				
Hager et al, Development and Validity of a 2-Item Screen to Identify Families at Risk for Food Insecurity. *Pediatrics 2010*;		**Abstract** **Objectives:** To develop a brief screen to identify families at risk for food insecurity (FI) and to evaluate the sensitivity, specificity, and convergent validity of the screen. **Patients and methods:** Caregivers of children (age: birth through 3 years) from 7 urban medical centers completed the US Department of Agriculture 18-item Household Food Security Survey (HFSS), reports of child health, hospitalizations in their lifetime, and developmental risk. Children were weighed and measured. An FI screen was developed on the basis of affirmative HFSS responses among food-insecure families. Sensitivity and specificity were evaluated. Convergent validity (the correspondence between the FI screen and theoretically related variables) was assessed with logistic regression, adjusted for covariates including study site; the caregivers' race/ethnicity, US-born versus immigrant status, marital status, education, and employment; history of breastfeeding; child's gender; and the child's low birth weight status. **Results:** The sample included 30,098 families, 23% of which were food insecure. HFSS questions 1 and 2 were most frequently endorsed among food-insecure families (92.5% and 81.9%, respectively). An affirmative response to either question 1 or 2 had a sensitivity of 97% and specificity of 83% and was associated with increased risk of reported poor/fair child health		

		(adjusted odds ratio [aOR]: 1.56; P < .001), hospitalizations in their lifetime (aOR: 1.17; P < .001), and developmental risk (aOR: 1.60; P < .001). **Conclusions:** A 2-item FI screen was sensitive, specific, and valid among low-income families with young children. The FI screen rapidly identifies households at risk for FI, enabling providers to target services that ameliorate the health and developmental consequences associated with FI.		

4.2.6.7 PREVENTION OF CHILD MALTREATMENT

High Risk Infants/Children/Parents/Caregivers/Families : Prevention of Child Maltreatment and General Recommendations	Strength of Recommendation
1. Prevention of child maltreatment: a. Risk factors for child maltreatment: i. Parent (low socio-economic status, maternal age <19 years, single parent family, non-biological parents, abused as child, substance abuse, lack of social support, unplanned pregnancy or negative parental attitude towards pregnancy) ii. Family (spousal violence, poor marital relations, poor child-parent relationship, unhappy family life) iii. Child (behaviour problems, disability). b. Discuss with parents of preschoolers teaching names of genitalia, appropriate and inappropriate touch, and normal sexual behaviour for age. c. Exposure to personal violence and other forms of violence have significant impact on physical and emotional well-being of children. **2. Assess home visit need: There is good evidence for home visiting by nurses during the perinatal period through infancy for first-time mothers of low socioeconomic status, single parents or teenaged parents to prevent physical abuse and/or neglect.** 3. Unexplained injuries (e.g. fractures, bruising, burns) or injuries that do not fit the rationale provided or developmental stage raise concern for child maltreatment.	**Good** Consensus

High Risk Infants/Children/Parents/Caregivers/Families and General Resources
1. INSPIRE: Seven strategies for Ending Violence Against Children

2. Child maltreatment prevention (USPSTF)
3. Bruising in suspected maltreatment cases (CPS)
4. Abusive head trauma (CPS)

High Risk Infants/Children/Parents/Caregivers/Families: Prevention of Child Maltreatment and General References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Williams, R.C., Bicaro, A., Clinton J., Canadian Paediatric Society, Early Years Task Force. **Relationships matter: How clinicians can support positive parenting in the early years.** Pediatrics and Child Health. 2019. 24(5):340-347 Retrieved From: https://www.cps.ca/en/documents/position/positive-parenting	**Subjects:** Children **Design:** Position Statement	**RECOMMENDATIONS** As part of routine care, primary care physicians must assess and nurture relational health in young children, along with other aspects of growth and development. To be effective, a trusting relationship between physician and family is essential. Physicians can then positively affect family health and well-being, support parents, and connect families with community resources. The CPS recommends incorporating the following strategies into every well-child visit: • Build on each family's relational strengths and protective factors, reinforce healthy routines, use anticipatory guidance to prepare parents for developmentally normal (and possibly challenging) behaviours, and help modify specific behaviours or skills, when needed. • Model responsive communication and use motivational interviewing techniques. • Develop an office or clinic environment that promotes relational health, through family-friendly hours, proactive scheduling and follow-up, and knowledgeable, interested staff. Support parents with empathy and understanding— both of expected daily stressors or serious adverse childhood experiences—and with strategies that build resilience. • Encourage self-care and follow-up for parents with mental health risks. Refer parents directly to specialist services and supports when appropriate. • Foster clinical connections with community resources, parenting programs, and specialized services		
Brown, C.M., Raglin-Bignall, W.J, Ammerman, R.T. Preventive Behavioural Health	**Subjects:** children 0 to 5 years old	**RESULTS:** Gaps in the literature include: study findings do not always support hypotheses about interventions' mechanisms, trust in primary care as a mediator has not been sufficiently studied, it is unclear to		

Programs inn Primary Care:A Systematic Review. Pediatrics. 2018, 141 (5)	**Design**: Systematic Review **Methods:** PubMed, PsycINFO, Cumulative Index to Nursing and Allied Health Literature, Embase, Evidence-Based Medicine Reviews, and Scopus databases were searched for articles published in English in the past 15 years. Search terms included terms to describe intervention content, setting, target population, and names of specific programs known to fit inclusion criteria.	which target populations study findings can be applied, parent participation remains an important challenge, and the long-term impact requires further evaluation. **CONCLUSIONS:** Targeting gaps in the literature could enhance understanding of the efficacy, effectiveness, and readiness for scale-up of these programs.		
Charach, A., Belanger, S.A., CPS, McLennan, J.D., Nixon, M.K., Canadian Academy of Child and Adolescent Psychiatry, Mental Health and Developmental Disabilities Committee. **Screening for disruptive behaviour problems in preschool children in primary health care settings.** Paediatr Child Health 2017;22(8):478–484 Retrieved from: https://www.cps.ca/en/documents/position/disruptive-behaviour	**Subjects:** Children **Design:** Position Statement	**RECOMMENDATIONS** The following recommendations are based on current clinical consensus and will be periodically reviewed as new evidence becomes available. As part of routine care for children 2 to 5 years of age, practitioners who see children and families in practice should: • Always enquire about social, emotional and behavioural concerns during periodic health examinations. Book additional time to complete assessment when needed. • If concerns are identified, use standardized measures to help determine whether behaviours fall within the normative, borderline or at-risk, or clinically significant range. Screening tools can complement clinical assessment when determining the need for further evaluation or intervention. • Consider evidence-based parent-training programs as a first-line intervention for children with significant disruptive behaviours.		

		• Provide anticipatory guidance and psycho-education to parents, including directed reading, when a child's behaviours fall within the borderline/at-risk range. • Refer to specialized, more intensive services for children with significant behaviour problems complicated by comorbidity or not responding to first-line interventions.		
Ahun, M. N.,Geoffroy, M. C. Herba, C. M., Brendgen, M. Seguin, J. R., Sutter-Dallay, A. L. Boivin, M.,Tremblay, R. E. Cote, S. M. **Timing and Chronicity of Maternal Depression Symptoms and Children's Verbal Abilities.** Journal of Pediatrics. 2017. 140;251-257	**Subjects:** mother-child pairs **Design:** Cohort Study **Methods:** Data were drawn from the Quebec Longitudinal Study of Child Development, whose protocol was approved by the Quebec Institute of Statistics and the Sainte-Justine Hospital Research Centre ethics committees. Participants were recruited via the Quebec Birth Registry using a stratified procedure based on living area and birth rate. The initial sample included n=2120 infants born in Quebec in 1997-1998.Our analysis sample included n = 1073 mother-child pairs for whom data was available for MDS at 2	The objective of this study was to model the association between the timing and chronicity of MDS in early childhood (first 5 years of life) and children's long-term verbal abilities (5-10 years).Inourpopulation-based birth cohort(n=1073),37.8% of mothers reported elevated MDS(eg, experiencing few symptoms a lot of the time or many symptoms at least some of the time over the past week) at least once during the first 5 years of the target child's life. However, only children exposed to chronic MDS had significantly lower verbal abilities during middle childhood (ages 5-10 years). Specifically, children exposed chronically had lower scores than those never exposed and those exposed early or late. This association remained after adjusting for a wide range of potential confounders of the MDS and receptive language skills association. Maternal verbal IQ and native language, as well as family SES, were the main predictors of children's verbal abilities, with a total effect size of (h2 =0.044). MDS had a relatively small effect size (h2 =0.007). These results illustrate that multiple family factors are involved in the long-term development of verbal abilities and points to the importance of addressing the wider psycho social environments of families affected by MDS in interventions. It has not been well explored whether the timing and chronicity of MDS are associated with receptive verbal skills with effects lasting into middle childhood (age 10 years). In a previous short-term study (ie, 1 year), persistent MDS were associated with less optimal language development.30 However, MDS were assessed only twice and language development was measured when children were 12 months. In another study, chronic MDS were associated with executive functioning at age 6 years,31 but the association with language was not specifically investigated. Our results indicate that children most affected by MDS in the long-term (ie, middle childhood)are those exposed intensively over the entire early childhood period, between 5 months and 5 years. This suggests that repeated		B

	or more time points from 5 months to 5 years, verbal abilities for at least 1 time point from 5 to 10 years, and all covariates. At each data collection, informed written consent was obtained from all participants.	exposure to MDS across the early childhood period, but not transient exposure (ie, only early or only late) during this period, is associated with children's verbal abilities in the long term (up to age 10 years). Overall, this study shows that exposure to chronic maternal depression during the first 5 years of life is a potential risk factor for lower levels of receptive language skills, and this risk may extend up to middle childhood. Further research is needed to replicate these findings in samples with larger numbers of chronically depressed mothers to understand the underlying mechanisms of this association and to test the impact of prevention programs to support mothers who experience lasting depression after the birth of a child		
Berkowitz, Carol, D. **Physical Abuse of Children**. The New England Journal of Medicine. 2017. 376(17): 1659-1666		Recommendations regarding the evaluation and management of suspected victims of physical child abuse have been published by the American Academy of Pediatrics.7,12,15,36 A list of recommended steps to be taken to assess suspected cases of physical child abuse is provided in Table 1. The reporting of cases is not mandated in all countries. The International Society for the Prevention of Child Abuse and Neglect provides a forum for discussion and exchange of best practices among nations. U.S. guidelines are recognized internationally as a framework for child abuse evaluations. Recommendations in the current article are concordant with U.S. guidelines. **Conclusions and Recommendations** The infant in the vignette has had a brief unexplained event that has resolved and has facial bruising, findings that arouse concern for abusive head trauma. The infant should be admitted to the hospital and evaluated with an MRI, a funduscopic examination for retinal hemorrhages, a skeletal survey, measurement of hepatic and pancreatic enzymes, and coagulation studies. A more extensive social history should be obtained, including who was caring for the infant during the mother's absence and whether other children are in the home (Table 1). The case must be reported to child protective services. All findings should be recorded meticulously in the infant's medical record.		
Traub, F., Boynton-Jarrett, R. **Modifiable Resilience Factors to Childhood Adversity for**	**Subjects:** Children **Design:** Review	**Conclusions** Pediatricians are ideally situated to address both primary and secondary prevention of trauma as well as to identify treatable trauma sequelae		

Clinical Pediatric Practice. Pediatrics. 2017. 139(5)	**Methods:** We review the state of resilience research, with a focus on recent work, as it pertains to protecting children from the health impacts of early adversity. We identify and document evidence for 5 modifiable resilience factors to improve children's long- and short-term health outcomes, including fostering positive appraisal styles in children and bolstering executive function, improving parenting, supporting maternal mental health, teaching parents the importance of good selfcare skills and consistent household routines, and offering anticipatory guidance about the impact of trauma on children. We conclude with 10 recommendations for pediatric practitioners to leverage the identified modifiable resilience factors to help children withstand,	and build resilience. In order for pediatricians to be successful in this undertaking, significant change at the individual pediatric practice level, as well as in the broader health care policy environment, is required. Addressing the malleable social and environmental resilience factors identified through this review offers children withstand, adapt to, and recover from adversity. We need innovative models to ensure that those payers who invest in treating early adversity share in the cost savings that will surely result. To intervene in the lives of children experiencing adversity offers an opportunity to improve the health and well-being of the current and future generations. Not only is this the right thing to do, but it will also enhance national productivity and reduce spending on health care for chronic diseases.		

	adapt to, and recover from adversity. Taken together, these recommendations constitute a blueprint for a trauma-informed medical home.			
Weisleder, A., Brockmeyer Cates, C., Dreyer, B.P., Johnson, S.B., Huberman, H.S., Seery, A.M., Canfield, C.F., Mendelsohn, A.L., **Promotion of Positive Parenting and Prevention of Socioemotional Disparities.** Pediatrics February 2016, 137 (2) **Retrived from:** https://pediatrics.aappublications.org/content/137/2/e20153239	**Subjects:** Mother/Newborn dyads **Design:** RCT **Methods:** This randomized controlled trial included random assignment to 1 of 2 interventions (Video Interaction Project [VIP] or Building Blocks [BB]) or to a control group. Mother–newborn dyads were enrolled postpartum in an urban public hospital. In VIP, dyads met with an interventionist on days of well-child visits; the interventionist facilitated interactions in play and shared reading through provision of learning materials and review of videotaped parent–child interactions. In BB, parents were mailed parenting pamphlets	**CONCLUSIONS** This study showed that pediatric primary care interventions focused on promotion of positive parenting through reading aloud and play can enhance socioemotional development among children in poverty. Given the potential for low cost and population-level reach of primary care interventions, these findings suggest that the pediatric platform should play an important role in primary prevention of poverty-related disparities in school readiness.		B

	and learning materials. This article analyzes socioemotional outcomes from 14 to 36 months for children in VIP and BB versus control.			
Michelle GK Ward, Amy Ornstein, Anne Niec, C Louise Murray; Canadian Paediatric Society, Child and Youth Maltreatment Section. **The medical assessment of bruising in suspected child maltreatment cases: A clinical perspective.** Paediatr Child Health 2013;18(8):433-7. Reaffirmed 2016. Available from: CPS	**Subjects: Children and Youth** **Design:** Practice point **Methods:** This is a practice point produced by the Child and Youth Maltreatment Section of the CPS, based on current literature and published recommendations, to help clinicians distinguish accidental from inflicted bruises, evaluate and manage bruising in the context of suspected child maltreatment, and evaluate for an underlying medical predisposition to bruising	**Red flags for inflicted injury in a child with bruising** • Bruises in babies who are not yet cruising • Bruises on the ears, neck, feet, buttocks or torso (torso includ • Bruises not on the front of the body and/or overlying bone • Bruises that are unusually large or numerous • Bruises that are clustered or patterned (patterns may include • Bruises that do not fit with the causal mechanism described **Recommended first-line laboratory testing for bruising and suspect maltreatment** • Complete blood count (CBC) (including platelets) • Peripheral blood smear • Prothrombin time (PT)/International normalized ratio (INR) • Activated partial thromboplastin time (aPTT) • Fibrinogen • von Willebrand studies • Blood group (for interpretation of von Willebrand levels) • Factor VIII level • Factor IX level • Liver function tests (for secondary platelet dysfunction) • Renal function tests (for secondary platelet dysfunction)		
Casillas, K. L., Fauchier, A., Derkash, B. T., & Garrido, E. F. (2015). Implementation of evidence-based home visiting programs aimed at reducing child	**Subjects:** Children 0-5 **Design:** Meta-analysis **Methods:** Reviewed 156 studies associated with 9 different home visitation program models for	**Implementation factors in home visitation programs for reducing child maltreatment:** **Selection**: no significant difference among type of professional in terms of effect size **Training**: role play during initial home visitor training associated with higher effect size than no role play		

maltreatment: a meta-analytic review. *Child abuse*	reducing child maltreatment targeted to caregivers of children 0-5	**Supervision**: reflective supervision yielded higher mean effect size than supervision addressing admin issues/case management. Supervision with observation yielded higher effect size than non		

& neglect. Abstract available from: PubMed.	years. Impact of 18 implementation factors and 4 study characteristics were analyzed. Also performed moderator analyses to determine whether a variety of study and outcome characteristics had a significant impact on program effectiveness.	**Fidelity**: one time or occasional monitoring have higher effect size than no fidelity monitoring; **Organizational**: no significant effects of ties to school, social service, mental health, or medical systems **Publication Type**: table 3 **Target Population**: targeted programs had larger effect than universal programs; **Study Design**: RCTs did not significantly differ from non-randomized or quasi- experimental studies **Comparison Group**: Treatment groups who were compared to group that received another active tx or to a group that received no special services had higher effect sizes than those compared to services as usual. **Outcomes:** positive parenting had larger effect sizes than parent functioning, child health and child social functioning. Child cognitive functioning/education had larger effect sizes than parent functioning and child health. **Conclusion:** Inclusion of role play significantly increased overall program effectiveness relative to trainings that did not. Inclusion of a reflective supervision component into a program's implementation resulted in greater program effectiveness relative to supervision involving only administrative issues and/or case management. One time or occasional fidelity monitoring was associated with greater program effectiveness than programs without fidelity monitoring or ongoing fidelity monitoring. Authors found the greatest program effects in increasing positive parenting and reducing likelihood of maltreatment.		
Kalmakis KA, Chandler GE. . Health consequences of adverse childhood experiences: a systematic review. J Am Assoc Nurse Pract. 2015 Aug;27(8):457-		**Abstract:** Purpose: Adverse childhood experiences (ACEs) have been associated with negative health outcomes, but the evidence has had limited application in primary care practice. The purpose of this study was to systematically review the research on associations		

65. Abstract available from: Pubmed.		between ACEs and adult health outcomes to inform nurse practitioners (NPs) in primary care practice. Data sources: The databases PubMed, CINAHL, PsycINFO, and Social Abstracts were searched for articles published in English between 2008 and 2013 using the search term "adverse childhood experiences." Forty-two research articles were included in the synthesis. The evidence was synthesized and is reported following the preferred reporting items for systematic reviews and meta-analysis procedure (PRISMA). **Conclusion:** ACEs have been associated with health consequences including physical and psychological conditions, risk behaviors, developmental disruption, and increased healthcare utilization. Generalization of the results is limited by a majority of studies (41/42) measuring childhood adversity using self-report measures. Implications for practice: NPs are encouraged to incorporate assessment of patients' childhood history in routine primary care and to consider the evidence that supports a relationship between ACEs and health. Although difficult, talking about patient's childhood experiences may positively influence health outcomes.		
Hodgkinson, S., Beers, L., Southammakosane, C., & Lewin, A. (2014). Addressing the mental health needs of pregnant and parenting adolescents. *Pediatrics*, *133*(1), 114-122. Available from: Pediatrics.	**Subjects:** Adolescent mothers **Design:** AAP review **Methods:** This article summarizes the current literature on the prevalence and severity of mental health disorders in adolescent mothers, barriers to care, and recommendations for interventions that address the mental health needs of this vulnerable population	Evaluated the prevalence of mental health concerns among teen mothers, understanding the relationship between teen motherhood and mental health, mental health screening in teen mothers, mental health interventions for young mothers. **Conclusion**: Pediatricians must spend time during primary care visits to assess the psychological and emotional well-being of both mother and child. Regular use of brief and effective screening tools is an efficient means of eliciting information and initiating conversations about mothers' stressors, symptoms of depression, history of trauma, and experiences in parenting. It is critical for pediatricians to establish relationships with teen mothers and appropriately refer to community mental health agencies, including home visiting programs, schools, and other agencies providing services to adolescent parents		

Lane, W. G. (2014). Prevention of child maltreatment. *Pediatric clinics of North America*, *61*(5), 873-888. Available from: PMC.	**Subjects:** Children and families **Design:** Author manuscript **Methods:** Review about how pediatricians can incorporate child abuse prevention into their practice by providing anticipatory guidance for effective discipline, screening for maltreatment risk factors, and referring parents and families to effective community-based programs.	Screening for maltreatment risk factors and identification of at risk families: SPARK questionnaire, SEEK questionnaire, PSQ questionnaire. Identify family protective factors. Prevention programs rooted in models of anticipatory guidance such as The Period of Purple Crying program; the AAP developed 2 programs—Connected Kids: Safe, Strong Secure (resiliency-based educational program) & Practicing Safety (providers can use it to screen for and address maternal depression and use anticipatory guidance to help parents cope with challenges). Ask parents about discipline and help them replace corporal punishment with more effective and less harmful strategies. Discuss sexual development and behavior with parents, help them become more skilling in communication. Advocate for implementation and sustaining of community based services to help families prevent maltreatment.		
Flaherty EG, Stirling J Jr; American Academy of Pediatrics. Committee on Child Abuse and Neglect. Clinical report—the pediatrician's role in child maltreatment prevention. Pediatrics. 2010;126(4):833–841. Reaffirmed 2014. Available from: Pediatrics.		**Abstract** It is the pediatrician's role to promote the child's well-being and to help parents raise healthy, well-adjusted children. Pediatricians, therefore, can play an important role in the prevention of child maltreatment. Previous clinical reports and policy statements from the American Academy of Pediatrics have focused on improving the identification and management of child maltreatment. This clinical report outlines how the pediatrician can help to strengthen families and promote safe, stable, nurturing relationships with the aim of preventing maltreatment. After describing some of the triggers and factors that place children at risk for maltreatment, the report describes how pediatricians can identify family strengths, recognize risk factors, provide helpful guidance, and refer families to programs and other resources with the goal of strengthening families, preventing child maltreatment, and enhancing child development.		

Jenny, C., Crawford-Jakubiak, J. E., Christian, C. W., Flaherty, E. G., Leventhal, J. M., Lukefahr, J. L., & Sege, R. D. (2013). The evaluation of children in the primary care setting when sexual abuse is suspected. *Pediatrics*, *132*(2), e558-e567. Available from: Pediatrics.	**Subjects:** Children and adolescents **Design:** AAP clinical report **Methods:** This clinical report updates an American Academy of Pediatrics (AAP) report from 2005 titled "The Evaluation of Sexual Abuse in Children"	Responding to parent's concern about possible sexual abuse, interviewing children about possible sexual abuse, physical exam when sexual abuse is suspected, testing for STIs, working with families to mitigate adverse effects of sexual abuse, guidance for pediatricians (11 points on understanding laws, awareness, referrals, effective and age appropriate communication, and support) **Conclusion:** Child sexual abuse occurs commonly and can have lifelong effects on victims' physical and mental health. When the issue of possible sexual abuse is raised in the clinical setting it is important for pediatricians to know how to respond to and evaluate the child, when to refer the child for evaluation by other professionals, when to report the case to the appropriate investigative agency, and how to counsel parents to decrease the long-term deleterious effects of the abuse.		
Moyer, V. A. (2013). Primary care interventions to prevent child maltreatment: US preventive services task force recommendation statement. *Annals of internal medicine*, *159*(4), 289-295. Retrieved from: http://annals.org/article.aspx?articleid=1696071	**Subjects:** Children in general US population between newborn to age 18 years who do not have signs or symptoms of maltreatment **Design:** Clinical guideline **Methods:** Systematic review on interventions to prevent child maltreatment for children at risk focusing on new studies and evidence gaps that were unresolved at the time of the 2004 recommendation. Beneficial outcomes considered include	The USPSTF concludes that the evidence is insufficient to assess the balance of benefits and harms of interventions delivered in primary care to prevent child maltreatment. The level of certainty of the magnitude of the benefits and harms of these interventions is low		

	reduced exposure to maltreatment and reduced harms to physical or mental health or mortality			
Selph SS, Bougatsos C, Blazina I, Nelson HD. **Behavioral interventions and counseling to prevent child abuse and neglect: a systematic review to update the US Preventive services task force recommendation.** Ann Intern Med. 2013 Feb 5;158(3):179-90. PubMed	**Subjects:** Children **Design:** Systematic review update **Methods:** In 2004, the U.S. Preventive Services Task Force determined that evidence was insufficient to recommend behavioural interventions and counselling to prevent child abuse and neglect. Authors used systematic methods to review new evidence on the effectiveness of behavioural interventions and counselling in health care settings for reducing child abuse and neglect and related health outcomes, as well as adverse effects of interventions.	Eleven fair-quality randomized trials of interventions and no studies of adverse effects met inclusion criteria. A trial of risk assessment and interventions for abuse and neglect in paediatric clinics for families with children aged 5 years or younger indicated reduced physical assault, Child Protective Services (CPS) reports, nonadherence to medical care, and immunization delay among screened children. Ten trials of early childhood home visitation reported reduced CPS reports, emergency department visits, hospitalizations, and self-reports of abuse and improved adherence to immunizations and well-child care, although results were inconsistent. **Conclusion:** 1) Risk assessment and behavioural interventions in paediatric clinics reduce abuse and neglect outcomes for young children. 2) Early childhood home visitation reduces abuse and neglect.	I B, C	B C
Perrin EC, Siegel BS, the COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH. **Promoting the Well-Being of Children Whose Parents Are Gay or**	**Subjects:** Children **Design:** Policy statement and technical report	To promote optimal health and well-being of all children, the American Academy of Pediatrics (AAP) supports access for all children to (1) civil marriage rights for their parents and (2) willing and capable foster and adoptive parents, regardless of the parents' sexual orientation. The AAP has always been an advocate for, and has developed policies to support, the optimal physical, mental, and social health and well-being of all infants, children, adolescents, and	III	C

Lesbian Pediatrics; originally published online March 20, 2013. Available from: Pediatrics		young adults. In so doing, the AAP has supported families in all their diversity, because the family has always been the basic social unit in which children develop the supporting and nurturing relationships with adults that they need to thrive. Children may be born to, adopted by, or cared for temporarily by married couples, nonmarried couples, single parents, grandparents, or legal guardians, and any of these may be heterosexual, gay or lesbian, or of another orientation. Children need secure and enduring relationships with committed and nurturing adults to enhance their life experiences for optimal social-emotional and cognitive development. Scientific evidence affirms that children have similar developmental and emotional needs and receive similar parenting whether they are raised by parents of the same or different genders. If a child has 2 living and capable parents who choose to create a permanent bond by way of civil marriage, it is in the best interests of their child(ren) that legal and social institutions allow and support them to do so, irrespective of their sexual orientation. If 2 parents are not available to the child, adoption or foster parenting remain acceptable options to provide a loving home for a child and should be available without regard to the sexual orientation of the parent(s). **Conclusion:** Children need secure and enduring relationships with committed and nurturing adults, regardless of sexual orientation or legal status, to enhance their life experiences for optimal social-emotional and cognitive development.		
Fergusson DM. Boden JM. Horwood LJ. **Nine-Year Follow-up of a Home-Visitation Program: A Randomized Trial.** Pediatrics. 2013;131(2):297-303. Available from: Pediatrics	**Subjects:** Families **Design:** Randomized controlled trial (N=443) **Methods:** Families were randomized into a control group and an intervention group that received a home-visitation program (Early Start) for up to 5	Comparisons between the Early Start and control series showed that families in the Early Start program showed significant ($P < .05$) benefits in reduced risk of hospital attendance for unintentional injury, lower risk of parent-reported harsh punishment, lower levels of physical punishment, higher parenting competence scores, and more positive child behavioural adjustment scores. Effect sizes (Cohen's "d") ranged from 0.13 to 0.29 (median = 0.25). There were no significant differences (all P values >.05) between the Early Start and control series on a range of measures of parental behaviour	I	A

	years. Assessments were made at baseline, 6 months, annually from 1 year to 6 years, and then at 9 years after trial enrolment.	and family outcomes, including maternal depression, parental substance use, intimate partner violence, adverse economic outcomes, and life stress. **Conclusion:** Home visitation has benefits in terms of reducing child abuse, increasing parental competence, and improving childhood behavioural adjustment.		
Shonkoff, JP, Garner AS, and THE COMMITTEE ON PSYCHOSOCIAL ASPECTS OF CHILD AND FAMILY HEALTH, COMMITTEE ON EARLY CHILDHOOD, ADOPTION, AND DEPENDENT CARE, AND SECTION ON DEVELOPMENTAL AND BEHAVIORAL PEDIATRICS. **The lifelong effects of early childhood adversity and toxic stress.** *Pediatrics*. *129(1),* pp. e232-e246. 2012. Available from: Pediatrics.	**Subjects:** Children **Design:** Technical report **Methods:** Apply ecobiodevelopmental (EBD) framework to better understand the complex relationships among diverse childhood circumstances, toxic stress, brain architecture, and poor physical and mental health into adulthood. Proposes a new role for pediatricians to promote the development and implementation of science-based strategies to reduce toxic stress in early childhood.	This report presents an ecobiodevelopmental framework that illustrates how early experiences and environmental influences can leave a lasting signature on the genetic predispositions that affect emerging brain architecture and long-term health. The report also examines extensive evidence of the disruptive impacts of toxic stress, offering insights into causal mechanisms that link early adversity to later impairments in learning, behavior, and both physical and mental well-being. They suggest that many adult diseases should be viewed as developmental disorders that begin early in life and that persistent health disparities associated with poverty, discrimination, or maltreatment could be reduced by the alleviation of toxic stress in childhood		
Durrant J, Ensom R. Physical punishment of children: lessons from 20 years of research. CMAJ 2012;184(12):1373-77. Available from: CMAJ.	**Subjects:** all children **Design:** Review **Methods:** Expert review	- Studies provide evidence that physical punishment is associated with adverse: child aggression and antisocial behaviour; externalizing behaviour; mental health, physical injury, parent-child relationships, family violence in adulthood. These studies are consistent with the growing body of literature on the impact of adverse childhood experiences on neurological, cognitive, emotional and social development, as well as physical health.		

		- No study has found physical punishment to have a long-term positive effect, and most studies have found negative effects. - Most child physical abuse occurs in context of punishment. - Professional consensus is emerging that parents should be supported in learning nonviolent, effective approaches to discipline.		
Milteer RM. Ginsburg KR. Council On Communications And Media. Committee On Psychosocial Aspects Of Child And Family Health. **The importance of play in promoting healthy child development and maintaining strong parent-child bond: focus on children in poverty.** Pediatrics. 2012;129(1):e204-13. Available from: Pediatrics	**Subjects:** Children, focus on children who live in poverty **Design:** Clinical report **Methods:** The AAP's Council on Communication and Media and the Committee on Psychosocial Aspects on Child and Family Health Issues discuss in this reports issues that may deprive children who live in poverty from gaining the maximum benefit from play.	The authors first present a narrative review on the benefits of play, which include child development and creativity, increasing physical activity levels, and developing resilience, social and emotional ties, and school engagement. Based on an assessment of the factors associated with reduced play, the authors suggest solutions and offer advice to paediatricians on how they can advocate for children by helping families, school systems, and communities consider how best to ensure play is protected and promoted. **Recommendation:** Paediatricians should promote the inclusion of play in homes, schools, and communities.	III A	1C
Shelleby EC, Shaw DS, Cheong J, Chang H, Gardner F, Dishion TJ, Wilson MN. **Behavioral control in at-risk toddlers: the influence of the family check-up.** J Clin Child Adolesc Psychol. 2012 May;41(3):288-301. Abstract available from: PubMed	**Subjects**: At-risk infants (n=713) and their primary caregivers **Design:** RCT **Methods:** This study examined whether increases in parental positive behaviour support (PBS), including proactive parenting, parent involvement, positive reinforcement, and	Results indicated that the intervention improved parental positive behaviour support and reduced growth of child behaviour problems. One dimension of positive behaviour support, proactive parenting, was modestly associated with behavioural control at age 3, which in turn was significantly associated with growth in behaviour problems from ages 2 to 4, with greater behavioural control related to lower levels of growth in behaviour problems. **Conclusion:** Proactive parenting is an important factor in the development of children's behavioural control and that behavioural control plays an important role in the growth of behaviour problems.	I A	A

	engaged parent–child interaction, was associated with greater child behaviour control.			
Danese A, Moffitt T, Harrinton H, Milne B, Polanczyk G, Pariante C, Poulton C, Caspi A. Adverse childhood experiences and adult risk factors for age-related disease. depression, inflammation, and clustering of metabolic risk markers. *Arch. Pediatr. Adolesc. Med. 163(12),* pp. 1135. 2009. Available from: JAMA Pediatrics.	**Subjects:** Children **Design:** 32-year prospective longitudinal study **Methods:** Participants are members of the Dunedin Multidisciplinary Health and Development Study, a longitudinal investigation of health and behavior in a complete birth cohort.	Children exposed to adverse psychosocial experiences were at elevated risk of depression, high inflammation levels, and clustering of metabolic risk markers. Children who had experienced socioeconomic disadvantage (incidence rate ratio, 1.89; 95% confidence interval, 1.36-2.62), maltreatment (1.81; 1.38-2.38), or social isolation (1.87; 1.38-2.51) had elevated age-related-disease risks in adulthood. **Conclusion**: Children exposed to adverse psychosocial experiences have enduring emotional, immune, and metabolic abnormalities that contribute to explaining their elevated risk for age-related disease. The promotion of healthy psychosocial experiences for children is a necessary and potentially cost-effective target for the prevention of age-related disease.		B
Zielinki DS, Eckenrode J, Olds DL. **Nurse home visitation and the prevention of child maltreatment: Impact on the timing of official reports.** Development and Psychopathology. 2009; 21: 441-453. Abstract available from: PubMed	**Subjects:** Mothers with at least one risk factor **Design:** RCT **Methods:** Families were randomized into a control group and an intervention group that had nurse home-visits from the onset of the mother's pregnancy until the child was 2 years of age. Participants were followed for 15 years. Outcome ascertainment was measured using Child Protective Services official reports.	In the intervention group, 76% of children "survived" until the age of 15 without a CPS report compared to 68% of children in the comparison group. Intervention and control groups were similar until ages 5 to 6. After age 6 the two curves separated and a significant difference was seen in the intervention and comparison group. The control group continued to generate new reports of maltreatment until children were age 15, while there were practically none in the intervention group. This study found that home-visits have an effect on the onset of child maltreatment. This study also supports the current evidence that the Nurse Family Partnership, a program to reduce child maltreatment in high-risk families can be successful.	I A	

Canadian Pediatric Society. (2008). *Multidisciplinary guidelines on the identification, investigation and management of suspected abusive head trauma.* Retrieved from: http://www.cps.ca/uploads/documents/AHT.pdf	**Subjects:** Infants **Design:** Multidisciplinary guidelines to equip the health sector, law enforcement, child protection, and other involved disciplines or sectors with a tool to identify, investigate, and initially manage cases of suspected Abusive Head Trauma	Abusive Head Trauma (AHT) is a specific form of traumatic brain injury and is medically defined by the constellation of symptoms, physical signs, laboratory, imaging and pathologic findings that are a consequence of violent shaking, impact or a combination of the two. The identification of traumatic brain injury relies on medical evaluation of the child and is a medical diagnosis. Clinical and historical elements of the injury may lead to a clinical determination of Abusive Head Trauma. When Abusive Head Trauma is suspected, and even if not yet confirmed, it is mandatory to provide early notification to child protection so that they can begin their investigation by gathering appropriate background information. A finding of traumatic retinoschisis is strongly suggestive of AHT. In the absence of a history of major accidental trauma or an explanatory medical condition, a child with diffuse multilayered retinal hemorrhages and subdural hematoma must be presumed to have suffered Abusive Head Trauma.		
MacMillan HL, Thomas BH, Walsh CA, Boyle MH, Shannon HS, Gafni A. **Effectiveness of home visitation by public-health nurses in prevention of the recurrence of child physical abuse and neglect: a randomized controlled trial.** Lancet. 2005; 365: 1786-1793. Abstract available from: PubMed	**Subjects:** Families **Design:** RCT **Methods:** Enrolled 163 families with a history of at least one child being exposed to physical abuse or neglect. The control group received the standard of care, which included routine follow-up by CPA (child protection agency) caseworkers. The intervention group was treated with the standard of care and a program of home visitation by nurses.	Incidents of physical abuse and neglect were measured by CPA records and hospital records. There was no difference in the recurrence of physical abuse and neglect between the control and intervention groups using CPA records. However, hospital records showed a significantly higher recurrence of physical abuse or neglect among the intervention group. One possible explanation for this is potential ascertainment bias when nurses visited the homes of the intervention group. This study failed to show positive results for an intervention to reduce recurrence of physical abuse or neglect. This study underlines the importance of initiating prevention strategies against child maltreatment before a pattern of abuse can be established in the family.	I A	
MacMillan HL and the Canadian Task Force on	**Subjects:** Children **Design:** Review	The review reports that the harms of screening for child maltreatment outweigh its potential benefits because of the high	III A	

Preventive Health Care. **Preventive health care, 2000 update: prevention of child maltreatment.** CMAJ. 2000;163(11):1451-1458. Abstract available from: PubMed	**Methods:** Review of the evidence for the effectiveness of interventions to prevent child maltreatment. Searched MEDLINE, PSYCINFO, ERIC etc. and consulted experts.	rate of false positives. Two RCTs showed reduced child maltreatment with nurse home-visiting interventions from pregnancy to age 2 in high-risk mothers. There is good evidence to recommend nurse home-visits to target high-risk mothers (i.e., less than 19 years old, unmarried and of low socioeconomic status). There is insufficient evidence to recommend education programs for the prevention of sexual abuse.		
American Academy of Pediatrics. **The role of home-visitation programs in improving health outcomes for children and families.** Pediatrics. 1998;101(3):486-489. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reviews the current research on home-visitation programs and gives recommendations for the role of physicians in supporting home-visitation programs and identifying children at high-risk.	The review reports that some long-term effects of home visitation programs include: decrease in use of welfare, decrease in verified incidents of child abuse and neglect, fewer subsequent pregnancies, reduced maternal criminal behaviour. The beneficial effects of home-visitation programs are seen in high-risk children/families (i.e. mothers who are teenagers, unmarried, poor or having a history of abuse and preterm and low birth weight babies).	III A	
Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal DepressionScale. *The British journal of psychiatry*, *150*(6), 782-786.	**Subjects:** Post partum mothers **Design:** Scale development **Methods:** A detailed analysis of the suitability of the Irritability, Depression and Anxiety Scale the Hospital Anxiety and Depression Scale (HAD), and the Anxiety and Depression Scale of Bedford & Foulds was carried out to select for items appropriate for the detection of postnatal	The sensitivity of the EPDS, the proportion of RDC depressed women (n = 35) who were true positives (n = 30), was 86%; the specificity, proportion of non-depressed women (n= 49) who were true negatives (n= 38), was 78%. The positive predictive value, the proportion of women above threshold on the EPDS (n=41) who met RDC criteria for depression (n = 30), was 73%. **Conclusion:** Women who scored above a threshold of 12/13 were most likely to be suffering from a depressive illness of varying severity, and should therefore be further assessed by the primary care worker to confirm whether or not clinical depression is present.		

	depression. Validation of the 10-item EPDS was determined for the total sample by comparing the EPDS scores with the RDC clinical diagnosis of depression			

4.2.6.8 High Risk Infants/Children/Parents/Caregivers/Families: OTHER

High Risk Infants/Children/Parents/Caregivers/Families: Other References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Lacaze-Masmonteil, Thierry and Pat O'Flaherty. (2018). Managing infants born to mothers who have used opioids during pregnancy. *Paediatr Child Health, 23*(3):220–226. Available at: Paediatrics and Child Health.		Abstract The incidence of infant opioid withdrawal has grown rapidly in many countries, including Canada, in the last decade, presenting significant health and early brain development concerns. Increased prenatal exposure to opioids reflects rising prescription opioid use as well as the presence of both illegal opiates and opioid-substitution therapies. Infants are at high risk for experiencing symptoms of abstinence or withdrawal that may require assessment and treatment. This practice point focuses specifically on the effect(s) of opioid withdrawal and current management strategies in the care of infants born to mothers with opioid dependency.		

4.2.7 NON PARENTAL CHILD CARE

Non Parental Child Care Recommendations	Strength of Recommendation
1. Inquire about current child care arrangements. *2.* High quality child care is associated with improved paediatric outcomes in all children. *3.* Factors enhancing quality child care include: practitioner general education and specific training; group size and child/staff ratio; licensing and registration/accreditation; infection control and injury prevention; and emergency procedures.	*Fair* Consensus Consensus

Non Parental Child Care Resources
1. Health implications of children in child care centres (PCH): Part A and Part B 2. Guide to child-care in Canada (CPS): Well Beings

Non Parental Child Care Recommendations				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Canadian Pediatric Society. Well Beings: **A Guide to Health in Child Care.** Available from: http://www.caringforkids.cps.ca/wellbeings/wellbeings_index	This book provides information on the daily care, health and safety of children from birth to preschool. It is an excellent resource for child care centers, agencies, home-based providers and public-health professionals.			

Canadian Pediatric Society. **Health implications of children in child care centres. Part A: Canadian trends in child care, behaviour and developmental outcomes.** Paediatr Child Health. 2008 13(10): 863-867. Reaffirmed: 2016. Available from: CPS.	**Subjects:** <5 years old **Design:** Position statement **Methods:** Searched MEDLINE (1950 to Aug. 2008), EMBASE (1988 to Aug. 2008), PsycInfo (1985 to 2008) and Cochrane Reviews. Keywords: day care, child day care centres AND child development or cost analysis or health care costs.	Most child care studies are longitudinal or cross-sectional. Randomization and blinding are hard to achieve in child care research, lowering the quality of RCTs. Also, it is difficult to control for confounding variables. Quality of child care is optimized when keeping with AAP-recommended ratios of staff to children (strength of recommendation A). Low child to caregiver ratios have been associated with high cognitive and language scores.		

Canadian Pediatric Society. **Health implications of children in child care centres. Part B: Injuries and infections.** Paediatr Child Health. 2009; 14(1):40-3. Reaffirmed: 2016. Abstract available from: CPS.	**Subjects:** <5 years old **Design:** Position statement **Methods:** Searched	**Recommendations:** • All child care centres should have a written policy (in accordance with provincial or territorial health policies) on the management of a sick child, which is reviewed with all staff. The policy should contain information on recognizing an emergent illness or injury and when to call for an ambulance, proper use of antibiotics, characteristics of common paediatric infections and procedures on childcare exclusion. To help control outbreaks, the reason for exclusion should be documented. There should be enough child care staff to allow at least one adult to stay with a sick child until they return home or until medical help arrives. The policy should be shared with parents. • All staff should be trained in basic first aid and cardiopulmonary resuscitation (eg, basic cardiac life support certification). • Handwashing, diapering and toileting instructions should include written and visual information, and should be reviewed with all staff. Ready access should be available to handwashing areas and/or hand sanitizer dispensers. • Children and child care staff should receive all recommended immunizations as per their provincial or territorial area. • Child care centres should be aware of the risk of injury and how to prevent the most serious and most common injuries. Compliance with supervision ratios and quality adult supervision are essential in preventing injuries. • Child care centres should conduct routine safety audits on a weekly, monthly, seasonal and yearly basis, using the *Well Being*s recommendations as a point of safety reference. • Play equipment and surfacing should comply with the Canadian Standards Association recommendations (www.csa.ca). Preschool-aged children should only use equipment that is designed for their age group. • Employers should consider allowing their employees to take time off work, without penalty, to care for their sick children who need to be excluded from child care.		

NICHD Early Child Care Research Network. **Child-care effect sizes for the NICHD study of early child care and youth development.** *Am Psychol* 2006;61(2):99-116. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/16478355	**Subjects:** 6 to 36 months old **Design:** Cohort study **Methods:** Early Child Care Research Network started in 1991 and followed children from birth independent of parents' decision for child care. The objective of this study was to look at exclusive maternal care versus non parental child care. For children in child-care, type, quality and quantity of child-care were measured.	In this study, higher quality care was related to advanced cognitive, language and pre-academic outcomes at every age (15, 24, 36 and 54 months). Exclusive maternal care was not predictive of any child outcomes. Better socio-emotional and peer outcomes were seen at some ages. Generally, higher quality care is correlated with better behavioural outcomes and higher income level of the families. In terms of quantity of child care, the evidence is weak and inconsistent.	II-2 B	
American Academy of Pediatrics. **Quality early education and child care from birth to Kindergarten.** Pediatrics. 2005; 115: 187-191. Revised 2010. Abstract available from: PubMed	**Subjects**: <5 years old **Design:** Policy statement **Methods:** Review and recommendations written by expert committee. No definitive methods section.	The AAP reports that it is important for early education and child care to be of high quality. Given its limited availability, the AAP recommends that physicians should work with parents and the community to facilitate access to the best child care possible. Evidence shows that high quality (i.e., developmentally sound and emotionally supportive) early education has a positive effect on both the child and their family. The AAP recommends that physicians are encouraged to ask families about their child care situation.	III	
Zoritch B, Roberts I, Oakley A. **Day care for pre-school children.** Cochrane Database of Systematic Reviews 2000, Issue 3:CD000564. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/10796726	**Subjects:** 0 to 5 years old **Design:** Systematic Review **Methods:** An extensive literature review was performed using 7 electronic databases (i.e., Medline, Embase, etc.)Eligibility criteria for inclusion in the review:	This review looks at the relation between non parental child-care and various outcomes. A total of 8 trials were found with a total of 2,203 children randomized to receive day care or be in the control group. Length of follow-up ranged from 6 months to 27 years. Authors concluded that out of home day-care is beneficial in important areas of children's well-being such as enhancing cognitive development and preventing later school failure. Authors also concluded that it is beneficial for children's behaviour. This review was methodologically rigorous in their inclusion criteria and	I A	

	trials had to be randomized or quasi-randomized. Intervention was non parental day-care for pre-school education.	assessed the possibility for bias. They concluded that there is potential for some interview bias in certain studies included.		
NICHD Early Child Care Research Network. Child **Outcomes when child care center classes meet recommended standards for quality.** Am J Public Health. 1999;89:1072-7. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/10394318	**Subjects:** 6 to 36 months old **Design:** Cohort study **Methods:** Early Child Care Research Network started in 1991 and followed children from birth independent of parents' decision for child care. The objective was to determine the outcomes of children who attended child care centres that meet recommended care standards.	The total sample size of this study was 1526. 1,364 (89%) completed a 1 month visit, out of those 1,216 (89%) continued to 36 months. The measures for quality of non parental child care were: child-staff ratio, observed group size, caregiver training and caregiver education. The average child-staff ratio and average group size was higher than recommended at ages 6, 15 and 24 months. At 36 months the ratio and group size were approximately equal to the recommended numbers. Caregiver training and education were at recommended levels at all 4 ages. Fewer behaviour problems, higher school readiness and language comprehension scores were reported in children that attended classes that met more of the recommended standards.	II-2 B	

4.2.8 LITERACY/ENCOURAGE READING

Literacy/Encourage Reading Recommendations	Strength of Recommendation
1. Encourage parents to read and sing to their infants and children and to limit TV, video and computer games to provide more opportunities for reading.	**Good**

Literacy/Encourage Reading References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Shaw A. Canadian Paediatric Society, Early Years Task Force. **Read, speak, sing: Promoting early literacy in the health care setting.** January 27, 2021 https://www.cps.ca/en/documents/position/read-speak-sing-promoting-literacy	**Subjects:** 0 to 18 years old **Design:** Position statement	Abstract: This statement will help health care providers assess and advise on early literacy with families in almost any practice setting. It defines emergent literacy skills, including early language learning and storytelling, and explores the benefits of reading, speaking, and singing with infants and toddlers for both children and caregivers. Book sharing at bedtime and other language-related routines positively affect family, relational, and social-emotional health. Early exposure to any language, when spoken at home, can benefit literacy learning in other languages children may encounter. Specific recommendations for clinicians counselling families on early literacy are included.		

AAP Council on Early Childhood. Literacy promotion: An essential component of primary care pediatric practice. Pediatrics 2014; 134(2):404-409. Available from: Pediatrics.	**Subjects:** Children **Design:** Policy statement **Methods:** Policy statement released by the American Academy of Pediatrics is supported by the AAP technical report "School Readiness" and supports the AAP policy statement "Early Childhood Adversity, Toxic Stress, and the Role of the Pediatrician: Translating Developmental Science Into Lifelong Health."	**Recommendations:** 1) advise all parents that reading aloud with young children can enhance parent-child relationships and prepare young minds to learn language and early literacy skills; 2) counsel all parents about developmentally appropriate shared-reading activities that are enjoyable for children and their parents and offer language-rich exposure to books, pictures, and the written word; 3) provide developmentally appropriate books given at health supervision visits for all high-risk, low-income young children; 4) use a robust spectrum of options to support and promote these efforts; and 5) partner with other child advocates to influence national messaging and policies that support and promote these key early shared-reading experiences.		
Navsaria, D., & Sanders, L. M. Early Literacy Promotion in the Digital Age. Pediatric Clinics of North America 2015; 62(5): 1273-1295. Abstract available from: Pubmed.	**Subjects:** Children **Design:** Review **Methods:** Review of the literature on early literacy promotion and the influence of digital media.	**Conclusion:** There is a sizeable difference in reading scores in schools that have a higher percentage of children living in poverty. Poor early reading skills carry lifelong health consequences. Children of adults with limited literacy are also at increased risk themselves for poor emergent literacy. Young children exposed to greater amounts of unmonitored or unregulated screen time are at increased risk of sleep disturbance and behavioral problems,		

		including attention-deficit hyperactivity disorder, during the school-aged years. Positive home environments, rich in the quantity and quality of verbal interactions be-tween adult and child, do have a greater ability, however, to buffer the negative effects of poverty on child health. The promotion of early brain and child development (EBCD) is an essential element of pediatric care. Coupled with supporting the development of a positive, nurturing relationship between the parent and child, health professionals must foster a strong foundation for children's lifelong learning, behavior, and health.		
Kumar, M. M., Cowan, H. R., Erdman, L., Kaufman, M., & Hick, K. M. Reach Out and Read is Feasible and Effective for Adolescent Mothers: A Pilot Study. Maternal and child health journal 2016; 20(3):630-8. Abstract available from: Pubmed.	**Subjects:** 28 adolescent mothers with their children aged 6-20 months (dyads) in teen-tot clinic **Design:** Randomized control pilot study (Toronto Sick Kids) **Methods:** intervention: 3 components of ROaR— 1) in addition to routine care, a staff clinician presented child with a new developmentally appropriate children's book inscribed with child's name; 2) clinician briefly provided anticipatory guidance on techniques for shared book reading and benefits of reading aloud to children; 3) volunteer student librarians from UofT created a literacy-rich environment by modelling shared book reading with	Results: Though regression models were not statistically significant, bivariate analyses at study completion revealed that intervention mothers were significantly more likely than controls to report reading as one of the child's favorite activities (29 vs 0 %) and had significantly lower maternal depression scores (7.0 vs 12.5; $\geq$10 = clinically significant depression). Trends for all other variables, including time spent reading together and maternal enjoyment of reading, were also in the direction of benefit. Limitations: small sample size, which resulted in inadequate power to establish statistical significance. The study was also implemented in a single clinic, which may limit its generalizability to other centers. Additionally, it lacked long-term follow-up of parental reading behavior and filial developmental trajectories.		1B

	families in their exam rooms, counselling and troubleshooting with mothers, informing them about local library service sand literacy programs, and signing each child up for a public library card. Control: routine clinical care for well child visits. Study measures: demographics; 3-question survey at baseline and study completion (child's 3 favourite things to do, 3 favourite things to do with your child, how many days each weeks do you and another caregiver read children's books with your child); BDI-IA (self-report inventory screening tool for depression and depression severity) at baseline and study completion			
Landry SH, Smith KE, Swank PR, Zucker T, Crawford AD, Solari EF. **The effects of a responsive parenting intervention on parent-child interactions during shared book reading.** Dev Psychol. 2012 Jul;48(4):969-	**Subjects:** Mothers from low-income backgrounds and their infant **Design:** RCT This study examined whether the **Methods:** Play and Learning Strategies (PALS) intervention that targets	The efficacy of PALS was previously demonstrated for improving mother and child behaviours within play contexts, everyday activities, and standardized measures of child language. Authors hypothesized that PALS effects would generalize to influence maternal and child behaviours during a shared reading task even though this situation was not a specific focus of the intervention and that this would be similar for children who varied in biological risk. Participation in at least PALS II was expected to have a positive effect due to children's increased capacity to engage in book	I B	B

86. Abstract available from: PubMed	global parenting techniques by facilitating a range of responsive behaviours in everyday activities can also support mothers' use of more effective shared book reading behaviours and children's engagement and use of language. Four groups of randomized mothers and their children (PALS I-II, PALS I-DAS II, DAS I-PALS II, DAS I-II) were observed in shared reading interactions during the toddler-preschool period and coded for (a) mother's affective and cognitive-linguistic supports and (b) child's responses to maternal requests and initiations.	reading at this age. Support was found for significant changes in observed maternal and child behaviours and evidence of mediation was found for the intervention to affect children's behaviours through change in maternal responsiveness behaviours. These results add to other studies supporting the importance of targeting a broad range of responsive behaviours across theoretical frameworks in interventions to facilitate children's development. **Conclusion:** An intervention that targets global parenting techniques may be effective in supporting mothers' use of more effective shared book reading behaviours.		
Mol SE , Bus AG, de Jong MT,. Smeets DJH. **Added Value of Dialogic Parent–Child Book Readings: A Meta-Analysis.** 2008. Early Education & Development, 19:1, 7-26. Abstract available from: http://www.tandfonline.com/doi/abs/10.1080/104092	**Subjects:** 2 to 6 year old children **Design:** Systematic review and meta-analysis **Methods:** This study aimed to examine the added value of an interactive shared book reading format that emphasizes active as opposed to noninteractive participation by the child.	After extracting relevant data from 16 eligible studies, a meta-analysis was conducted to attain an overall mean effect size reflecting the success of dialogic reading in increasing children's vocabulary compared to typical shared reading. When focusing on measures of expressive vocabulary in particular ($k = 9$, $n = 322$), Cohen's d was .59 (SE = .08; 95% CI = 0.44, 0.75; $p < .001$), which is a moderate effect size. However, the effect size reduced substantially when children were older (4 to 5 years old) or when they were at risk for language and literacy impairments. Dialogic reading can change the home literacy activities of families with 2- to 3-year-old children but not those of families with children at greatest risk for school failure.	I B	C

80701838603#.Uaxw4ys6Wp0	Studies that included a dialogic reading intervention group and a reading-as-usual control group, and that reported vocabulary as an outcome measure were identified through a systematic search to March 2007.	**Conclusion:** Enhancing the dialogue between parent and child during reading sessions strengthens the effects of book reading, especially in young children (2-3 years old) and those not at risk for language and literacy impairments.		
Duursma E, Augustyn M, Zuckerman B. **Reading aloud to children: the evidence.** Arch Dis Child. 2008;93:554-557. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** The authors compiled evidence to support parents and caregivers reading aloud to children and participating in shared book reading to promote language development.	This review reports that children who are read to aloud from an early age tend to have higher scores on language measures later in life. Socioeconomic status, race/ethnicity and parental education are factors that can affect the development of literacy and oral language skills. The authors report that parents should take into account their child's personal interests and physicians should encourage reading aloud.	III B	
Needleman R, Toker KH, Dreyer BP, Klass P, Mendelsohn AL. **Effectiveness of a primary care intervention to support reading aloud: a multicenter evaluation.** Ambul Pediatr 2006;(5)4:209-215. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/16026185	**Subjects:** 6 to 72 months old **Design:** Before-after intervention study **Methods:** 19 clinical sites were included in 10 states. At each site a convenience sample was interviewed before the implementation of the Reach Out and Read (ROR) program, which served as the control group. A separate convenience sample was interviewed after the	The total sample size was 1,647 subjects. Main outcome measures were parental interviews based on questions from validated questionnaires about their attitudes and practices related to reading out loud. There was a significant association ($p < 0.001$) between exposure to ROR and reading aloud as a favourite parenting activity, at bedtime, 3 or more days a week and ownership of >= 10 picture books. Limitations to this study are taking a convenience sample of subjects and sites that were different before and after. This can limit the ability to generalize the findings to the population and can introduce selection bias. There is also possibility for social desirability bias from parents' answers to the questions.	II B	

	program which served as the experimental group.			
Sharif I, Rieber S, Ozuah PO. **Exposure to Reach Out and Read and vocabulary outcomes in inner city preschoolers.** J Natl Med Assoc. 2002;(94)3:171-7. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/11918387	**Subjects:** 2 to 5.9 years old **Design:** Cross-sectional survey **Methods:** Two federally funded health centres were used as the two sites of comparison. Subjects attending clinic A had a 3 year Reach Out and Read (ROR) intervention while attendants of clinic B had no ROR exposure. The ROR program included counselling parents about reading to children and parents received an age-appropriate book at each well-child visit.	The sample size for this study was 200 parent/child pairs with mean age of children of 3.8 years. The outcome measures were expressive and receptive one word picture vocabulary tests, a home literacy orientation scale created by the authors, and the STIMQ-READ subscale. Comparing English-speaking children, there was a statistically significant difference (p=0.01) between ROR-exposed children and controls. A positive association between the Reach Out and Read program and better receptive vocabulary scores were reported. Higher scores were also found on measures of home reading activities. Limitations of this study include the cross-sectional design's inability to determine a causal relationship and parental reports of home reading activity may have lead to a degree of recall bias.	II B	
High PC, LaGasse L, Becker S, Ahlgren I, Gardner A. **Literacy promotion in primary care: can we make**	**Subjects:** 5 to 11 months old **Design:** RCT	At follow-up (an average of 3.4 well-child visits later; mean age 18.4 months), there was a 40% increase in Child-Centered Literacy Orientation among the intervention families compared to 16% among controls. In older intervention toddlers, receptive and	I B	

a difference? Pediatrics. 2000;105:927-934. Abstract available from: PubMed	**Methods:** Low-income families were randomized to intervention or control groups. At baseline. The intervention group received children's books, educational materials and advice from 226 paediatricians about sharing books with children. Follow-up included family interviews and child language testing. A Child-Centered Literacy Orientation was defined as a stated enjoyment of reading and/or report of usual reading together at bedtime.	expressive vocabulary scores were higher, but not for younger intervention toddlers. When reading aloud was added to a multivariate analysis, the effect of the intervention was no longer evident. The authors concluded that this simple intervention changed parental attitudes, and as they increasingly read to their children, older toddlers in particular experienced enhanced language development.		

4.2.9 TOILET LEARNING

Toilet Learning Recommendations	Strength of Recommendation
1. The process of toilet learning has changed significantly over the years and within different cultures. In Western culture, a child-centred approach is recommended, where the timing and methodology of toilet learning is individualized as much as possible.	Consensus

Toilet Learning Resources
1. Toilet Learning (CPS) 2. Toilet Training Strategy (PCH): Part A, Part B

Toilet Learning References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Canadian Pediatric Society Community Paediatrics Committee. **Toilet learning: Anticipatory guidance with a child-oriented approach.** 2000. Reaffirmed 2018. Available from: CPS.	**Subjects:** <4 years old **Design:** Position statement **Methods:** Review of issues surrounding toilet training in children. Includes appropriate timing, using a child-oriented approach, assessing a child's readiness, toilet refusal and children with special needs.	Toilet learning readiness should not be dictated by a child's chronological age. Rather, as the child-oriented approach advocates, a child must be physiologically and psychologically ready to begin the process. For the child, physiological readiness precedes psychological readiness. A list of signs of a child's toilet learning readiness is provided in Table 1. A potty chair is recommended rather than a toilet during the early stages because children feel more secure and stable on the potty. The potty also provides the best biomechanical position for the child. In western culture, a child-centred approach, where the timing and methodology of toilet learning is individualized as much as possible, is recommended.	III	

Kaerts N, Van Hal G, Vermandel A, Wyndaele JJ. **Readiness signs used to define the proper moment to start toilet training: a review of the literature.** Neurourol Urodyn. 2012 Apr;31(4):437-40. Abstract available from: PubMed	**Subjects**: Healthy children < 6 years old **Design:** Review **Methods:** Searched PubMed and CSA-database for literature on toilet training in the Western society.	Twenty-one signs of readiness were found. In order of age in which they appear: child can imitate behaviour, child is capable of sitting stable and without help, child can walk without help, child is able to pick up small objects, child can say no as a sign of independence, voluntary control over bowel and bladder reflex actions, child understands and can respond to directions, questions or explanations and can follow simple commands, child expresses a need to evacuate by non-verbal communication (such as mimicry, posture or gestures, going to the toilet, or grabbing the potty) or by words, child enjoys putting things in containers, awareness of bladder sensations and the need to void, child understands potty related words and has an adequate vocabulary of his own, child wants to participate in, wants to cooperate with the toilet training and the child shows interest in toilet training, child has bigger bladder capacity, child insists on completing tasks without help and is proud of new skills, child is asking for the pot, child wants to be clean and is distressed by wet or soiled diapers, child wants to wear grown-up clothes, child is able to pull clothes up and down, child stays bowel movement-free overnight, child begins to put things where they belong, child can sit still on the potty for 5-10 min. No evidence-based research assessing which readiness sign should be used is currently available.	III	C
Russell K, Lang ME. **Among healthy children, what toilet-training strategy is most effective and prevents fewer adverse events (stool withholding and dysfunctional voiding)?** Paediatric & Child Health. 2008; 13(3):201- 204. Abstract available from: PubMed	**Subjects:** Infants >18 months old **Design:** Review (Part A: Evidence-based answer and summary; Part B: Clinical commentary.) **Methods:** Reviews the literature on the best method to toilet-train an infant. Searched databases MEDLINE, EMABSE, ERIC, PsycINFO and Cinahl.	The current CPS and AAP guidelines recommend a child-oriented approach starting between 18 and 24 months and not beginning before the child displays interest. The two main methods are the child-oriented approach and the Foxx and Azrin Method of Toilet Training in Less Than One Day. According to this review, neither method has conclusive evidence that makes it better than the other.		

4.3 ENVIRONMENTAL HEALTH

4.3.1 GENERAL ENVIRONMENTAL HEALTH ISSUES

General Environmental Health Resources
1. Global Climate Change and Health (CPS)
2. Canadian Partnership for Children's Health and Environment (CPCHE)
3. Climate Change AAP

General Environmental Health Issues References

Reference	Methods	Outcomes	CTFPHC	GRADE
Rogan WJ, Brady MT, the Committee on Environmental Health, and the Committee on Infectious Diseases. Drinking Water From Private Wells and Risks to Children. Pediatrics 2009;123(6):e1123-e1137. Reaffirmed 2014. Available from: Pediatrics.		**Abstract** Drinking water for approximately one sixth of US households is obtained from private wells. These wells can become contaminated by pollutant chemicals or pathogenic organisms, leading to significant illness. Although the US Environmental Protection Agency and all states offer guidance for construction, maintenance, and testing of private wells, there is little regulation, and with few exceptions, well owners are responsible for their own wells. Children may also drink well water at child care or when traveling. Illness resulting from children's ingestion of contaminated water can be severe. This report reviews relevant aspects of groundwater and wells; describes the common chemical and microbiologic contaminants; gives an algorithm with recommendations for inspection, testing, and remediation for wells providing drinking water for children; reviews the definitions and uses of various bottled waters; provides current estimates of costs for well testing; and provides federal, national, state, and, where appropriate, tribal contacts for more information.		

Karr C. **Addressing environmental contaminants in pediatric practice.** Pediatrics in Review. 2011;32(5):190-200. Available from: http://pedsinreview.aappublications.org/content/32/5/190.full.pdf+html	**Subjects:** Children **Design**: Narrative review **Methods:** Not reported	This article provides an overview of issues pertaining to environmental contaminants in pediatric practice. **Conclusion** (specific references for each point are listed in article): 1) Pediatricians are a trusted, desired, and important source of information on environmental health topics. 2) It is well established that children are more vulnerable to environmental contaminants due to their rapid and ongoing growth and development and potential for higher exposures based on behavioral and physiologic differences. 3) Evidence and consensus highlight the importance of the environmental history in identifying and reducing children's exposure to hazardous contaminants. 4) There is sufficient evidence that lead exposure is common among United States children and that concentrations below the current action level (BLL >10 g/dL [0.48 mol/L]) are associated with adverse effects on neurodevelopment and behavior. A joint federal advisory from the FDA and the EPA recommends reducing exposure to mercury by highlighting the importance of selecting fish that contain lower concentrations of methylmercury. 5) Multiple studies identify risks in the indoor environment that reflect housing quality, choice of building sites, and exposures that include lead from paint or water, asbestos, radon, particulate matter, mold, pesticide use patterns, and carbon monoxide.		

Wigle DT, Arbuckle TE, Walker M, Wade MG, Liu S, Krewski D. **Environmental hazards: evidence for effects on child health**. J Toxicol Environ Health B Crit Rev. 2007;10(1-2):3-39. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **References:** This review summarizes knowledge of associations between child health and development outcomes and environmental exposures, including lead, methylmercury, polychlorinated biphenyls (PCBs), dioxins and related polyhalogenated aromatic hydrocarbons (PHAHs), certain pesticides, environmental tobacco smoke (ETS), aeroallergens, ambient air toxicants (especially particulate matter [PM] and ozone), chlorination disinfection by-products (DBPs), sunlight, power-frequency magnetic fields, radiofrequency (RF) radiation, residential proximity to hazardous waste disposal sites, and solvents.	The adverse health effects linked to such exposures include fetal death, birth defects, being small for gestational age (SGA), preterm birth, clinically overt cognitive, neurologic, and behavioral abnormalities, subtle neuropsychologic deficits, childhood cancer, asthma, other respiratory diseases, and acute poisoning. Some environmental toxicants, notably lead, ionizing radiation, ETS, and certain ambient air toxicants, produce adverse health effects at relatively low exposure levels during fetal or child developmental time windows.	III	C

Wigle DT, Arbuckle TE, Turner MC, Bérubé A, Yang Q, Liu S, Krewski D. **Epidemiologic evidence of relationships between reproductive and child health outcomes and environmental chemical contaminants.** J Toxicol Environ Health B Crit Rev. 2008 May;11(5-6):373-517. Abstract available from: PubMed	**Subjects:** Mother and child **Design:** Review **Methods:** This review summarizes the level of epidemiologic evidence for relationships between prenatal and/or early life exposure to environmental chemical contaminants and fetal, child, and adult health. Discussion focuses on fetal loss, intrauterine growth restriction, preterm birth, birth defects, respiratory and other childhood diseases, neuropsychological deficits, premature or delayed sexual maturation, and certain adult cancers linked to fetal or childhood exposures. Environmental exposures considered here include chemical toxicants in air, water, soil/house dust and foods (including human breast milk), and consumer products. Reports reviewed here included original epidemiologic studies (with at least basic descriptions of methods and results), literature reviews, expert group reports, meta-analyses, and pooled	There was sufficient epidemiological evidence for causal relationships between several adverse pregnancy or child health outcomes and prenatal or childhood exposure to environmental chemical contaminants. These included prenatal high-level methylmercury (CH(3)Hg) exposure (delayed developmental milestones and cognitive, motor, auditory, and visual deficits), high-level prenatal exposure to polychlorinated biphenyls (PCBs), polychlorinated dibenzofurans (PCDFs), and related toxicants (neonatal tooth abnormalities, cognitive and motor deficits), maternal active smoking (delayed conception, preterm birth, fetal growth deficit [FGD] and sudden infant death syndrome [SIDS]) and prenatal environmental tobacco smoke (ETS) exposure (preterm birth), low-level childhood lead exposure (cognitive deficits and renal tubular damage), high-level childhood CH(3)Hg exposure (visual deficits), high-level childhood exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD) (chloracne), childhood ETS exposure (SIDS, new-onset asthma, increased asthma severity, lung and middle ear infections, and adult breast and lung cancer), childhood exposure to biomass smoke (lung infections), and childhood exposure to outdoor air pollutants (increased asthma severity). Evidence for some proven relationships came from investigation of relatively small numbers of children with high-dose prenatal or early childhood exposures, e.g. CH(3)Hg poisoning episodes in Japan and Iraq. In contrast, consensus on a causal relationship between incident asthma and ETS exposure came only recently after many studies and prolonged debate. There were many relationships supported by limited epidemiologic evidence, ranging from several studies with fairly consistent findings and evidence of dose-response relationships to those where 20 or more studies provided inconsistent or otherwise less than convincing evidence of an association. The latter included childhood cancer and parental or childhood exposures to pesticides. In most cases, relationships supported by inadequate epidemiologic evidence reflect scarcity of evidence as opposed to strong evidence of no effect.	III, II-2	C

	analyses			

4.3.2 SECOND-HAND SMOKE/E-CIGS/CANNABIS EXPOSURE

Second-Hand Smoke/E-Cigs/Cannabis Exposure Recommendations	Strength of Recommendation
1. There is no safe level of exposure. Advise caregivers to stop smoking and/or reduce second-hand smoke exposure, which contributes to childhood respiratory illnesses, SIDS and neuro-behavioral disorders. Offer smoking cessation resources. **2. Educate parents on the health risks and harms associated with e-cigs and cannabis (including edibles), and on safe storage. Cannabis (CPS)**	**Good**

Second-Hand Smoke/E-Cigs/Cannabis Exposure Resources
1. Cannabis and Canada's children and youth CPS

Second-Hand Smoke Exposure References

Reference	Methods	Outcomes	CTFPHC	GRADE
Grant, C.N., Belanger, R.E., **Cannabis and Canada's children and youth.** Paediatrics & Child Health. 2017. 22(2):98-102. Retrieved From: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5804770/pdf/pxx017.pdf	**Subjects:** Children and Youth **Design:** Position Statement in place, vital public health priorities.	**CONCLUSION** Youth should not use cannabis recreationally because its many potentially harmful effects are serious. These effects are present in the entire population; however, the developing brain is especially sensitive to the negative consequences of cannabis use. Canadian youth are at significant risk for developing CUD and, possibly, for doubling their risk of having a psychotic illness. Driving under the influence of cannabis increases the risk for motor vehicle accidents. Where cannabis has been legalized in the USA, children are requiring emergent medical care at greater rates due to unintentional ingestion. The potential extension of the legal cannabis industry in Canada has raised a dilemma regarding the most appropriate age for its legal use, which should minimize harm to children and youth, the population most vulnerable to the product. On the one hand, prohibiting cannabis use until the mid-20s would protect adolescents during a period of critical brain development. On		

		the other, adolescents and young adults are already experimenting frequently with marijuana. Aligning the legal age for cannabis use with that for other legally controlled substances, notably alcohol and tobacco, would help ensure that youth who have attained age of majority have access to a regulated product, with a known potency. Also, they would be less liable to engage in high-risk illegal activities to access cannabis. Cannabis legislation will have a significant impact on the lives and health of children and youth, and safeguards are necessary. Based on the physical and mental health risks, and with many legal, financial and public safety issues at stake, policy makers— with support from physicians and the public at large— must continue to limit access to cannabis.		
Ryan, S.A., Ammerman, S.D., Committee on Substance Use and Prevention. **Counseling Parents and Teens About Marijuana Use in the Era of Legalization of Marijuana.** American Academy of Pediatrics. 2017. 139(3) Retrieved From: https://pediatrics.aappublications.org/content/139/3/e20164069	**Subjects:** Teens and Parents **Design:** Clinical Report This clinical report offers guidance to the practicing pediatrician based on existing evidence and expert opinion/ consensus of the American Academy of Pediatrics regarding anticipatory guidance and counseling to teenagers and their parents about marijuana and its use. The recently published technical report provides the detailed evidence and references regarding the research on which the information in this clinical report is based	This report provides detailed "key facts and suggested talking points for the pediatrician to use in speaking with youth and their parents about marijuana and the effects of its use" **SUMMARY AND CONCLUSIONS** Pediatricians are in a unique position to provide parents and teenagers with accurate information and counseling regarding the consequences of marijuana or cannabis use by children, teenagers, and adults. A number of strategies can be used to counsel families about preventing use and to intervene if marijuana is being used either recreationally or medically by the families for whom they provide medical care.		
Claudet, I. Mouvier, S., Labadie, M. Manin, C., Michard-Lenoir, A-P., Eyer, D. Dufour,D. **Unintentional Cannabis Intoxication in**	**Subjects:** Children aged <6 years **Design:** Retrospective Observational Study **Methods:** All children aged	**RESULTS:** Twenty-four PEDs participated in our study; 235 children were included, and 71% of the patients were 18 months old or younger. Annual admissions increased by a factor of 13. Hashish resin was the main form ingested (72%). During the study period, the evolution was characterized by a national increase in intoxications, younger		C

Toddlers. Pediatrics September 2017, 140 (3) Retrieved From: https://pediatrics.aappublications.org/content/140/3/e20170017	<6 years admitted to a tertiary-level pediatric emergency department (PED) for proven cannabis intoxication(compatible symptoms and positive toxicological screening results) during the reference period were included.	intoxicated children (1.28 ± 0.4 vs 1.7 ± 0.7 years, P = .005), and more comas (n = 38) (P = .05, odds ratio 3.5 [1.02–11.8]). Compared with other intoxications, other PED admissions, and the same age population, cannabis-related admissions were greater. There was a potential link between the increased incidence of comas and increased THC concentration in resin seized in France over the period. **CONCLUSIONS:** Children are collateral victims of changing trends in cannabis use and a prevailing THC concentration. Intoxicated children are more frequent, are younger, and have intoxications that are more severe. This raises a real issue of public health.		
Richards, J.R., Smith, N.E., Moulin, A.K. **Unintentional Cannabis Ingestion in Children:A Systematic Review.** The Journal of Pediatrics. 2017. 190: 142-152 Retrieved from: https://www.sciencedirect.com/science/article/pii/S0022347617309393?via%3Dihub	**Subjects:** Children aged 12 or less **Design:** Systematic Review **Methods:** All published studies, case series, or case reports of unintentional ingestion of cannabis in young children (age 12 years or less) were considered in the literature search. This age cut-off was chosen because the transition between unintentional and intentional ingestion appeared to be most distinct at this stage of maturity with intentional ingestion representing prior knowledge and assent to cannabis use. Data were abstracted systematically from a query of PubMed, Open Grey, and Google Scholar from inceptiontoApril2017.Non-Englishlanguagepublications were included and translated. To maximize	The unintentional ingestion of cannabis by children is a serious public health concern and is well-documented in numerous retrospective studies, case series, and case reports. Clinicians should consider cannabis toxicity in any child with sudden onset of lethargy orataxia. Hypotonia, mydriasis, tachycardia, and hypoventilation represent other common clinical findings of cannabis toxicity. As cannabis legalization, availability, and potency increases so does the possibility for the rising incidence of unintentional pediatric cannabis intoxication, which frequently requires hospitalization, and, in some cases, admission to the PICU for airway support.		

	results, our search strategy included only free-text words (TW) as filters: (“cannabis”[TW]or “cannabinoid”[TW]or “marijuana”[TW] or“cannabinoids”[TW]or “hash”[TW]or “hashish”[TW])and (“children”[TW] or “pediatric”[TW] or “child”[TW] or “toddler”[TW]or“infant”[TW]or“baby”[TW]or“girl”[TW] or “boy”[TW]). References in each selected publication were also carefully hand screened for any additional relevant reports. A gray literature search was also performed using Open Grey, Google, and Google Scholar. All authors reviewed the articles independently, and articles without mention of specific route of exposure were excluded.The PRISMA guidelines were followed. Articles were excluded if intentional ingestion was noted. Articles were graded using the Oxford Center for Evidence Based Medicine levels of evidence.8 These levels are defined as I=properly powered and conducted randomized clinical trial, systematic review, or meta-analysis; II = well-designed controlled			

	trial without randomization; prospective comparative cohort;III = case-control studies, retrospective cohort studies; IV = case series with or without intervention, cross-sectional studies; andV = opinion of authorities, case reports. Reviews of poison center data were considered level III.			
Kamboj A, Spiller HA, Casavant MJ, Chounthirath T, Smith GA., **Pediatric Exposure to E-Cigarettes, Nicotine, and Tobacco Products in the United States. Pediatrics. 2016. 137(6).** **Retrieved From:** https://www.ncbi.nlm.nih.gov/pubmed/27244861	**Subjects:** children younger than 6 years **Design:** Retrospective Analysis **Methods:** The American Association of Poison Control Centers (AAPCC) maintains the National Poison Data System (NPDS), which captures data regarding calls to US PCCs on a near real-time basis.8 These PCCs receive calls for exposures to a variety of substances through the Poison Help Line 24 hours per day, offer medical advice, and document reported events in the database. Extensive quality control measures are used to ensure the accuracy and completeness of the data collected.9 This report is a retrospective analysis of data obtained from the NPDS.	**CONCLUSIONS** The frequency of exposures to e-cigarettes and nicotine liquid among young children reported to US PCCs is rising rapidly. Children exposed to e-cigarette devices and nicotine liquid are >2.5 times more likely to have a severe outcome than children exposed to cigarettes, and lethal exposure has occurred. Swift government action is needed to regulate these products to help prevent child poisoning. Prevention strategies include public education; appropriate product storage and use away from children; warning labels; and modifications of e-cigarette devices, e-liquid, and e-liquid containers and packaging to make them less appealing and accessible to children.		B
Wang, G.S., Le Lait, M-C.,	**Subjects:** patients 0 to 9	**Conclusions**	C	

Deakyne, S.J., Bronstein, A.C., Bajaj, L., Roosevelt, G. **Unintentional Pediatric Exposures to Marijuana in Colorado,2009-2015.** JAMA Pediatrics. 2016. 170(9) Retrieved from: https://jamanetwork.com/journals/jamapediatrics/fullarticle/2534480	years of age **Design:** Retrospective cohort study **Methods:**	There was an increase in unintentional pediatric exposures during the first 2 years after legalization of recreational marijuana in Colorado. Continued surveillance is critical in evaluating the effect marijuana legislation has on the pediatric population. Edible marijuana products continue to be a significant source of pediatricexposuresgiventheirattractivenessandpalatabilitytochildren.Identifyingsuccessfulpreventivestrategiesrequiresfurtherinvestigation.Asmorestates pass laws legalizing recreational marijuana, legislators and healthcare professionals will need to consider strategies to decrease its effect on the pediatric population.		
Onders, B., Casavant, M.J., Spiller, H.A., Chounthirath, T., Smith, G.A. **Marijuana Exposure Among Children Younger Than Six Years in the United States.** Clinical Pediatrics 2016, Vol. 55(5) 428–436 Retrieved from: https://journals.sagepub.com/doi/pdf/10.1177/0009922815589912	**Subjects:** Children 6 years and Younger **Design:** Retrospective Analysis **Methods:** This study retrospectively analyzes data from the National Poison Data System (NPDS) to describe the epidemiology of marijuana exposures among US children <6 years old and to assess the influence of legalization of medical marijuana on the rate of exposure in the United States from 2000 through 2013. The American Association of Poison Control Centers (AAPCC) maintains the NPDS, which is the data warehouse for all the poison control centers (PCCs) in the United States. These PCCs receive calls for potentially	**Conclusions** The rate of exposure to marijuana among young children nationwide is rising. Young children in states where laws allow sale and use of marijuana face significantly elevated risks of exposure and poisoning.		C

	toxic exposures, provide medical advice and document the occurrences in the database. The NPDS serves as a comprehensive toxic exposure surveillance database with extensive quality control measures to ensure data completeness and accuracy			
Ammerman, S.D., Ryan, S.A., Adelman, W., Committee on Substance Abuse, The Impact of Marijuana Policies on Youth: Clinical, Research, and Legal Update. American Academy of Pediatrics. 2015. 135(3). Retrieved From https://pediatrics.aappublications.org/content/135/3/584	**Design:** Policy Statement **Methods:** This policy statement is an update of the American Academy of Pediatrics policy statement "Legalization of Marijuana: Potential Impact on Youth," published in 2004. Pediatricians have special expertise in the care of children and adolescents and may be called on to advise legislators about the potential impact of changes in the legal status of marijuana on adolescents. Parents also may look to pediatricians for advice as they consider whether to support state-level initiatives that propose to legalize the use of marijuana for medical and nonmedical purposes or to decriminalize the possession of small amounts of marijuana. This policy statement provides the position of the American Academy of	**Recommendations** 1. Given the data supporting the negative health and brain development effects of marijuana in children and adolescents, ages 0 through 21 years, the AAP is opposed to marijuana use in this population. 2. The AAP opposes "medical marijuana" outside the regulatory process of the US Food and Drug Administration. Notwithstanding this opposition to use, the AAP recognizes that marijuana may currently be an option for cannabinoid administration for children with life-limiting or severely debilitating conditions and for whom current therapies are inadequate. 3. The AAP opposes legalization of marijuana because of the potential harms to children and adolescents. The AAP supports studying the effects of recent laws legalizing the use of marijuana to better understand the impact and define best policies to reduce adolescent marijuana use. 4. In states that have legalized marijuana for recreational purposes, the AAP strongly recommends strict enforcement of rules and regulations that limit access and marketing and advertising to youth. 5. The AAP strongly supports research and development of pharmaceutical cannabinoids and supports a review of policies promoting research on the medical use of these compounds. The AAP recommends changing marijuana from a Drug Enforcement		

	Pediatrics on the issue of marijuana legalization. The accompanying technical report reviews what is currently known about the relationships of marijuana use with health and the developing brain and the legal status of marijuana and adolescents' use of marijuana to better understand how change in legal status might influence the degree of marijuana use by adolescents in the future.	Administration schedule I to a schedule II drug to facilitate this research. 6. Although the AAP does not condone state laws that allow the sale of marijuana products, in states where recreational marijuana is currently legal, pediatricians should advocate that states regulate the product as closely as possible to tobacco and alcohol, with a minimum age of 21 years for purchase. Revenue from this regulation should be used to support research on the health risks and benefits of marijuana. These regulations should include strict penalties for those who sell marijuana or marijuana products to those younger than 21 years, education and diversion programs for people younger than 21 years who possess marijuana, point-of-sale restrictions, and other marketing restrictions. 7. In states where marijuana is sold legally, either for medical or recreational purposes, regulations should be enacted to ensure that marijuana in all forms is distributed in childproof packaging, to prevent accidental ingestion. 8. The AAP strongly supports the decriminalization of marijuana use for both minors and young adults and encourages pediatricians to advocate for laws that prevent harsh criminal penalties for possession or use of marijuana. A focus on treatment for adolescents with marijuana use problems should be encouraged, and adolescents with marijuana use problems should be referred to treatment. 9. The AAP strongly opposes the use of smoked marijuana because smoking is known to cause lung damage,15 and the effects of second hand marijuana smoke are unknown. 10. The AAP discourages the use of marijuana by adults in the presence of minors because of the important influence of role modeling by adults on child and adolescent behavior.		

Stanwick, R. **E-cigarettes: Are we renormalizing public smoking? Reversing five decades of tobacco control and revitalizing nicotine dependency in children and youth in Canada.** Paediatr Child Health. 2015; 20(2); 101-105. Available from: Paediatr Child Health.	**Subjects:** Adults and children **Design:** CPS position statement **Methods:** This policy statement presents the position of the Canadian Pediatric Society on the use of e-cigarettes. It discusses the growing use of e-devices, the types of emissions and exposures due to such products, and implications for children and youth.	Children and youth are particularly susceptible to the substantial amounts of fine particulate matter, toxins and heavy metals generated by e-devices, which may cause or worsen pre-existing breathing problems such as asthma and bronchitis. In order to reduce second-hand exposure risks for nonusers, particularly children, the CPS recommends that paediatricians, family physicians and other healthcare providers stay informed about research on the risks and effects of e-cigarette smoking, and educate young patients and their families on the risks and hazards of e-cigarette use and exposure. The CPS also recommends making counseling on e- devices a segue into broader discussion of tobacco use and smoking cessation.		
Feleszko, W., Ruszczynski, M., Jaworska, J., Strzelak, A., Zalewski, B. M., & Kulus, M. **Environmental tobacco smoke exposure and risk of allergic sensitisation in children: a systematic review and meta-analysis.** Arch Dis Child. 2014; 99(11): 985-992. Available from: PubMed.	**Subjects:** 0 to 18 years old **Design:** Systematic review **Methods:** Systematic review of cross-sectional, case-control and prospective cohort studies on the impact of environmental tobacco smoke (ETS) on markers of allergic sensitisation in children.	ETS exposure in children has been linked to the development of allergic asthma. However, the mechanisms of this association remain unclear. This publication systematically reviewed the existing evidence to characterize the influence of ETS exposure on allergic sensitisation according to the following markers: total immunoglobulin E (tIgE) concentrations, at least one specific IgE (sIgE+), and positive skin-prick tests (SPTs+) in ETS-exposed and non-exposed children. **Conclusion**: ETS exposure in children increases the risk of allergic sensitisation. Household smoke exposure is associated with: 1) significantly higher tIgE concentrations, 2) the presence of sIgE to any common allergens; and 3) positive SPT against common allergens. Subgroup meta-analyses demonstrated that the observed effects were mostly expressed in preschoolers (<7 years). This review underscores ETS as an important risk factor for the development of allergic disease in children.		

Warren, G. W., Alberg, A. J., Kraft, A. S., & Cummings, K. M. **The 2014 Surgeon General's report: "The health consequences of smoking--50 years of progress": a paradigm shift in cancer care.** Cancer. 2014; 120(13): 1914-1916. Available from: Cancer.	**Subjects:** Children and adults **Design:** Government report **Methods:** Review of published and unpublished studies taken from the scientific literature and other sources on the epidemiology, causes, and health effects of tobacco use among children and adults	No new conclusions in updated 2014 Surgeon General's report on health consequences of secondhand smoke (SHS) in children. The 2014 Surgeon General's report reiterates the association between SHS exposure and respiratory effects in infants and children, including asthma, chronic respiratory symptoms (cough, phlegm, wheeze, dyspnea, etc.), influenza, pneumonia, acute respiratory illnesses, impaired lung function during childhood, and middle ear disease and SIDS.		
Baxi, R., Sharma, M., Roseby, R., Polnay, A., Priest, N., Waters, E., . . . Webster, P. **Family and carer smoking control programmes for reducing children's exposure to environmental tobacco smoke**. Cochrane Database Syst Rev. 2014; 3: CD001746. Available from: Cochrane.	**Subjects:** Adults **Design:** Systematic review **Methods:** Review of controlled trials on the effectiveness of interventions aiming to reduce exposure of children to environmental tobacco smoke.	This Cochrane publication provides a review of the research on the effect of interventions aimed at family and caregivers to reduce children's (aged 0 to 12 years) ETS exposure. The majority of studies included targeted parents within healthcare contexts, with 23 targeting parents in 'well child' settings and 24 reporting interventions in 'ill child' healthcare settings (out of a total of 57 studies). 14 of the 57 studies showed a statistically significant intervention effect for reduced child ETS exposure. These studies used a range of interventions: intensive counseling or motivational interviewing, telephone counseling, educational home visits, etc. This review was unable to determine if any one intervention reduced parental smoking and child exposure more effectively than others, although 7 studies were identified which reported that motivational interviewing or intensive counseling provided in clinical settings was effective.		

Kabir Z, Connolly GN, Alpert HR. **Secondhand smoke exposure and neurobehavioral disorders among children in the United States.** Pediatrics. 2011 Aug;128(2):263-70. Abstract available from: Pediatrics	**Subjects:** Children aged < 12 years **Design:** 7 National Survey on Children's Health **Methods:** The association between parent-reported postnatal second-hand tobacco smoke exposure in the home and neurobehavioral disorders (attention-deficit/hyperactivity disorder, learning disabilities, and conduct disorders) among children younger than 12 years in the United States was examined using the 2007 National Survey on Children's Health. Excess neurobehavioral disorders attributable to secondhand smoke (SHS) exposure in the home in 2007 were further investigated. The methods used in this study were multivariable logistic regression models that accounted for potential confounders and complex survey designs to evaluate associations.	A total of 6% of 55,358 children (aged < 12 years), corresponding to a weighted total of 4.8 million children across the United States, were exposed to SHS in the home. The weighted prevalence and 95% confidence intervals of each of the children's neurobehavioral outcomes were 8.2% (7.5– 8.8) with learning disabilities, 5.9% (5.5–6.4) with attention-deficit/hyperactivity disorder, and 3.6% (3.1–4.0) with behavioural and conduct disorders. Children exposed to SHS at home had a 50% increased odds of having ≥ 2 childhood neurobehavioural disorders compared with children who were not exposed to SHS. Boys had a significantly higher risk. Older children, especially those aged 9 to 11 years, and those living in households with the highest poverty levels were at greater risk. In absolute terms, 274,100 excess cases in total of these 3 disorders could have been prevented if children had not been exposed to SHS in their homes. **Recommendation:** Smoke-free home policies are vigorously encouraged.	III B	1C

Kwok MK, Schooling CM, Ho LM, Leung SS, Mak KH, McGhee SM, Lam TH, Leung GM. **Early life second-hand smoke exposure and serious evidence from Hong Kong's "Children of 1997" birth cohort.** Tobacco Control. 2008;17:263-270. Abstract available from: PubMed	**Subjects:** 0 to 8 years old **Design:** Prospective, population-based cohort study **Methods:** Using data from the 1997 birth cohort from April and May in Hong Kong, investigators followed up with infants and parents at 3, 9 and 18 months. Based on self-reported smoking data, families were classified as no exposure, smoking more than 3 meters and less than 3 meters away from the child.	In this study, second-hand smoke exposure less than 3 meters away from the infant was associated with the highest risk of admission for infectious illness (hazard ratio 1.14, 95% CI: 1.00-1.31). This association was strongest for infants 0 to 6 months years old. Exposure of infants to second-hand smoke within 3 meters increased their risk of serious illness, both respiratory and other infections. This study also showed that young infants (<6 months) as well as low birth weight and preterm infants are at high risk.	II-2 A	
DiFranza JR, Aligne CA, Weitzman M. **Prenatal and postnatal environmental tobacco smoke exposure and children's health.** Pediatrics. 2004;113:1007-1015. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reviewed the literature for the most up-to-date data on environmental tobacco smoke (ETS) and the effects on infants and children.	Studies since 1967 suggest that ETS exposure is associated with decreased lung growth, respiratory tract infection, asthma, otitis media, SIDS, neurocognitive decrements and behavioural problems. This review reported that the greatest risk of adverse health effects occurs during pregnancy and the first few years of life; there is a potential causal relationship between maternal smoking and SIDS; the risk of hospitalization for respiratory illness is greatest in the first 6 months of life.	III A	

American Academy of Pediatrics Committee on Environmental Health. **Environmental tobacco smoke: A hazard to children.** Pediatrics. 1997; 99: 639-642. Abstract available from: PubMed	**Subjects:** Children **Design:** Policy statement **Methods:** Review of epidemiological studies on the association between environmental tobacco smoke (ETS) and respiratory infections in children and infants.	Studies were found that evaluated the effects of ETS on lower respiratory infections, middle ear effusions, asthma, SIDS, lipid profiles and cancer. The statement reports that there is strong evidence that exposure to ETS is associated with an increased risk of lower respiratory infections, middle ear effusions, SIDS and asthma. The AAP recommends that physicians should counsel parents against the hazards of second-hand smoke.	III A	

4.3.3 SUN EXPOSURE/SUNSCREEN/INSECT REPELLENTS

Sun Exposure/Sunscreen/Insect Repellents Recommendations	Strength of Recommendation
1. Minimize sun exposure. Wear protective clothing, hats, and properly applied sunscreen with SPF ≥ 30 for those > 6 months of age. 2. Insect bites/repellents: Prevent insect bites. No DEET in < 6 months; 6–24 months 10% DEET apply max once daily; 2–12 years 10% DEET apply max TID	Consensus

Sun Exposure/Sunscreen/Insect Repellents Resources
1. Preventing mosquito and tick bites (CPS)

Sun Exposure/Sunscreen/Insect Repellents References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Grossman D.C. et al. US Preventive Services Task Force. Behavioral Counseling to Prevent Skin Cancer US Preventive Services Task Force Recommendation Statement. JAMA. 2018;319(11):1134-1142	**Design:** Recommendation Statement	The USPSTF recommends counseling young adults, adolescents, children, and parents of young children about minimizing exposure to UV radiation for persons aged 6 months to 24 years with fair skin types to reduce their risk of skin cancer (B recommendation) (Figure1). The USPSTF recommends that clinicians selectively offer counseling to adults older than 24 years with fair skin types about minimizing their exposure to UV radiation to reduce risk of skin cancer. Existing evidence indicates that the net benefit of counseling all adults older than 24 years is small. In determining whether counseling is appropriate in individual cases, patients and clinicians should consider the presence of risk factors for skin cancer.(C recommendation) See the Clinical Considerations section for information on risk assessment. The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of		

		counseling adults about skin self-examination to prevent skin cancer.(I statement) See the Clinical Considerations section for suggestions for practice regarding the I statement		
Onyett, H., Canadian Paediatric Society, I. D., & Immunization, C. **Preventing mosquito and tick bites: A Canadian update**. Paediatr Child Health. 2014; 19(6): 326-332. Reaffirmed 2017. Available from: CPS.	**Subjects:** Children **Design:** CPS position statement **Methods:** General information on insect repellent use and personal protection measures in infants and children.	In this position statement, the CPS provides updated guidance on personal protective measures to prevent mosquito and tick bites, including recommendations for insect and tick repellents. 1) Health Canada has not evaluated the safety of repellents for infants <6 months of age. Non-chemical measures should be used to protect this population from bites. 2) Use a product containing no more than 10% DEET for children ≤12 years of age. 3) For children >12 years of age, a repellent containing up to 30% DEET can be used as recommended on the product label. 4) Icaridin is considered to be the repellent of first choice by PHAC's Canadian Advisory Committee on Tropical Medicine and Travel for children 6 months to 12 years of age. Products containing up to 20% icaridin are considered to be safe and efficacious. 5) Natural repellents are not necessarily safer than DEET or icaridin. See statement for age restrictions of specific products.		
American Academy of Dermatology. Infant sun protection: How parents can keep their baby safe. 2017. Available at https://www.aad.org/news/sun-protection-for-kids	**Design:** News Release	Recommendations: 1. **Keep your baby in the shade.** Shade is the best way to shield your baby from the sun, especially if he or she is younger than 6 months old. Keep your baby in the shade as much as possible, and if you can't find shade, create your own using an umbrella, canopy or the hood of a stroller. 2. **Dress your baby in sun-protective clothing, such as a lightweight, long-sleeved shirt and pants**. In addition, make sure your baby always wears a wide-brimmed hat and sunglasses with UV protection. 3. **Minimize sunscreen use on children younger than 6 months old, but use it when needed.** If shade and adequate clothing are not available, parents and caretakers may apply a minimal amount of broad-spectrum, water-resistant sunscreen with an SPF of at least 30 to their children's skin. Sunscreens containing titanium dioxide or zinc oxide are less likely to irritate a baby's sensitive skin. Remember to reapply your child's sunscreen		

		every two hours or immediately after swimming or sweating, as there is no such thing as "waterproof" sunscreen. 4. **Stay safe on hot days.** In addition to sun protection, stay safe on hot days by making sure your baby does not get overheated and drinks plenty of fluids. If your baby is fussy, crying excessively or has redness on any exposed skin, take him or her indoors immediately.		
Paller, A. et al. **New Insights About Infant and Toddler Skin: Implications for Sun Protection**. Pediatrics. 2011. 128(92). Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/21646256	**Subjects:** Infants and Toddlers **Design:** Review Article **Methods:** In this article we review recent studies in which differences between the skin properties of infants and young children and those of adults were compared, and we discuss the implications of these differences for sun-protection practices	**CONCLUSIONS/FUTURE RESEARCH** Results of recent research have suggested that skin possesses unique properties and vulnerability in infants and toddlers, which leads to an increased risk of xerosis, atopic dermatitis, and UVR damage. Pediatricians must remember the special vulnerabilities of infants and toddlers when counseling parents about sun protection measures. These measures include avoiding midday sun, wearing protective clothing and hats, seeking shade, using UVA/UVB protective sunglasses, and applying sunscreen. The ultimate goal of sun protection is to protect all parts of the skin exposed to the sun by using a variety of techniques, including sunscreen in infants older than 6 months. Establishing firm standards of care for infant and toddler sun protection on the basis of a developing understanding of their needs will require additional epidemiologic data about sun exposure and sunburn in early life. These data include the specific nature of sunburn in infants and actual caregiver practices, stratified according to setting and ethnicity. Definitively establishing that sun avoidance in the first 6 months and vigorous sun protection thereafter during infancy prevents melanogenesis-related DNA damage and standardizing results for Barrier function according to different SC thickness throughout the body are logical next steps as well. More non invasive studies to elucidate the time course of pigmentation in sun-exposed areas compared with the development of the skin barrier and		

		immunity will be critical for making decisions about sunscreen use. Ensuring that oral vitamin D3 administration obviates the need for UVR-induced vitamin D3 production in skin will also be essential. In addition, any sunscreen recommended for infants and toddlers must be evaluated thoroughly in children in this age group for broad-spectrum protection, safety, skin absorption, and reactivity. Separate assessments, including clinical studies, must also be conducted to ensure tolerance for products recommended for infants with atopic dermatitis. Studies to better assess the need for sun protection in infants and toddlers with darker skin types (eg, is a lower SPF value sufficient?) should also be performed. Finally, consideration might be given to designing sunscreens in bases that provide added benefit, such as emollition, vitamin D3 supplementation, and promotion of barrier development.		

American Academy of Pediatrics Committee on Environmental Health. **Ultraviolet light: A hazard to children and adolescents.** Pediatrics. 1999; 104: 328-333. Revised March 2011. Available from: Pediatrics	**Subjects:** Children **Design:** Review **Methods:** Reviews recommendations for physicians to counsel their patients on sun exposure, appropriate use of sunscreen and effective ways to prevent skin cancer.	There are no clinical trials on the effectiveness of sunscreen in the prevention of skin cancer. However, sunscreen does prevent the skin from burning. According to the AAP, children should be protected from intense sun exposure early in life to prevent skin cancer; children <6 months of age should not be exposed to direct sunlight and should instead be placed in the shade and/or covered by clothes; children >6 months of age should wear sunscreen that is SPF 15 or above and well rubbed into their skin. The AAP recommends that physicians should counsel parents on sun protection. The revised version further highlights the lack of evidence supporting recommendations on sun behaviour in children and includes discussions on vitamin D and outdoor physical activity. The AAP recommendations are largely based on evidence from epidemiologic studies that UVR causes skin cancer. **Recommendations:** 1) Paediatricians should incorporate advice about UVR exposure into health-supervision practices. 2) Advice includes keeping infants < 6 months out of direct sunlight and/or covered by clothes, avoiding sun burning and sun tanning, wearing clothing and hats with brims, and applying and reapplying sunscreen when a child might sunburn. 3) Advice should be framed in the context of promoting outdoor physical activity in a sun-safe manner.	III III	1C
Meurer LN, Jamieson B. **What is the appropriate use of sunscreen for infants and children?** The Journal of Family Practice. 2006;55(5):437, 440, 444. Abstract available from: PubMed	**Subjects:** Children **Design:** Clinical inquiry **Methods**: An evidence-based answer top the question "What is the appropriate use of sunscreen for infants and children?" using the SORT grades of evidence.	According to this report, infants <6 months of age should be kept out of direct sunlight or be covered to avoid sunburn and children >6 months of age should wear a liberal amount of sunscreen that is SPF 15 or above and reapplied every 2 hours, especially if swimming.	III B	

Canadian Paediatric Society. **Insect repellents for children.** Available from: Caring for Kids	**Subjects:** Children **Design:** Website **Methods:** General information on insect repellent use in children <6 months, 6 months to 2 years, 2 to 12 years and >12 years of age.	**Conclusion:** 1) Children should not apply their own repellent; 2) Parents should remember to read the entire label before using. 3) Repellent should not be used on infants <6 months old; 4) Overall, the recommendations from the CPS are as follows: children <12 years old can use a product with 10% DEET; children >12 years old can use 30% DEET; children 6 months to 2 years old should use a product with no more than 10% DEET applied only once per day.	III	

4.3.4 PESTICIDE USE

Pesticide Use Recommendations	Strength of Recommendation
1. Ask about pesticide use and storage at home; avoid exposure. Wash all fruits and vegetables that cannot be peeled.	*Fair*

Pesticide Use References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Trasande et al. AAP Council on Environmental Health. Food additives and child health. Pediatrics 2018; 142(2):e20181408		**Abstract:** Our purposes with this policy statement and its accompanying technical report are to review and highlight emerging child health concerns related to the use of colorings, flavorings, and chemicals deliberately added to food during processing (direct food additives) as well as substances in food contact materials, including adhesives, dyes, coatings, paper, paperboard, plastic, and other polymers, which may contaminate food as part of packaging or manufacturing equipment (indirect food additives); to make reasonable recommendations that the pediatrician might be able to adopt into the guidance provided during pediatric visits; and to propose urgently needed reforms to the current regulatory process at the US Food and Drug Administration (FDA) for food additives. Concern regarding food additives has increased in the past 2 decades, in part because of studies in which authors document endocrine disruption and other adverse health effects. In some cases, exposure to these chemicals is disproportionate among minority and low-income populations. Regulation and oversight of many food additives is inadequate because of several key problems in the Federal Food, Drug, and Cosmetic Act. Current requirements for a "generally recognized as safe" (GRAS) designation are insufficient to ensure the safety of food additives and do not contain sufficient protections against conflict of interest. Additionally, the FDA does not have adequate authority to acquire data on chemicals on the market or reassess their safety for human health. These are critical		

		weaknesses in the current regulatory system for food additives. Data about health effects of food additives on infants and children are limited or missing; however, in general, infants and children are more vulnerable to chemical exposures. Substantial improvements to the food additives regulatory system are urgently needed, including greatly strengthening or replacing the "generally recognized as safe" (GRAS) determination process, updating the scientific foundation of the FDA's safety assessment program, retesting all previously approved chemicals, and labeling direct additives with limited or no toxicity data.		
Council on Environmental Health. Pesticide Exposure in Children. Pediatrics 2012; 130(6): e1757-e1763.		**Abstract:** This statement presents the position of the American Academy of Pediatrics on pesticides. Pesticides are a collective term for chemicals intended to kill unwanted insects, plants, molds, and rodents. Children encounter pesticides daily and have unique susceptibilities to their potential toxicity. Acute poisoning risks are clear, and understanding of chronic health implications from both acute and chronic exposure are emerging. Epidemiologic evidence demonstrates associations between early life exposure to pesticides and pediatric cancers, decreased cognitive function, and behavioral problems. Related animal toxicology studies provide supportive biological plausibility for these findings. Recognizing and reducing problematic exposures will require attention to current inadequacies in medical training, public health tracking, and regulatory action on pesticides. Ongoing research describing toxicologic vulnerabilities and exposure factors across the life span are needed to inform regulatory needs and appropriate interventions. Policies that promote integrated pest management, comprehensive pesticide labeling, and marketing practices that incorporate child health considerations will enhance safe use.		

Chen, M., Chang, C. H., Tao, L., & Lu, C. **Residential Exposure to Pesticide During Childhood and Childhood Cancers: A Meta-Analysis.** Pediatrics. 2015; 136(4): 719-729. Available from: Pediatrics.	**Subjects:** ≤19 years old **Design:** Meta-analysis **Methods:** PubMed search of observational studies published before 2014 on association between residential childhood pesticide exposure and childhood cancers. Data was sub-grouped and calculated by pesticide categories, exposure locations, and type of cancer. A random effects model was used in this analysis.	16 case-controlled studies were found. A meta-analysis was run separately for 2 windows of exposure: prenatal and after birth to diagnosis, and postnatal to diagnosis. Outcomes from either window of exposure were similar. Results from the window from postnatal until diagnosis can be found in the Supplemental Data. Results suggest that cancer risks are related to the type of pesticide and location of use. Overall childhood cancer risk is elevated with childhood home pesticide exposure. Exposure to residential indoor insecticides during childhood was significantly associated with an increased risk of childhood cancers (leukemia, acute leukemia, and lymphoma). No significant childhood cancer risk was associated with exposure to outdoor pesticides in general. However, exposure to herbicides was associated with a slightly higher risk of childhood cancers. This association was only statistically significant for leukemia. **Recommendations:** minimize childhood exposure to pesticides in the home. Healthcare providers should learn about common pesticide types, labeling information, and stay aware of short- and long-term effects. Every effort should be made to limit children's exposure to pesticides.		

Suarez-Lopez, J. R., Himes, J. H., Jacobs, D. R., Jr., Alexander, B. H., & Gunnar, M. R. **Acetylcholinesterase activity and neurodevelopment in boys and girls**. Pediatrics. 2013; 132(6): e1649-1658. Available from: Pediatrics.	**Subjects:** 4 to 9 years old **Design:** Cross-sectional study **Methods:** Data analysis based on The Secondary Exposure to Pesticides Among Infants, Children and Adolescents (ESPINA) study. This study quantified acetylcholinesterase (AChE) activity in children and neurodevelopment in 5 domains: attention/executive functioning, language, memory/learning, visuospatial processing, and sensorimotor (NEPSY-II test). Associations were adjusted for demographic and socioeconomic characteristics, height-for-age, flower worker cohabitation, and hemoglobin concentration.	Cholinesterase inhibitors (e.g. organophosphates, carbamates) are common insecticides which suppress the activity of AChE. The inhibition of this enzyme can be neurotoxic. This study analyzed whether lower AChE activity is associated with lower neurodevelopment in children, using logistic models (dichotomous and polychotomous) and linear regression models. Lower AChE activity was associated with overall lower neurobehavioral development, particularly affecting attention, inhibitory control, and memory in boys but not in girls. This suggests that boys may have a greater sensitivity than girls for neurodevelopmental delays from subclinical pesticide exposure.		B
Morgan, M. K., Wilson, N. K., & Chuang, J. C. **Exposures of 129 preschool children to organochlorines,**	**Subjects:** Preschool children **Design:** Cross-sectional study	Exposures to 9 past-use pesticides (aldrin, α-chlordane, γ-chlordane, p,p'-DDT, dieldrin, endrin, heptachlor, lindane, and 2,4,5-trichlorophenoxyacetic acid (2,4,5-T)) and 7 current-use pesticides (chlorpyrifos, diazinon, cyfluthrin, cis-permethrin, trans-permethrin, dicamba, and 2,4-D) were assessed in 256 preschool		C

organophosphates, pyrethroids, and acid herbicides at their homes and daycares in North Carolina. Int J Environ Res Public Health. 2014; 11(4): 3743-3764. Available from: PMC.	**Methods:** Data analysis of Children's Total Exposure to Persistent Pesticides and Other Persistent Organic Pollutants (CTEPP) study. Environmental (soil, dust, outdoor air, indoor air) and personal (hand wipes, solid food, liquid food) samples were collected in homes and daycare centers, and extracted for target pesticides. Children's estimated potential exposures (ng/day) calculated for frequently detected pesticides (≥50% detection frequency in ≥2 different samples) through the dietary, non-dietary, and inhalation routes. Potential intake doses (ng/kg/day) to these pesticides were then computed. Estimated potential aggregate exposures and potential aggregate intake doses also calculated for frequently detected pesticides.	children. Results showed that preschool children were exposed at low levels to a number of past-use and current-use pesticides from several sources and routes of exposure at home and in daycare centers. Pesticides detected at ≥50% in several different samples included α-chlordane, γ-chlordane, heptachlor, chlorpyrifos, diazinon, cis-permethrin, trans-permethrin, and 2,4-D. Exposures varied greatly by exposure route. Inhalation was the predominant route of children's exposure to α/γ chlordane (~83%), heptachlor (~98%), and diazinon (~94%), and to a lesser extent to chlorpyrifos (~35%). Dietary ingestion was the major exposure route to chlorpyrifos (~61%), cis/trans-permethrin (~65%), and 2,4-D (~97%). Non-dietary ingestion was also an important secondary exposure route for cis/trans-permethrin (~32%).		
Council On Environment And Health. **Pesticide exposure in children.** Pediatrics 2012;130;e1757.	**Subjects:** Children **Design:** Policy statement **Methods:** This policy statement presents the position of the American	Based on an in-depth review of pesticide exposure in children, this position statement reported that pesticide exposures are common and has both acute and chronic deleterious effects on health.	III, II-3 A	1C

Abstract available from: Pediatrics	Academy of Pediatrics on exposure pesticides. It discusses steps that paediatricians should take to identify pesticide poisoning, evaluate patients for pesticide-related illness, provide appropriate treatment, and prevent unnecessary exposure and poisoning. A thorough review of these topics can be found in the technical report.	**Recommendation:** The AAP recommends that paediatricians acquire the knowledge and the skills in pesticide identification, counselling, and management.		
Roberts JR, Karr CK; American Academy of Pediatrics, Council on Environmental Health. **Technical report—pesticide exposure in children.** Pediatrics. 2012:130(6). Abstract available from: Pediatrics	**Subjects:** Children **Design:** Review and technical report **Methods:** This review focuses on select insecticides, herbicides, and rodenticides and specific chemical classes within these groups that have the greatest acute and chronic toxicity for children on the basis of historical experience and/or emerging evidence.	This report reviews the evidence about health outcomes associated with both acute and chronic exposure to pesticides. The sources of pesticides, the mechanism of toxicity, the clinical manifestations, the chronic health effects of pesticide exposures and the state of pesticide knowledge among pediatricians are among several topics presented. Authors note that children are uniquely vulnerable to uptake and adverse effects of pesticides because of developmental (e.g. hand-to-mouth activity), dietary, and physiologic factors (e.g. greater intake of food or fluids per pound of body weight). The recommendations issued are similar to those found in the AAP policy statement. **Recommendations:** Pediatricians should be familiar with the common pesticide types, signs and symptoms of acute toxicity, and chronic health implications, and that efforts should be made to limit children's exposure as much as possible.	III, II-3 A	1C
Bassil KL, Vakil C, Sanborn M, Cole DC, Kaur JS, Kerr KJ. **Cancer health effects of pesticides: Systematic**	**Subjects:** Adultsand children exposed to pesticides **Design:** Systematic review	Eighty-three studies were found. Most studies on non-Hodgkin lymphoma and leukemia showed a positive association with pesticide exposure. There was an association between kidney cancer in children and parents with occupational exposure. The 8	II-2 B	

review. Can Fam Physician. 2007;53:1704-1711. Abstract available from: PubMed	**Methods:** Performed a search of electronic databases MEDLINE, PreMedline, CancerLit and LILACS for studies On non-Hodgkin lymphoma, leukemia and 8 solid-tumour cancers published between 1992 and 2003. Studies were reviewed by 2 trained reviewers and rated on methodologic quality according to a 5-page assessment tool. Studies rates below a score of 4 out of 7 were excluded.	solid-tumour cancers included: brain, breast, kidney, lung, ovarian, pancreatic, prostate and stomach cancer. This review of evidence shows an association between pesticide exposure and cancer, particularly brain, prostate, kidney and non-Hodgkin lymphoma and leukemia. Children had an increased risk of cancer during critical periods of exposure (both prenatal and postnatal) and with parental exposure at work. **Recommendation:** Reduced exposure to all pesticides.		
Buckley JD, Meadows AT, Kadin ME, Le Beau MM, Siegel S, Robison LL. **Pesticide exposures in children with non-Hodgkin lymphoma.** Cancer. 2000;89:2315-2321. Abstract available from: PubMed	**Subjects:** ≤20 years old **Design:** Case-control study **Methods:** Data from the Children's Cancer Group. Used matched, randomly selected, regional population controls. Assessed pesticide exposure through telephone interviews with mothers.	This study found a significant association between the risk of non-Hodgkin lymphoma (NHL) and increased frequency of pesticide use in the home. Use of professional extermination services and postnatal exposure were also significant predictors of NHL. However, due to some limitations of the study (self-report of pesticide exposure can lead to potential for recall bias), no causal trend can be determined and further investigation is warranted.	II-2 I	

4.3.5 LEAD

Lead Recommendations	Strength of Recommendation
There is no safe level of lead exposure in children. Evidence suggests that low blood lead levels can have adverse health effects on a child's cognitive function. Blood Lead Screening is recommended for children who: - in the last 6 months lived in a house or apartment built before 1960; - live in a home with recent or ongoing renovations or peeling or chipped paint; - have a sibling, housemate, or playmate with a prior history of lead poisoning; - live near point sources of lead contamination; - have household members with lead-related occupations or hobbies; - are refugees aged 6 months–6 years, within 3 months of arrival and again in 3–6 months. - have emigrated or been internationally adopted from a country where population lead levels are higher than in Canada. - are at risk of lead exposure from water pipes. - require diagnostic investigations for neurodevelopmental delays/disorders	*Fair* *Fair*

Lead Resources
1. Prevention of Childhood Lead Toxicity (AAP) 2. Lead and Children (CFP) 3. Kids new to Canada (CPS) 4. Low-level lead exposure (CPS) 5. Reduce your exposure to lead (HC)

Lead References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Gantor AG, Hendrickson R, Blazina I, et al. **Screening for Elevated Blood Lead Levels in Childhood and Pregnancy.** Updated Evidence Report and Systematic Review for the US Preventive Services Task Force. J*AMA.* 2019;321(15):1510-1526. Available from: JAMA.		**Abstract** Importance Elevated blood lead level is associated with serious, often irreversible, health consequences. Objective To synthesize evidence on the effects of screening, testing, and treatment for elevated blood lead level in pregnant women and children aged 5 years and younger in the primary care setting to inform the US Preventive Services Task Force. Data Sources Cochrane CENTRAL and Cochrane Database of Systematic Reviews (through June 2018) and Ovid MEDLINE (1946 to June 2018); surveillance through December 5, 2018. Study Selection English-language trials and observational studies of screening for and treating elevated lead levels in asymptomatic children and pregnant women. Data Extraction and Synthesis Independent critical appraisal and data abstraction by 2 reviewers using predefined criteria. Main Outcomes and Measures Elevated blood lead level, morbidity, mortality, clinical prediction tools, test accuracy, adverse events. Results A total of 24 studies (N = 11 433) were included in this review. No studies evaluated the benefits or harms of screening vs no screening in children. More than 1 positive answer on the 5-item 1991 Centers for Disease Control and Prevention (CDC) screening questionnaire was associated with a pooled sensitivity of 48% (95% CI, 31.4% to 65.6%) and specificity of 58% (95% CI, 39.9% to 74.0%) for identifying children with a venous blood lead level greater than 10 µg/dL (5 studies [n = 2265]). Adapted versions of the CDC questionnaire did not demonstrate improved accuracy. Capillary blood lead testing		

		demonstrated sensitivity of 87% to 91% and specificity greater than 90%, compared with venous measurement (4 studies [n = 1431]). Counseling and nutritional interventions or residential lead hazard control techniques did not reduce blood lead concentrations in asymptomatic children, but studies were few and had methodological limitations (7 studies [n = 1419]). One trial (n = 780) of dimercaptosuccinic acid (DMSA) chelation therapy found reduced blood lead levels in children at 1 week to 1 year but not at 4.5 to 6 years, while another trial (n = 39) found no effect at 1 and 6 months. Seven-year follow-up assessments showed no effect on neuropsychological development, a small deficit in linear growth (height difference, 1.17 cm [95% CI, 0.41 to 1.93]), and poorer cognitive outcomes reported as the Attention and Executive Functions subscore of the Developmental Neuropsychological Assessment (unadjusted difference, −1.8 [95% CI, −4.5 to 1.0]; adjusted *P* = .045) in children treated with DMSA chelation. Evidence was too limited to determine the accuracy of screening questionnaires or benefits and harms of treatment in pregnant women. Conclusions and Relevance Screening questionnaires were not accurate for identifying children with elevated blood lead levels. Chelating agents in children were not significantly associated with sustained effects on blood level levels but were associated with harms.		
Bukam I., Hervouet-Zeiber, C. Canadian Pediatric Society. **Lead toxicity with a new focus: Addressing low-level lead exposure in Canadian children.** 2019 Available at: https://www.cps.ca/en/documents/position/lead-toxicity	**Subjects:** Children **Design:** Practice Point	**Conclusion** Low levels of lead exposure can manifest with subtle or severe neurodevelopmental, behavioural and cognitive symptoms. Prevention, early identification, source removal and nutritional measures are key to avoiding chronic and damaging symptomatology. Paediatricians need to be alert to the hazards of low-dose lead toxicity to recognize, assess and manage potential exposures. While chelation is recommended only for high level exposures, identifying and mitigating sources of lower level exposures are important treatment modalities.		
AAP Council On	**Subjects:** Children	The scientific literature indicates that prevention efforts should		

Environmental Health. **Prevention of Childhood Lead Toxicity**. Pediatrics. 2016; 138(1). doi:10.1542/peds.2016-1493. Available from: Pediatrics.	**Design:** Policy statement **Methods:** This statement focuses on how pediatricians, primary care providers and public health officials can help prevent lead exposure in children, and provides recommendations to this effect.	focus on reducing sources of childhood lead exposures rather than identifying children who have already been exposed or attempting to ameliorate the toxic effects of lead exposure. The key to preventing lead toxicity in children is identification and elimination of major sources of lead exposure. Because lead exposure is cumulative and there exists no apparent threshold for its adverse effects, all sources of exposure should be eliminated. Lead-based paint is the most common source of lead exposure for children living in older housing. Major pathways for exposure include ingestion of lead-contaminated house dust and residential soil, waterborne exposure, and airborne lead in some communities, such as those surrounding regional airports. Other sources of lead intake include nutritional supplements and folk medicines, ceramic dishware, and cosmetics. Lead brought into the home from a worksite by a parent can also be a major source of exposure for some children. In the primary care office, primary prevention should begin with education and counseling. This policy statement puts forward the following **recommendations** for US pediatricians, healthcare providers, and public health officials: • routinely recommend individual environmental assessments of older housing • advocate for the promulgation and enforcement of strict legal standards based on empirical data that regulate allowable levels of lead in air, water, soil, house dust, and consumer products. These standards should address the major sources of lead exposure, including industrial emissions, lead paint in older housing, lead contaminated soil, water service lines, and consumer products. • be familiar with collection and interpretation of reports of lead hazards found in house dust, soil, paint, and water, or refer to the appropriate professional • be familiar with federal, provincial, local, and professional recommendations or requirements for screening children and pregnant women for lead poisoning • test asymptomatic children for elevated blood lead concentrations according to federal, provincial, and local requirements For further recommendations, refer directly to the statement.		

Advisory Committee on Childhood Lead Poisoning Prevention of the Centers for Disease Control and Prevention. **Low level lead exposure harms children: A renewed call for primary prevention**. 2012. (pp. 1–54). Available from: CDC.	**Subjects:** Children **Design:** Government report **Methods:** Using data from the published literature and risk assessments of other regulatory bodies, the ACCLPP provides recommendations to shift priorities to implement primary prevention strategies and guidance to respond to children with blood lead levels (BLLs) <10 µg/dL.	The ACCLPP recommends discontinuation of a designated 'level of concern' for elevated BLL in children. No measureable level of blood lead is known to be without deleterious effects. The ACCLPP recommends using a childhood BLL reference value based on the 97.5th percentile of the population BLL in children aged 1-5 (currently 5 µg/dL) to identify children associated with lead-exposure hazards. This reference value should be updated every 4 years based on the most recent population based blood lead surveys among children. The ACCLPP also emphasizes primary prevention to lead exposure. Clinicians are reminded that they have an important role in preventing lead exposure and in managing lead-exposed children. This includes 1) taking a primary role in educating families about preventing lead exposures; 2) emphasizing healthy nutrition and/or dietary supplements to reduce absorption; 3) blood lead testing to promptly identify exposed children, for whom primary prevention has failed; 4) intervening appropriately when clinically indicated; 5) overseeing ongoing monitoring of children with elevated BLLs; 6) coordinating efforts with parents and health authorities to minimize risks to individual children and to assist communities in their primary prevention efforts.		

McLaine, P., Navas-Acien, A., Lee, R., Simon, P., Diener-West, M., & Agnew, J. **Elevated blood lead levels and reading readiness at the start of kindergarten.** Pediatrics. 2013; 131(6): 1081-1089. Available from: Pediatrics.	**Subjects:** Kindergarten schoolchildren **Design:** Cross-sectional study **Methods:** Kindergarten reading readiness test scores (PALS-K test) for children attending kindergarten were linked to state health department records of blood lead testing to evaluate an association. Analyses were adjusted for child characteristics (gender, age, race, and language), year enrolled and socioeconomic status.	3 406 children were included in this study. For each child, the geometric mean BLL was estimated by using all previously reported BLLs. Compared with children with BLLs <5 µg/dL, the adjusted prevalence ratios for failing to achieve the national benchmark for reading readiness were 1.21 (95% CI: 1.19 - 1.23) and 1.56 (95% CI: 1.51 - 1.60) for children with BLLs of 5 to 9 and ≥10 µg/dL, respectively. On average, reading readiness scores decreased by 4.5 (95% CI: 22.9 - 26.2) and 10.0 (95% CI: 27.0 to 213.3) points for children with BLLs of 5 to 9 and ≥10 µg/dL, respectively, compared with BLLs <5 µg/dL. These results suggest that lead exposure at levels below 10 µg/dL also contribute to decreased reading readiness at kindergarten entry.		A
Searle, A. K., Baghurst, P. A., van Hooff, M., Sawyer, M. G., Sim, M. R., Galletly, C., . . . McFarlane, A. C. **Tracing the long-term legacy of childhood lead exposure: a review of three decades of the port Pirie cohort study**.	**Subjects:** Children and adults **Design:** Review **Methods:** Review of all childhood and adulthood findings of the Port Pirie Cohort study to date	The Port Pirie Cohort study is one of few studies to follow participants into adulthood to analyze associations between early childhood lead exposure and subsequent developmental outcomes. 723 infants were born into the cohort, and 210 participants completed interviews and questionnaires in adulthood (25 – 29 years old). At all childhood assessments (2, 4, 7, and 11-13 years old), postnatal lead levels showed small significant associations with outcomes including cognitive development, IQ, and mental health problems. While associations were substantially		

Neurotoxicology. 2014; 43: 46-56. Abstract available from: PubMed.		attenuated after adjusting for several childhood covariates, many remained statistically significant. Furthermore, average childhood blood lead showed small significant associations with some adult mental health problems for females after adjustment, including anxiety problems and phobia. Measures of postnatal rather than prenatal lead exposure were more predictive of later developmental outcomes. Decreases in lead levels across childhood did not predict subsequent changes in developmental status, suggesting that associations between early childhood lead exposure and subsequent developmental outcomes may be persistent rather than transient. The association between lead and developmental outcomes was linear with no clear evidence of a threshold of effect. Finally, females appeared more vulnerable to lead-associated developmental deficits, compared with males, throughout childhood, early adolescence and adulthood.		
Abelsohn AR, Sanborn M. **Lead and children: Clinical management for family physicians.** Canadian Family Physician. 2010; 56:531-5. Abstract available: PubMed	**Subjects:** Children **Design:** Narrative review **Methods:** MEDLINE search of English-language articles published in 2003 to 2008.	The review paper reiterates the lead screening guidelines as reported by the CDC. The paper reports that a new action level of 0.24 µmol/L (5 µg/dL) has been proposed in the United States. No guidelines or changes in action level have been proposed for Canada. The authors report that "interventions that reduce high blood lead levels have not been proven effective for preventing neurocognitive deficits". Office-based approach to prevention and public education campaigns are important. Specifically, physicians can counsel at all visits, including preconception counseling, antenatal and well-baby visits. Physicians can inquire about lead paint exposure (housing, occupation) and drinking water, and especially be more vigilant in screening for high-risk groups.	II-III B	
Centers for Disease Control. CDC lead poisoning prevention in newly arrived refugee children: tool kit. Atlanta, GA: Centers for Disease Control; 2009.	**Subjects**: Infants **Design:** Lead poisoning prevention guidelines **Methods:** Developed guidelines for preventing lead poisoning in children.	**Recommendations:** Lead screening recommended for children who: - in the last 6 months lived in a house or apartment built before 1978, - live in a home with recent or ongoing renovations or peeling or chipped paint,	III	

Available from: Centers for Disease Control.	There are a variety of screening questions that can be asked during well-baby visits to target potentially high-risk infants for blood tests.	- have a sibling, housemate, or playmate with a prior history of lead poisoning, - live near point sources of lead contamination, - have household members with lead-related occupations or hobbies, - are refugees aged 6 mo - 6 yrs, within 3 months of arrival and again in 3-6 months. There are other guidelines that are not included in the CFP study but are quite vague.		
Bellinger DC. **Very low lead exposures and children's neurodevelopment.** Current Opinion in Pediatrics. 2008;20(2):172-177. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reviewed the literature for studies that show adverse outcomes when children are exposed to blood lead levels <10µg/dL (the current screening guideline).	Many studies have shown adverse effects, such as cognitive deficits and behavioural problems, in children with "low" blood lead levels. According to this review, there is no level of lead exposure that is considered to be safe. The authors highlight that in order to prevent exposure it is important to keep parents of young children informed of all sources of lead in their child's environment.	III B	
Téllez-Rojo MM, Bellinger DC, Arroyo-Quiroz C, Lamadrid-Figueroa H, Mercado-Garcia A, Schnaas-Arrieta L, Wright RO, Hernandez-Avila M, Hu H. **Longitudinal associations between blood lead concentrations lower than 10 µg/dL and neurobehavioral development in environmentally exposed children in Mexico City.** Pediatrics. 2006;118:e323-	**Subjects:** Infants **Design:** Prospective cohort study (N=294) **Methods:** Healthy mother – infants pairs were recruited from Mexican maternity hospitals. Infants were included if their blood lead levels at both 12 and 24 months of age were <10 µg/dL. Outcome measures were Bayley Scales of Infant Development II, specifically: 1) the Mental Development Index (MDI) and 2) the	At 12 months, there was no significant association between MDI and PDI scores and blood lead levels. At 24 months, blood lead levels were inversely associated with both MDI and PDI scores Blood lead levels at 12 months were inversely associated with PDI scores at 24 months. These relationships were not altered by adjustment for cord lead blood levels or 12-month MDI and PDI scores. Results of this study suggest that exposure to lead, even in the range of <10 µg/dL (the current screening guideline), may adversely impact the neurodevelopment of infants in a dose-dependent manner.	II-2 B	

e330. Abstract available from: PubMed	Psychomotor Development Index (PDI) at 12 and 24 months.			
Tsekrekos SN, Buka I. **Lead levels in Canadian children: Do we have to review the standard?** Paediatr Child Health. 2005;10(4):215-220. Abstract available from: PubMed	**Subjects:** Children **Design:** Review **Methods:** Reviewed literature from searches of MEDLINE and Web of Science database using key words: Canada, child, lead poisoning, blood lead, and paediatrician.	There has been limited surveillance for blood lead levels among children and little research on the effects of low-level lead poisoning. Neurodevelopmental damage has been seen in children with blood lead levels lower than the current standards (i.e., 0.48 µmol/L). The authors conclude that the current regulations might be inadequate to protect children against lead poisoning. The review reports that physicians should be aware of screening tools for use in high-risk children and inform parents about the symptoms of lead poisoning.	III B	
Government of Canada. Reduce your Exposure to Lead. https://www.canada.ca/en/health-canada/services/home-garden-safety/reduce-your-exposure-lead.html	**Design:** Web resource	What you can do to reduce your family's exposure to lead • Clean your house regularly to remove dust and particles that may contain lead. This is especially important for surfaces that young children might touch often. • Do not keep food or drinks in lead crystal containers for any length of time. Do not serve pregnant women or children drinks in crystal glasses. Babies should never drink from lead crystal. • If you own glazed glass or ceramic dishes bought outside of Canada, do not use them for serving food or drinks. They may contain higher levels of lead than are allowed in Canada. • If you have children 6 years of age or under, remove any horizontal PVC (plastic) mini-blinds made in Asia or Mexico from your home. • Discourage children from putting things into their mouths unless they are intended to be mouthed (like food and pacifiers). • If you work in a smelter, refinery or any other industry where you are exposed to high levels of lead, shower and change your clothing before going home. Make sure you have your blood lead level checked regularly. • Never burn waste oil, coloured newsprint, battery casings or wood covered with lead paint in or near your home, because lead fumes may be released. Dispose of them		

		through your city or town's hazardous waste program. • If you use lead solder in a hobby (like making stained glass), use a good quality breathing mask, keep surfaces clean, and keep children and pregnant women out of the area. Wash hands after handling lead solder. • Avoid eating wild game that has been shot with lead bullets. Use non-lead bullets and shot when hunting for food. • If you are concerned about exposure to lead, speak to your doctor.		
Canadian Paediatric Society. Caring for Kids New to Canada: Lead Toxicity. https://www.kidsnewtocanada.ca/screening/lead	**Methods:** This resource is "a guide for health professionals working with immigrant and refugee children and youth"	**Key Points** • Refugee and internationally adopted children, especially from resource-poor countries, may have elevated lead levels in their body when they arrive in Canada. • Immigrant and refugee children may also be at risk of lead exposure after arriving in Canada. • Sources of lead include environmental contamination, cooking utensils, cosmetics and food items. • Lead exposure may cause no symptoms, produce vague, chronic symptoms or present acutely. • A high index of suspicion is needed for lead exposure in newly arrived children. They should be screened as soon as possible after arrival and, ideally, rescreened 3 to 6 months later when risk factors or anemia are present.		

4.3.6 HEAVY METALS

Heavy Metal Resources
1. Children's Exposure to Mercury Compounds (WHO)

Heavy Metals References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Karagas, M. R., Punshon, T., Sayarath, V., Jackson, B. P., Folt, C. L., & Cottingham, K. L. **Association of Rice and Rice-Product Consumption With Arsenic Exposure Early in Life.** JAMA Pediatrics. 2016; 170(6): 609-616. Available from: http://jamanetwork.com/journals/jamapediatrics/fullarticle/2514074JAMA Pediatrics.	**Subjects:** Infants **Design:** Cohort study **Methods:** Study with 951 infants delivered to mothers enrolled in the New Hampshire Birth Cohort Study from 2011 - 2014. Data on infants' intake of rice and rice products was collected from interviews with parents at 4, 8, and 12 months' follow-up and from a 3-day food diary at 12 months from March 2013 to August 2014. Total urinary arsenic (As) was measured from collected urine samples. Commonly reported infant rice snacks were also tested for As. The associations between log_{10}-transformed urinary As concentrations at 12	This cohort study looked at the types and frequency of rice and rice-containing products consumed by infants in the first year of life and the association with As biomarker concentrations. Dietary data was obtained for 759 of 951 infants. An estimated 80% were introduced to rice cereal in the first year of life. In a subset of 129 infants studied at 12 months of age, 55% reported consuming rice or rice products, including rice snacks, in the 2 days prior to urine collection, and consumption of these products was associated with urinary As concentrations in infants. Among infants aged 12 months who did not eat fish or seafood, total urinary As concentrations were higher among those who ate infant rice cereal (9.53 µg/L) or rice snacks (4.97 µg/L) compared with those who did not eat rice or rice products (2.85 µg/L; all $P < .01$). The highest urinary As concentrations were observed among infants who consumed baby rice cereal (9.53 µg/L; 95% CI, 4.12-21.98 µg/L; $P = .005$). Testing of infant rice snacks showed that they contained between 36 - 568 ng/g of As and 5 - 201 ng/g of inorganic As. These findings suggest that infants' consumption of rice and rice-containing foods contribute to their arsenic exposure, prompting the need for strategies to reduce exposure during this critical phase of development.		C

	months and consumption of rice products was evaluated using general linear models (GLMs). Potential confounding factors examined include home tap water As concentration and sex.			
Lee R, Middleton D, Caldwell K, Dearwent S, Jones S, Lewis B, Monteilh C, Mortensen ME, Nickle R, Orloff K, Reger M, Risher J, Rogers HS, Watters M. **A review of events that expose children to elemental mercury in the United States**. Environ Health Perspect. 2009;117(6):871-8. Abstract available from: PMC	**Subjects:** Children **Design:** Review **Methods**: Comprehensive review of the existing exposure data sources and the scientific literature to identify and quantify common sources of mercury exposure for children in the United States and to describe the location, demographics, and proportion of children affected by such exposures. The numerous mercury exposure prevention initiatives were also reviewed.	Federal, state, and regional programs with information on mercury releases along with published reports of children exposed to elemental mercury in the United States were identified and reviewed. All mercury-related events that were documented to expose (or potentially expose) children were selected. Primary exposure locations were at home, at school, and at other locations such as industrial property not adequately remediated or medical facilities. **Conclusion:** 1) Exposure to small spills from broken thermometers was the most common scenario; however, reports of such exposures are declining. 2) Childhood exposures to elemental mercury often result from inappropriate handling or cleanup of spilled mercury. 3) Most releases do not lead to demonstrable harm if the exposure period is short and the mercury is properly cleaned up. **Recommendation:** Primary prevention to reduce human exposure to heavy metals such as mercury should include health education and policy initiatives.	III I	2C

4.3.7 RADON

Radon Resources
1. WHO Handbook on Indoor Radon

Radon References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Hystad P, Brauer M, Demers PA, Johnson KC, Setton E, Cervantes-Larios A, et al. **Geographic variation in radon and associated lung cancer risk in Canada**. Canadian journal of public health. 2014;105(1): e4-e10. Abstract available from: PubMed.	**Subjects:** Adults **Design:** Residential radon epidemiological study **Methods:** This study determined the lung cancer risk associated with living in high radon areas of Canada. Geographic variation in radon was estimated using two mapping methods; a Health Canada survey of 14 000 residential radon measurements aggregated to health regions, and radon risk areas previously estimated from geology, sediment geochemistry and aerial gamma-ray spectrometry. Lung cancer risk associated with living in these radon areas was examined using a population-based case-control study collected from 1994 - 1997 in 8	This epidemiological study estimates the lung cancer risk associated with living in high radon areas of Canada. Geographic variation in radon was estimated using two national radon risk maps for Canada. Associated lung cancer risks were estimated by applying these maps to 20 years of residential histories using a population-based case-control study of 2 390 histologically confirmed lung cancer incidence cases and 3 507 population controls. Hierarchical logistic regression analyses were used to estimate odds ratios for lung cancer incidence after adjusting for individual and geographic covariates. Findings show that significant variation in average residential radon concentrations (range: 16-386 Bq/m^3) exist across Canada. In multivariate models, a 50 Bq/m^3 increase in average health region radon was associated with a 7% (95% CI: -6-21%) increase in the odds of lung cancer. For every 10 years that individuals live in high radon geological areas, the odds of lung cancer increase by 11% (95% CI: 1-23%). These findings provide further evidence that radon is indeed an important risk factor for lung cancer.		C

	Canadian provinces. Residential histories over a 20-year period were used in combination with the two mapping methods to estimate ecological radon exposures.			
Chen J, Moir D, Whyte J. **Canadian population risk of radon induced lung cancer: a re-assessment based on the recent cross-Canada radon survey**. Radiat Prot Dosimetry. 2012; 152(1-3): 9-13. Available from: PMC.	**Subjects:** Adults **Design:** Cross-sectional study **Methods:** Radon concentrations in Canadian homes are based on Health Canada's 2009 national residential radon survey. The survey was conducted over a 2-year period during the heating seasons of 2009 - 2010 and 2010 - 2011. Long-term radon measurements (3 months or longer) were performed in all the surveyed homes. The population risk of radon-induced lung cancer was assessed by an attributable risk (AR).	Exposure to indoor radon is the second leading cause of lung cancer. Previous studies have estimated that approximately 10% of lung cancers in Canada result from indoor radon exposure. This article reports the results of the most recent cross-Canada radon survey, undertaken in 2009 to re-assess the Canadian population risk for radon-induced lung cancer. Long-term (≥3 month) indoor radon measurements from 14 000 homes across 121 health regions was used to obtain theoretical estimates. These estimates show that 16 % of lung cancer deaths among Canadians are attributable to indoor radon exposure. Furthermore, radon mitigation at 200 Bqm^{-3} (current Canadian action level) to outdoor radon levels could result in the prevention of approximately 927 deaths annually, of the anticipated 3 261 radon-induced lung cancer deaths. These results strongly suggest the ongoing need for the Canadian National Radon Program and further action to reduce the risk from indoor radon exposure.		C

4.3.8 OTHER ENVIRONMENTAL HEALTH ISSUES

4.3.8.1 Home References

Reference	Methods	Outcomes	CTFPHC	GRADE
MacDonald C, Sternberg A, Hunter PR. **A systematic review and meta-analysis of interventions used to reduce exposure to house dust and their effect on the development and severity of asthma.** Environ Health Perspect. 2007 Dec;115(12):1691-5. Abstract available from: PubMed	**Subjects:** Adults and children **Design:** Systematic review and meta-analysis **Methods:** Electronic searches on household intervention and atopic disease were conducted in January 2007 in EMBASE, MEDLINE, and the Cochrane Central Register of Controlled Trials. Randomized controlled trials comparing asthma outcomes in a household intervention group with either placebo intervention or no intervention.	Fourteen studies met the inclusion criteria. Eight recruited antenatally and measured development of atopic disease. Six recruited known atopic individuals and measured disease status change. Meta-analyses on the prevention studies found that the interventions made no difference to the onset of wheeze but made a significant reduction in physician-diagnosed asthma. Meta-analysis of lung function outcomes indicated no improvement due to the interventions but found a reduction in symptom days. Qualitatively, health care was used less in those receiving interventions. However, in one study that compared intervention, placebo, and control arms, the reduction in health care use was similar in the placebo and intervention arms. **Conclusion:** There is not sufficient evidence to suggest implementing hygiene measures in an attempt to improve outcomes in existing atopic disease, but interventions from birth in those at high risk of atopy are useful in preventing diagnosed asthma but not parental-reported wheeze.	I I	A

4.3.8.2 Home Product Safety References

Reference	Methods	Outcomes	CTFPHC	GRADE
Allen UD, Infections Diseases and Immunization Committee; Canadian Paediatric Society.	**Subjects:** All **Design:** Position statement **Methods:** The present position statement	Antimicrobial chemicals (biocides) include sterilants, disinfectants and fungicides. **Recommendations:**	III A	C

Antimicrobial products in the home: the evolving problem of antibiotic resistance. Mar 1 2006. Reaffirmed Jan 30 2013. Available from: http://www.cps.ca/en/documents/position/antimicrobial-products-in-the-home	examines the risks and benefits of the use of antimicrobial products in the home and outlines appropriate home hygiene measures for common scenarios.	1) The Canadian Paediatric Society does not recommend the use of antimicrobial-impregnated household products. In many situations, the use of antiseptics and antimicrobials is unnecessary. 2) The Canadian Paediatric Society promotes hand hygiene using plain soap and water in the vast majority of domestic settings. 3) Alcohol-based solutions or gels can be used to wash hands if regular soap and water are not available. Such alcohol-based products should be kept out of the reach of young infants and children. 4) Antimicrobial chemical agents may be used selectively in the home in specific high-risk scenarios, such as the care of individuals who are receiving medical care at home. 5) Where appropriate, alcohol, bleach or peroxidase-based agents are preferred because they dissipate readily and are less likely to exert prolonged antimicrobial pressure. Agents such as triclosan, chlorhexidine and quaternary ammonium compounds exert more prolonged antimicrobial pressure. 6) Health care personnel should encourage educational strategies that minimize the risk of transmission of infections in the home.		
Braun JM, Kalkbrenner AE, Calafat AM, Yolton K, Ye X, Dietrich KN, Lanphear BP. **Impact of Early-Life Bisphenol A Exposure on Behavior and Executive Function in Children.** Pediatrics; originally published online October 24, 2011. Available from: Pediatrics	**Subjects:** Mothers and their 3 year-old children **Design:** Prospective birth cohort **Methods:** This study was to estimate the impact of gestational and childhood bisphenol A (BPA) exposures on behaviour and executive function at 3 years of age and to determine whether child gender modified those associations. In 244 mothers and their 3 year-old children, gestational	BPA was detected in >97% of the gestational (median: 2.0 µg/L) and childhood (median: 4.1 µg/L) urine samples. With adjustment for confounders, each 10-fold increase in gestational BPA concentrations was associated with more anxious and depressed behavior on the BASC-2 and poorer emotional control and inhibition on the BRIEF-P. The magnitude of the gestational BPA associations differed according to child gender; BASC-2 and BRIEF-P scores increased 9 to 12 points among girls, but changes were null or negative among boys. Associations between childhood BPA exposure and neurobehavioral were largely null and not modified by child gender. In this study, gestational BPA exposure but not childhood exposure affected behavioral and emotional regulation domains at 3 years of age, especially among girls. **Conclusion:** Concerned patients may be advised to reduce their exposure to certain consumer products containing bisphenol A	II-2 B	C

	and childhood BPA exposures was characterized by using the mean BPA concentrations in maternal (16 and 26 weeks of gestation and birth) and child (1, 2, and 3 years of age) urine samples, respectively. Behaviour and executive function were measured by using the Behavior Assessment System for Children 2 (BASC-2) and the Behavior Rating Inventory of Executive Function-Preschool (BRIEF-P).	(BPA, including dental sealants, food/beverage containers and linings.		

4.3.8.3 Outdoor Air References

Reference	Methods	Outcomes	CTFPHC	GRADE
Bråbäck L, Forsberg B. **Does traffic exhaust contribute to the development of asthma and allergic sensitization in children: findings from recent cohort studies.** Environ Health. 2009;8:17. Available from: BioMed Central	Subjects: children Design: review The aim of this review was to assess the evidence from recent prospective studies that long-term traffic pollution could contribute to the development of asthma-like symptoms and allergic sensitization in children. Cohort studies published since 2002 and found in PubMed in Oct	All surveys reported associations with at least some of the studied respiratory symptoms. The outcome varied, however, according to the age of the child. Nevertheless, the consistency in the results indicates that traffic exhaust contributes to the development of respiratory symptoms in healthy children. Potential effects of traffic exhaust on the development of allergic sensitization were only assessed in the four European birth cohorts. Long-term exposure to outdoor air pollutants had no association with sensitization in ten-year-old schoolchildren in Norway. In contrast, German, Dutch and Swedish preschool children had an increased risk of sensitization related to traffic exhaust despite fairly similar levels of outdoor air pollution as in Norway. Traffic-related effects on sensitization could be restricted to individuals with a specific	II-2 B	C

	2008 were reviewed. In all, 13 papers based on data from 9 cohorts have evaluated the relationship between traffic exposure and respiratory health.	genetic polymorphism. Assessment of gene-environment interactions on sensitization has so far only been carried out in a subgroup of the Swedish birth cohort. **Conclusion:** Traffic exhaust contributes to the development of respiratory illness in childhood.		

4.3.8.4 Indoor Air References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Mendell MJ. **Indoor residential chemical emissions as risk factors for respiratory and allergic effects in children: a review.** Indoor Air. 2007;17(4):259-77. Abstract available from: PubMed	**Subjects:** Infants and children **Design:** Review **Methods:** This review summarizes 21 studies in the epidemiologic literature on associations between indoor residential chemical emissions, or emission-related materials or activities, and respiratory health or allergy in infants or children.	Associations, some strong, were reported between many risk factors and respiratory or allergic effects. Risk factors identified most frequently included formaldehyde or particleboard, phthalates or plastic materials, and recent painting. Findings for other risk factors, such as aromatic and aliphatic chemical compounds, were limited but suggestive. Elevated risks were also reported for renovation and cleaning activities, new furniture, and carpets or textile wallpaper. Reviewed studies were entirely observational, limited in size, and variable in quality, and specific risk factors identified may only be indicators for correlated, truly causal exposures. Nevertheless, overall evidence suggests a new class of residential risk factors for adverse respiratory effects, ubiquitous in modern residences, and distinct from those currently recognized. It is important to confirm and quantify any risks, to motivate and guide necessary preventive actions. Composite wood materials that emit formaldehyde, flexible plastics that emit plasticizers, and new paint have all been associated with increased risks of respiratory and allergic health effects in children. Although causal links have not been documented, and other correlated indoor-related exposures may ultimately be implicated, these findings nevertheless point to a new class of little recognized indoor risk factors for allergic and respiratory disease, distinct from the current set of indoor risk factors. The available evidence thus	III	C

		raises initial questions about many common residential practices: for instance, using pressed wood furnishings in children's bedrooms, repainting infant nurseries, and encasing mattresses and pillows with vinyl for asthmatic children.		

4.4 OTHER ISSUES

4.4.1 OTC COUGH/COLD MEDICATION

OTC Cough/Cold Medication Avoidance Recommendations	Strength of Recommendation
1. Advise parents against using OTC cough/cold medications.	**Good**

OTC Cough/Cold Medication Avoidance Resources
1. <u>Treating Cough and Cold (CPS)</u>

OTC Cough/Cold Medication Avoidance References

Reference	Methods	Outcomes	CTFPHC	GRADE
Green, J. L., Wang, G. S. Reynolds, K. M.,Banner, W. Bond, G. R., Kauffman, R. E. Palmer, R. B., Paul, I. M. Dart, R. C. **Safety Profile of Cough and Cold Medication Use in Pediatrics.** Pediatrics. 2017.139(6) Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28562262	**Subjects:** Children <12 years of age **Methods:** Cases with Adverse Events (AEs) after ingestion of at least 1 CCM ingredient (brompheniramine, chlorpheniramine, dextromethorphan, diphenhydramine, doxylamine, guaifenesin, phenylephrine, and pseudoephedrine) in children <12 years of age were collected from 5 data sources. An expert panel	**Conslusion**: Of the 4202 cases reviewed, 3251 (77.4%) were determined to be at least potentially related to a CCM, with accidental unsupervised ingestions (67.1%) and medication errors (13.0%) the most common exposure types. Liquid (67.3%), pediatric (75.5%), and singleingredient (77.5%) formulations were most commonly involved. AEs occurring in >20% of all cases included tachycardia, somnolence, hallucinations, ataxia, mydriasis, and agitation. Twenty cases (0.6%) resulted in death; most were in children <2 years of age (70.0%) and none involved a therapeutic dose. The overall reported		C

	determined relatedness, dose, intent and risk factors.			
Smith, S. M., Schroeder, K., & Fahey, T. **Over-the-counter (OTC) medications for acute cough in children and adults in community settings**. Cochrane Database Syst Rev. 2014; 11: CD001831. Available from: Cochrane.	**Subjects:** Children and adults **Design:** Systematic review **Methods:** Cochrane review of randomised controlled trials assessing the effects of oral OTC cough preparations compared to placebo in children and adults suffering from acute cough in community settings.	29 trials (19 in adults, 10 in children) involving 4 835 participants (3 799 adults and 1 036 children) were included. In the child studies, antitussives (3 studies), antihistamines (3 studies), antihistamine-decongestants (2 studies) and antitussive/bronchodilator combinations (1 study) were no more effective than placebo. No studies using expectorants were included in this review. The results of one trial favoured active treatment with mucolytics over placebo. One trial tested two paediatric cough syrups and both preparations showed a satisfactory response in 46% and 56% of children compared to 21% of children in the placebo group. In total, 21 studies reported adverse effects to medications. The authors conclude that there is no good evidence for or against the effectiveness of OTC medicines in acute cough. The results of this review must be interpreted with caution because of the small number of studies in each category of cough preparations. Studies were very different from each other in terms of treatment types, treatment duration and outcomes measured, making evaluation of overall efficacy difficult. Many studies were also poorly reported making assessment of risk of bias difficult.		

Isbister GK, Prior F, Kilham HA. **Restricting cough and cold medicines in children.** Journal of Paediatrics and Child Health. 2012;48:91–98. Abstract available from: PubMed	**Subjects:** children < 12 years **Design:** Systematic review **Methods:** The authors searched Medline, Embase and the Cochrane Database for studies on the use of products to treat symptoms of the common cold, influenza or allergic rhinitis, and relating to poisoning or toxicity from unintentional ingestion or overdose in children.	Seventy-two relevant studies were identified by the authors. Six clinical trials were considered to have high methodological quality for acute cough and three for the treatment of the common cold. The evidence synthesized in this review provides little support for the effectiveness of cough and cold medicines for acute cough or the common cold in children. Overall, adverse effects and cases of toxicity are uncommon except for diphenhydramine and codeine, which appear to be associated with a high frequency of severe adverse effects and toxicity. The authors conclude that this evidence supports the restriction of cough and cold medicines in children. **Recommendation:** The use of cough and cold medicines in children is not recommended.	I A	1A
Dart RC, Paul IM, Bond GR, Winston DC, Manoguerra AS, Palmer RB, Kauffman RE, Banner W, Green JL, Rumack BH. **Pediatric fatalities associated with over the counter cough and cold medications**. *Ann Emerg Med*. 2009;53:411-417. Abstract available from: PubMed	**Subjects:** 0 to 12 years old **Design:** Case review article **Methods:** A panel of 8 experts reviewed all fatalities gathered from 5 different sources to assess a causal relationship between the ingestion of cough and cold medication (CCM) and deaths in children <12 years old. Other inclusion criteria included U.S. residence, and use of 1 or more of 8 CCMs.	Out of 189 cases included, the deaths of 118 were judged possibly, likely or definitely related to a CCM ingredient. The review reports that risk factors included; age <2 years old, use of CCM for the purpose of sedation, use of CCM in a day care setting, use of 2 or more CCMs with the same ingredient, no use of a measuring device, use of product intended for adult use only and product misidentification.	III A	
Rimsza ME, Newberry S. **Unexpected infant deaths associated with use of cough and cold**	**Subjects:** 0 to 10 months old **Design:** Case review	Ten infants died unexpectedly in Arizona in 2006. They were between 17 days and 10 months of age. All of the cases had apparent cough and cold medications in their blood. Nine out of 10 of the parents did not seek physician counsel prior to administering	II-3 A	

medications. Pediatrics 2008;122:e318-e322. Abstract available from: PubMed	**Methods:** The Arizona Child Fatality database was reviewed for cases of infants who died unexpectedly in 2006. Post-mortem and toxicology reports were then reviewed.	the medication. The authors report that OTC cough and cold medications should not be given to children <6 years old and that education campaigns are needed to inform parents		
Sharfstein JM, North M. **Over the counter but not longer under the radar-pediatric cough and cold medications.** New England Journal of Medicine. 2007; 357:2321-2324. Abstract available from: PubMed	**Subjects:** 0 to 12 years old **Design:** Review **Methods:** Article describing the most recent actions of an advisory committee looking at over-the-counter cough and cold medicine use in children.	Six RCTs have been done since 1985 on cough and cold medication efficacy in children <12 years old. The review reported that there have been no meaningful differences found between active drugs and placebo. The committee voted in favour of immediate action against the use of cough and cold medication in children <6 years old. According to this review, cough and cold medication should not be used to sedate a child.	III A	

4.4.2 INQUIRY ON COMPLEMENTARY/ALTERNATIVE MEDICINE

Inquiry on Complementary/Alternative Medicine Recommendations	Strength of Recommendation
1. Questions should be routinely asked about the use of complementary and alternative medicine, therapy, or products, especially for children with chronic conditions.	*Fair*

Complementary/Alternative Medicine Resources
1. Natural Health Products (Caring For Kids, CPS) **2.** Homeopathy (CPS) **3.** Chiropractic Care (PCH)

Inquiry on Complementary/Alternative Medicine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Hawke K, van Driel ML, Buffington BJ, McGuire TM, King D., **Homeopathic medicinal products for preventing and treating acute respiratory tract infections in children.** Cochrane Database of Systematic Reviews. 2018 Retrieved from:	**Subjects:** children aged 0 to 16 years **Design:** Systematic Review **Methods:** We searched CENTRAL (2017, Issue 11), which contains the Cochrane Acute Respiratory Infections Specialised Register, MEDLINE (1946 to 27 November 2017), Embase (2010 to 27 November	**Author's Conclusions** Implications for practice The eight included studies that assessed a spectrum of oral homeopathic medicinal products for preventing and treating acute respiratory tract infections (ARTIs) in children did not find any significant and consistent benefit for cure, disease severity, recurrence of ARTI, or any of the secondary outcomes defined for this review. Severe adverse events related to the homeopathic remedies studied were not reported, but reporting of adverse events was poor and inconsistent. Overall, the findings of this review do not support the use of homeopathic medicinal products for ARTIs in children in clinical practice. Implications for research The results of this review are consistent		

https://www.ncbi.nlm.nih.gov/pubmed/29630715	2017), CINAHL (1981 to 27 November 2017), AMED (1985 to December 2014), CAMbase (searched 29 March 2018), British Homeopathic Library (searched 26 June 2013 - no longer operating). We also searched the WHO ICTRP and ClinicalTrials.gov trials registers (29 March 2018), checked references, and contacted study authors to identify additional studies.	with all previous systematic reviews on homeopathy. Funders and study investigators contemplating any further research in this area need to consider whether further research will advance our knowledge, given the uncertain mechanism of action and debate about how the lack of a measurable dose can make them effective. The studies we identified did not use a uniform approach to choosing and measuring outcomes or assigning appropriate time points for outcome measurement. The use of validated symptom scales would facilitate future meta-analyses. It is unclear if there is any benefit from individualised (classical) homeopathy over the use of commercially available products.		
Oduwole O, Udoh EE, Oyo-Ita A, Meremikwu MM. **Honey for acute cough in children.** Cochrane Database of Systematic Reviews. 2018. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/29630715	**Subjects:** children aged 12 months to 18 years **Design:** Review **Method:** We searched CENTRAL (2018, Issue 2), which includes the Cochrane Acute Respiratory Infections Group's Specialised Register, MEDLINE (2014 to 8 February 2018), Embase (2014 to 8 February 2018), CINAHL (2014 to 8 February 2018), EBSCO (2014 to 8 February 2018), Web of Science (2014 to 8 February 2018), and LILACS (2014 to 8 February 2018). We also searched ClinicalTrials.gov and the World Health Organization	**Key results** We compared honey to over-the-counter cough preparations, bromelin (a pineapple enzyme) mixed with honey, fake treatment (placebo), and no treatment. Honey probably reduces cough symptoms more than placebo and salbutamol (a drug that opens lung airways) when given for up to three days. Honey is probably more effective at providing cough relief and reducing the impact of cough on children's sleep at night than no treatment. There may be little or no difference between the effects of honey and dextromethorphan (an ingredient in over-the-counter cough remedies) or honey and bromelin with honey on all cough symptoms. Honey may be better than diphenhydramine (an antihistamine) at relieving and reducing children's cough. The parents of seven children given honey and two given dextromethorphan reported side effects in their children, such as not falling asleep easily, restlessness, and becoming overexcited. The parents of three children in the diphenhydramine group reported that their children were often sleepy. The parents of nine children given salbutamol, seven given honey, and six given		

	International Clinical Trial Registry Platform (WHO ICTRP) on 12 February 2018. The 2014 review included searches of AMED and CAB Abstracts, but these were not searched for this update due to lack of institutional access.	placebo reported diarrhoea. The parents of four children who received salbutamol and one child given honey reported rash. We found no evidence for or against the use of honey to relieve cough in children. Using honey for infants aged up to 12 months is not advised because of poor immunity against bacteria that may be present, which can cause paralysis. Most of the children received honey for just one night, which is a limitation to the results of this review.		
Canadian Pediatric Society. **Chiropractic care for children: Controversies and issues**. Paediatr Child Health. 2002; 7(2): 85-104. Reaffirmed 2016. Available from CPS.	**Subjects:** Children **Design:** CPS position statement **Methods:** Reviews the current literature and gives recommendations to physicians on how to advise parents interested in or already using chiropractic therapy for their children.	The scientific evidence for the use of chiropractic therapy is controversial, due to poorly designed trials and a paucity of well-documented data for the paediatric population. The CPS recommends that physicians routinely ask families about complementary and alternative therapies or product use. If a parent discloses that they have been taking the child to a chiropractor, one should inquire whether neck manipulations or forceful thrusts have been used, and if herbal or homeopathic preparations have been given. It is important to know the conditions for which the parent has used chiropractic for the child, the frequency of visits and the motivation for seeking chiropractic care. The physician should undertake to have open and honest discussions with families using or planning to use chiropractic for their children, to ensure a rational use of this treatment in selected musculoskeletal conditions for which there is proof of efficacy. All questions arising from parents about the risks and benefits of immunization should also be discussed by the physician. If it is established that a chiropractor has negatively influenced a decision, it should be pointed out that the Canadian Chiropractic Association accepts and endorses vaccination.		

Posadzki, P., Lee, M. S., & Ernst, E. **Osteopathic manipulative treatment for pediatric conditions: a systematic review**. Pediatrics. 2013; 132(1): 140-152. Available from: Pediatrics.	**Subjects:** <18 years old **Design:** Systematic review **Methods:** Eleven databases (AMED (EBSCO), Cumulative Index to Nursing and Allied Health Literature (EBSCO), Embase (OVID), Medline (OVID), OSTMED.DR, PsycINFO, The Cochrane Library, ISI Web of Knowledge, Osteopathic Research Web, PEDro, Rehabdata) were searched from their respective inceptions to November 2011 for RCTs investigating the effect of osteopathic manipulative treatment (OMT) on pediatric conditions. Study quality was critically appraised by using the Cochrane criteria.	This systematic review evaluated the effectiveness of OMT as a treatment option for pediatric conditions using data from 17 RCTs (887 patients). Clinical conditions studied in these trials include cerebral palsy, respiratory conditions, otitis media, musculoskeletal functions, and others. Due to the clinical and methodological heterogeneity of the data, a meta-analysis could not be performed. 7 clinical trials favored OMT, 7 revealed no effect, and 3 did not report between group comparisons. The 7 RCTs favoring OMT suggested a significantly greater reduction in symptoms of asthma, congenital nasolacrimal duct obstruction (post-treatment), daily weight gain and length of hospital stay in preterm infants, dysfunctional voiding, infantile colic, otitis media, or postural asymmetry compared with various control interventions. The 7 RCTs indicating no effect suggested that OMT had no effect on symptoms of asthma, cerebral palsy, idiopathic scoliosis, obstructive apnea, otitis media, or temporomandibular disorders compared with various control interventions. Of the 5 RCTs defined as high quality evidence, only 1 favored OMT, whereas 4 revealed no effect compared with various control interventions. **Conclusion:** The authors conclude that evidence from RCTs of OMT for treating pediatric conditions remains unproven.		

Snyder J, Brown P. **Complementary and alternative medicine in children: an analysis of the recent literature.** Curr Opin Pediatr. 2012 Aug;24(4):539-46. Abstract available from: PubMed	Subjects: children Design: review Authors reviewed the literature published in the past year to identify the types of CAM most often studied in children, the variety of conditions to which these modalities are applied, and the methodologies used in the articles exploring the most prevalent CAM modalities.	111 articles published in 2011on CAM use in children were identified. The most common modalities were herbal/dietary supplements, acupuncture, massage, chiropractic, and homeopathy. The most commonly studied conditions were pain, headache, attention deficit hyperactivity disorder (ADHD), asthma, and colic. Although a majority of the articles consisted of reviews, case reports, and other nonhypothesis-driven methodologies, we did find that several were randomized controlled trials, meta-analyses, or systematic reviews. These methodologies, however, rarely accounted for the majority of publications on a particular therapy or condition. **Conclusion:** There is an increased use of CAM therapy in children.	I, II-1, II-2, II-3,III A, B, C	A,B,C
Canadian Pediatric Society. **Homeopathy in the pediatric population.** Paediatrics & Child Health. 2005;10:173-177. Reaffirmed February 2014. Available from: Paediatrics & Child Health	**Subjects:** Children **Design:** Position statement **Methods:** Reviewed the literature for studies on homeopathy in the pediatric population.	Two well-designed studies were found: an RCT and a meta-analysis, conducted by the same author. Both showed a positive effect of homeopathy on diarrhea. Homeopathy is a common form of CAM. Adverse events from properly prepared medicines are uncommon. The CPS statement reports that parents who use homeopathic remedies may be resistant to vaccinating their child, which may negatively affect the child's health.	III B	
Canadian Pediatric Society. **Children and natural health products: what a clinician should know.** *Paediatric & Child Health*. 2005;12:227-232. Reaffirmed 2016. PubMed	**Subjects:** Children **Design:** Position statement **Methods:** Reviews the literature and gives recommendations to physicians on how to advise parents interested in complementary and alternative medicine (CAM) and natural health products (NHPs).	Many RCTs have been done looking at NHP use in the paediatric population however they are of poor methodological quality. Only 20-30% of NHPs are FDA approved for paediatric use. The CPS recommends that where possible, physicians should try and follows an evidence-based rationale for therapy and that it is important for physicians to maintain an open mind and nonjudgmental attitude towards both CAM and NHPs.	III B	

4.4.3 FEVER ADVICE/THERMOMETERS/ANTIPYRETIC USE

Fever Advice/Thermometers/Antipyretic Use Recommendations	Strength of Recommendation
1. Fever ≥ 38ºC in an infant < 3 months needs urgent evaluation. **2. Ibuprofen and acetaminophen are both effective antipyretics. Acetaminophen remains the first choice for antipyresis under 6 months of age; thereafter ibuprofen or acetaminophen may be used. Alternating acetaminophen with ibuprofen for fever control is not recommended in primary care settings as this may encourage fever phobia, and the potential risks of medication error outweigh measurable clinical benefit.**	Consensus **Good**

Fever Advice/Thermometers/Antipyretic Use Resources
1. Fever in the returning child (CPS) **2. Fever and temperature taking (Caring for kids CPS)**

Fever Advice/Thermometers References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Audcent, T., Hunter A., Canadian Paediatric Society, Global Child and Youth Health Section. **Fever in the returning Child Traveller. 2018.** Retrieved from: https://www.cps.ca/en/documents/position/fever-in-the-returning-child-traveller	**Subjects:** Children **Design:** Practice Point	GENERAL APPROACH TO CARE FOR THE RETURNING CHILD TRAVELLER WITH FEVER 1. Take an initial travel history. 2. Institute isolation precautions based on presenting symptoms [16]. 3. Obtain a detailed history of exposures and perform a full physical exam, including skin examination. 4. Conduct the following investigations to rule out malaria and other life-threatening or serious infections [7][17]:		

		• Complete blood count with differential: liver enzymes; electrolytes; creatinine • Malaria smears ± antigen detection testing, when available (immediately and at least 2 subsequent samples over 24 to 48 hours when the child has visited a malaria-endemic area) • Blood culture (ensure adequate weight or age-based volume collected) • Urinalysis +/– urine culture Consider: • Stool culture for enteropathogens x 1 (*Salmonella*, *Shigella*, *Campylobacter*, *Yersinia*, *E coli* O157:H7) • Chest x-ray • Stool for ova and parasites, particularly if diarrhea is chronic or patient is immunocompromised (*Cyclospora, Cryptosporidium, Entamoe bahistolytica, Giardia*) • Viral serology: Acute serology should be saved in the laboratory and paired with convalescent serology if a diagnosis has not been reached within 10 to 14 days. Examples: Dengue serology when fever onset occurs within 14 days of return from South or Southeast Asia, Latin America or some areas of the Caribbean; Chikungunya serology when a child has returned from travel to Southeast Asia, Latin America or the Carribean; Zika virus or arboviruses [13]. ****Ensure that travel history is included on all lab and radiologic requisitions.* 5. Management When travel history includes a malaria-endemic area and the child is unwell or lab diagnosis may be delayed, empiric treatment for *P falciparum* malaria should be initiated presumptively (http://publications.gc.ca/collections/collection_2014/aspc-phac/HP40-102-2014-eng.pdf), including broad-spectrum antibiotics with gram-negative coverage. Remember that a well-appearing child with *P falciparum* malaria can deteriorate quickly, and malaria can also present as a co-infection with pneumonia or bacteremia [11]. In critically ill cases		

		or when a child's condition is worsening, prompt consultation with an infectious diseases specialist is warranted. Also, supportive therapy, such as fluids for severe diarrheal illness, should be initiated promptly. When malaria and bacteremia have been excluded in the well-appearing, clinically stable child, initiate targeted therapy based on the individual's history, physical exam and results of investigations and make arrangements for adequate follow-up.		
Narayan, K., Cooper, S., Morphet, J., Innes, K., **Effectiveness of paracetamol versus ibuprofen administration in febrile children: A systematic literature review**. Journal of Paediatrics and Child Health. 2017. 53; 800-807	**Subjects: Children aged 1 month to 12 year** **Design:** A systematic literature review **Methods:** A systematic review of randomised controlled trials investigating the administration of oral paracetamol and ibuprofen to reduce fever in children. Children aged 1 month to 12 years with a temperature between 37.5 and 41C were included. A total of 3023 papers were identified. After removal of duplications, application of inclusion criteria and screening, eight papers were subjected to critical appraisal and included in this study.	**Recommendations** Further studies that involve a larger sample, uniform dosages, and with age controls, are needed to definitively conclude the efficacy of paracetamol or ibuprofen in fever management. These studies should solely focus on paracetamol and ibuprofen as monotherapy and include evaluation of their use in specific paediatric populations. **Conclusion** Evaluation of the eight studies in this systematic review revealed wide variation in regards to study design, sample age group and medication dosages. Due to these inherent differences, comparison of outcome measures was difficult. There was no significant difference in the effect of paracetamol compared with ibuprofen in reducing fever in children. As such, either paracetamol or ibuprofen can be considered to be equally effective in the treatment of fever in children.		

Luo, S., Ran, M., Luo, Q., Shu, M., Guo, Q., Zhu, Y., Xie, X., Zhang, C., Wan, W., Alternating Acetaminophen and Ibuprofen versus Monotherapies in Improvements of Distress and Reducing Refractory Fever in Febrile Children: A Randomized Controlled Trial. Paediatric Drugs. 2017. 19(5); 479-486 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28523589	**Subjects:** Children **Design:** **Methods**: A statistician created a randomization allocation sequence using SPSS v19.0 and kept it and the intervention instructions in serially numbered opaque sealed envelopes. For eligible children, an investigator collected their demographic information and completed a medical record. One researcher then obtained informed consent from the parents and enrolled and randomly assigned the participant into either the alternating acetaminophen and ibuprofen (AI) group, the acetaminophen monotherapy group, or the ibuprofen monotherapy group according to the allocation sequence. In total, 158 participants were allocated to each group. Axillary temperature was taken at 0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, and 24 h, and distress was measured at 0, 4, 8, 12, 16, 20, and 24 h after initial administration of the antipyretic. A separate researcher	**Conclusions** Alternating acetaminophen and ibuprofen can reduce the proportion of children with refractory fever compared with monotherapies, but if one cycle of alternating therapy does not reduce febrile distress, two or more cycles of alternating therapy may have minimal to no clinical efficacy in some cases.		

	administered the antipyretics to the children according to the indication and interval of their allocated intervention and recorded other follow-up data.			
Wong, T., Stang, A. S., Ganshorn, H., Hartling, L., Maconochie, I. K., Thomsen, A. M., & Johnson, D. W. **Combined and alternating paracetamol and ibuprofen therapy for febrile children**. *Cochrane Database Syst Rev.* 2013 Oct 30;(10):CD009572. doi: 10.1002/14651858.CD009572.pub2. Available from: Cochrane.	**Subjects:** <18 years old **Design:** Systematic review **Methods:** Cochrane review of randomized controlled trials comparing alternating or combined paracetamol and ibuprofen therapy with monotherapy for treating fever in children.	6 studies, enrolling 915 participants, were included. 3 studies compared combined antipyretic therapy at baseline with monotherapy. Compared to giving a single antipyretic alone, giving combined paracetamol and ibuprofen to febrile children can result in a lower mean temperature at 1 hour after treatment (moderate quality evidence). If no further antipyretics are given, combined treatment probably also results in a lower mean temperature at 4 hours (moderate quality evidence), and in fewer children remaining or becoming febrile for at least 4 hours after treatment (moderate quality evidence). 3 studies evaluated the benefits of administering a second antipyretic 3 to 4 hours after the first dose of a single agent. Giving alternating treatment in this way may result in a lower mean temperature at 1 hour after the additional dose (low quality evidence), and may also result in fewer children remaining or becoming febrile for up to 3 hours after it is given (low quality evidence). No serious adverse events were attributed to medication use in any of the trials. There is some evidence that both alternating and combined antipyretic therapy may be more effective at reducing temperatures than monotherapy alone. However, there is insufficient evidence to support the use of alternating antipyretic therapy over combined antipyretic therapy. A commentary of this Cochrane review written by Drs Niraj Mistry and Alan Hudak can be found at www.ncbi.nlm.nih.gov/pmc/articles/PMC4276386/pdf/pch-19-531.pdf.		

Canadian Paediatric Society. Temperature measurement in paediatrics. Reference No. CP00-01 Reaffirmed 2017. Available from: CPS.	**Subjects:** Children **Design:** Position statement **Methods:** Examination of the current types of measurements and methods for taking a child's temperature properly.	The CPS recommends that 1) children <2 years old should have their temperature taken rectally to obtain accurate and reliable measurements; 2) children <5 years old should have their temperature taken with a rectal thermometer (gold standard) and that axillary (0-5yo) or tympanic (2-5yo) measurements could be used for screening purposes (less precise); 3) For children >5 years old the recommended technique is using an oral thermometer. The CPS reports that mercury thermometers should no longer be used.	III	
Sullivan JE, Farrar HC and the Section on Clinical Pharmacology and Therapeutics, and Committee on Drugs. Clinical Report: Fever and antipyretic use in children. Pediatrics. 2011; 127: 580–587. Abstract available from: PubMed	**Subjects:** Children **Design:** Clinical Report	This clinical report from the American Academy of Pediatrics reviewed several issues related to fever in childhood and antipyretic use. This report highlighted that there is "no evidence that fever itself worsens the course of an illness or that it causes long-term neurologic complications." The focus of treating the febrile child should be to improve comfort rather than normalization of body temperature. The report also noted that evidence suggested that "there is no substantial difference in the safety and effectiveness of acetaminophen and ibuprofen" in generally healthy febrile child. Of note, evidence does exist that the combination of acetaminophen and ibuprofen is more effective than the use of a single drug alone. However, the concern is that the combination treatment may lead to unsafe use of these drugs. The authors report that "pediatricians should also promote patient safety by advocating for simplified formulations, dosing instructions, and dosing devices." Parental counselling practices were also reviewed.	I, II, III A	
Perrott DA, Piira T, Goodenough B, Champion D. **Efficacy and safety of acetaminophen vs.**	**Subjects:** 0 to 18 years old **Design:** Meta-analysis **Methods:** Searched electronic databases	Seventeen studies met the inclusion criteria. Primary outcomes were pain, fever and safety. Both ibuprofen and acetaminophen were equally effective for pain. Ibuprofen was superior for fever relief. There was no evidence that the drugs differed in safety.	I A	

ibuprofen for treating children's pain or fever: a meta-analysis. Arch Pediatr Adolesc Med. 2004;158:521-526. Abstract available from: PubMed	(MEDLINE, EMBASE, Cochrane Library, Biological Abstracts etc). Studies had to include random allocation to treatment arms and have blinded participants.	There was no difference between ibuprofen and acetaminophen for pain and safety; however, ibuprofen was superior for fever reduction, especially at 4 and 6 hours after treatment. There is no clear preference as both treatments are more effective than placebo.		

4.4.4 FOOTWEAR

Footwear Recommendations	Strength of Recommendation
1. Shoes are for protection, not correction. Walking barefoot develops good toe gripping and muscular strength	Consensus

Footwear Resources
1. Footwear for Children (CPS)

Footwear References

Reference	Methods	Outcomes	CTFPHC	GRADE
Canadian Paediatric Society. **Footwear for children.** Paediatric & Child Health. 2009;14:119. Reaffirmed February 2018. Abstract available from: PubMed	**Subjects:** Children **Design:** Practice point **Methods:** Review of recommendations for appropriate footwear for children.	The CPS reports that using footwear for correction of foot or leg 'deformities' in children is common but lacks evidence of effectiveness. **Conclusion:** 1) Infants do not need shoes until they are walking, 2) Shoes are necessary for protection and should be well-fitting, soft, light weight and should have cushioned soles.	III	

4.4.5 ORAL HEALTH/DENTAL CARE

Oral Health/Dental Care Recommendations	Strength of Recommendation
1. Teething: Discomfort can be managed by providing gum massage with a cold facecloth/teething ring and appropriate use of oral analgesics. E.g. acetaminophen (all ages), or ibuprofen if ≥ 6 mos. Anaesthetics/numbing gels and teething necklaces are contraindicated	**Good**
2. Dental Cleaning: As excessive swallowing of toothpaste by young children may result in dental fluorosis, children under 3 years of age should have their teeth and gums brushed twice daily by an adult using either water (if low risk for tooth decay) or a rice grain sized portion of fluoridated toothpaste (if at caries risk). Children 3–6 years of age should be assisted during brushing and only use a small amount (e.g. pea-sized portion) of fluoridated toothpaste twice daily. Caregiver should brush child's teeth until they develop the manual dexterity to do this alone, and should continue to intermittently supervise brushing after children assume independence. Begin flossing daily when teeth touch.	**Good**
3. Caries risk factors include: child has caries or enamel defects, hygiene or diet is concerning, parent has caries, premature or LBW infant, or no water fluoridation.	Consensus
4. To prevent early childhood caries: avoid juices/sweetened liquids and constant sipping of milk or natural juices in both bottle and cup. Fluoride varnish should be used for those at caries risk. Consider dietary fluoride supplements only for high risk children who do not have access to systemic community water fluoridation.	Consensus
5. Consider the first dentist visit by 6 months after eruption of 1st tooth or at age 1 year.	

Dental Care Resources
1. Oral Health – Smiles for Life 2. Dental Devel (CDA) 3. Canadian Caries Risk Assessment Tool PDF: https://umanitoba.ca/CRA_Tool_ENG_Version.pdf 4. Caries-risk assessment (AAPDA) 5. Fluoride & your child (CDA) 6. Homeopathic Teething Products (FDA)

Dental Care References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Garcia, R.I et al. **Absence of Fluoride Varnish–Related Adverse Events in Caries Prevention Trials in Young Children, United States.** Prev Chronic Disease. 2017. 14(17). Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28207379	**Subjects:** Children aged 0 to 5 years **Methods:** We determined the incidence of adverse events related to fluoride varnish treatment in 3 clinical trials on the prevention of early childhood caries, conducted under the auspices of the Early Childhood Caries Collaborating Centers, an initiative sponsored by the National Institute of Dental and Craniofacial Research. Each trial incorporated use of fluoride varnish in its protocol and systematically queried all children's parents or legal guardians about the occurrence of acute adverse events after each fluoride varnish treatment.	Among the 3 RCTs examined in our study, we found no evidence of fluoride varnish–related adverse events after more than 10,000 fluoride varnish applications in more than 2,400 children. Our study is the first large-scale systematic prospective assessment of fluoride varnish–related adverse events in young children. The use of fluoride varnish for caries prevention in young children is expected to increase as a result of the USPSTF recommendation (3) and growth in government and commercial insurance coverage for physicians and dentists who apply fluoride varnish. Safety concerns are likely to remain an important consideration in decision making for health care providers and families of young children. Thus, our study is a timely contribution to the evidence base. Future clinical studies of fluoride varnish should systematically assess data on safety and investigate the effectiveness of fluoride varnish in preventing caries in the primary dentition, including the optimal dose or frequency of fluoride varnish treatments		
Dos Santos, A. Oliveira, B., Nadanovsky P. A Systematic Review of the effects of Supervised Toothbrushing on	**Subjects:** Children and adolescents up to 18 years of age	Four trials were included and none of them had a low risk of bias. They were all carried out in schools but there was great variation regarding children's age, fluoride content of the toothpaste,		

caries incidence in Children and Adolescents. International Journal of Pediatric Dentistry. 2017	**Design:** Systematic Review **Methods:** A systematic review of controlled trials was performed. Electronic and hand searches retrieved 2046 records, 112 of which were read in full and independently assessed by two reviewers, who collected data regarding characteristics of participants, interventions, outcomes, length of follow up and risk of bias.	baseline caries levels and the way caries incidence was reported. Among the four trials, two found statistically significant differences favouring supervised toothbrushing, but information about the magnitude and/or the precision of the effect estimate was lacking and in one trial clustering effect was not taken into consideration.		
American Academy of Pediatrics Section on Pediatric Dentistry and Oral Health. **Maintaining and improving the oral health of young children.** Pediatrics. 2014; 134(6): 1224-1229. Available from: Pediatrics.	**Subjects:** Children **Design:** AAP Position Statement **Methods:** This statement provides preventive strategies, anticipatory guidance topics and further suggestions to pediatricians to use in their practice.	The AAP provides the following **recommendations** to pediatricians: 1) Administer an oral health risk assessment periodically to all children; 2) Include anticipatory guidance for oral health as an integral part of comprehensive patient counseling; 3) Counsel parents/caregivers and patients to reduce the frequency of exposure to sugars in foods and drinks; 4) Encourage parents/caregivers to brush a child's teeth as soon as teeth erupt with a smear or a grain-of-rice–sized amount of fluoride toothpaste and a pea-sized amount at 3 years of age; 5) Advise parents/caregivers to monitor brushing until 8 years of age; 6) Refer to the AAP clinical report, "Fluoride Use in Caries Prevention in the Primary Care Setting," for fluoride administration and supplementation decisions; 7) Build and maintain collaborative relationships with local dentists; and 8) Recommend that every child has a dental home by 1 year of age.		

American Academy of Pediatrics Section on Pediatric Dentistry and Oral Health. **Fluoride use in caries prevention in the primary care setting**. Pediatrics. 2014; 134(3): 626-633. Available from: Pediatrics.	**Subjects:** Children **Design:** AAP Clinical Report **Methods:** This report seeks to clarify the use of fluoride products in pediatric populations for caries prevention in the primary care setting based on published research and current clinical recommendations.	In this clinical report, the AAP provides recommendations for the use of fluoride products, including toothpastes, varnish, rinses and supplements. The AAP further makes the following **recommendations** to pediatricians: 1) Know how to assess caries risk. Pediatricians should perform oral health risk assessments on all children at preventive visits beginning at 6 months of age; 2) Know how to assess a child's exposure to fluoride and determine the need for topical or systemic supplements; 3) Understand indications for fluoride varnish and how to provide it. Fluoride varnish can be a useful tool in the prevention of early childhood caries; and 4) Advocate for water fluoridation in the local community.		
Marinho, V. C., Worthington, H. V., Walsh, T., & Clarkson, J. E. **Fluoride varnishes for preventing dental caries in children**	**Subjects:** <16 years old **Design:** Meta-analysis **Methods:** This Cochrane review includes randomised or quasi-	This review is an update of the 2002 Cochrane publication on fluoride varnishes for preventing dental caries in children and adolescents. 22 studies including 12 455 participants were included. In the 10 studies looking at the effect of fluoride varnish on primary teeth, the evidence suggests a 37% reduction in decayed, missing		See outcomes

and adolescents. Cochrane Database Syst Rev. 2013; 7: CD002279. Available from: Cochrane.	randomised controlled trials comparing topically-applied fluoride varnish with placebo or no treatment to determine the effectiveness and safety of fluoride varnishes in preventing dental caries	and filled tooth surfaces (pooled d(e/m)fs prevented fraction estimate) when comparing fluoride varnish with placebo or no treatment. This body of evidence was assessed as moderate quality. For the 13 studies that contributed data for the permanent tooth surfaces meta-analysis, there was on average a 43% reduction in decayed, missing and filled tooth surfaces (pooled D(M)FS prevented fraction estimate) when comparing fluoride varnish with placebo or no treatment. This body of evidence was also assessed as moderate quality. There was little information concerning possible adverse effects. The conclusions of this updated review remain the same, suggesting a substantial caries inhibiting effect of fluoride varnish in both primary and permanent teeth. However, the quality of the evidence was assessed as moderate, as it included mainly high risk of bias studies, with considerable heterogeneity.		
Irvine, J., Holve, S., Krol, D., & Schroth, R. **Early childhood caries in Indigenous communities: A joint statement with the American Academy of Pediatrics**. Paediatr Child Health. 2011; 16(6): 351-364. Available from: CPS. Reaffirmed 2016.	**Subjects:** **Design:** CPS Position Statement **Methods:** This statement provides recommendations for preventive and clinical care, community-based health promotion initiatives, oral health workforce and access issues and advocacy for reducing early childhood caries in Indigenous communities	The oral health of Indigenous children of Canada (First Nations, Inuit and Métis) is a major child health issue. This is observed by the high prevalence of early childhood caries (ECC), an infectious disease influenced by a variety of factors including socioeconomic conditions, parenting practices, and maternal and infant nutrition. This CPS statement includes recommendations for oral health preventive and clinical care for young infants and pregnant women by primary healthcare providers, community-based health promotion initiatives for reducing consumption of sugar-containing drinks and snacks, oral health workforce and access issues to ensure early access to dental health services, and advocacy for community water fluoridation and fluoride varnish program access. In terms of clinical care, the CPS **recommends** the following: • Discuss oral health, including oral hygiene and diet, during well-child care visits, using motivational interviewing and anticipatory guidance for parents and caregivers of infants and children. • Promote supervised twice-daily use of fluoridated toothpaste in all Indigenous and other high-risk children after the first tooth has erupted (rice grain-size portion of toothpaste for infants and green pea-size portion for children).	II-3 I II-3 I	B A B B

		• Community health nurses, family physicians, or paediatricians should perform oral health screening during child health assessments and provide referrals as needed to dental health providers. • Provide women of Indigenous communities with preconception and prenatal screening for oral health, anticipatory guidance for oral health and hygiene, and referral for dental care if required. • Ensure that all Indigenous children have access to a) the series of fluoride varnish, and b) an assessment to determine the need for sealant placement on deep grooves and fissures. Primary care providers should be aware of access to fluoride in the drinking water for the various Indigenous communities in their service area.	II-2 I	A A
U.S. Preventive Services Task Force. **Prevention of Dental Caries in Children From Birth Through Age 5 Years: Draft Recommendation Statement.** AHRQ Publication No. 12-05170-EF-2. Available from: http://www.uspreventiveservicestaskforce.org/uspstf/uspsdnch.htm	**Subjects:** 0-5 years **Design:** Systematic review **Methods:** To update the 2004 recommendation, the USPSTF commissioned a systematic review of the evidence on prevention of dental caries by primary care clinicians in children age 5 years or younger. The review focused on screening for caries, assessment of risk for future caries, and the effectiveness of various medications that have possible benefits in preventing caries. The USPSTF reviewed evidence on xylitol and other interventions not included	**Recommendations:** The U.S. Preventive Services Task Force (USPSTF) recommends that primary care clinicians prescribe oral fluoride supplementation starting at age 6 months for children whose water supply is deficient in fluoride, and apply fluoride varnish to the primary teeth of infants and children starting at the age of primary tooth eruption. (Level B recommendation according to USPSTF grading system). **Conclusion:** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of routine screening for dental caries in children from birth to age 5 years by primary care clinicians. The full methodology and results of the systematic review used to update the USPSTF recommendations can be found at: http://pediatrics.aappublications.org/content/132/2/332.full-text.pdf**.**		

	in the previous recommendation.			
Rowan-Legg A; Canadian Paediatric Society; Community Paediatrics Committee. **Oral health care for children – a call for action.** 2011; Paediatr Child Health 18(1):37-43. Reaffirmed February 2016. Available from: Canadian Paediatric Society	**Subjects:** Children and youth **Design:** Position Statement **Methods:** This statement evaluates the current status of paediatric dental health in Canada, including: 1) the structure and economic basis of Canada's dental care delivery system, 2) existing disparities in access to oral health care, and 3) areas where advocacy for children's oral health is most needed.	Oral health is a fundamental component of overall health. All children and youth should have access to preventive and treatment-based dental care. Canadian children continue to have a high rate of dental disease, and this burden of illness is disproportionately represented by children of lower socioeconomic status, those in Aboriginal communities and new immigrants. In Canada, the proportion of public funding for dental care has been decreasing. This financial pressure has most affected low-income families, who are also less likely to have dental insurance. Publicly funded provincial/territorial dental plans for Canadian children are limited and show significant variability in their coverage. There is sound evidence that preventive dental visits improve oral health and reduce later costs, and good evidence that fluoridation therapy decreases the rate of dental caries, particularly in high-risk populations. Paediatricians and family physicians play an important role in identifying children at high risk for dental disease and in advocating for more comprehensive and universal dental care for children. **Recommendations:** 1) Ensure that all children in their respective jurisdictions be afforded equal access to basic treatment and preventive oral care, regardless of where they live or their family's socioeconomic status. 2) Ensure that every child has a dental home by one year of age. 3) Support the Canadian Paediatric Society and the Canadian Dental Association recommendations on fluoride supplementation. 4) Create leadership positions to represent the specific interests of children and youth on oral health issues. 5) Develop an ongoing surveillance system to capture key data and to reflect the state of paediatric oral health.	III A, B	1C
CDA Position on Use of Fluorides in Caries	**Subjects**: All ages **Design:** Position statement	The CDA revised the position statement for the use of fluoride in prevention of caries. The CDA **recommends** that parents of children	III A	

Prevention. Approved by the CDA Board of Directors. REVISED April 2010. Available from: Canadian Dental Association	**Methods:** The statement is a review of the recommendations for the use of fluoride in cavity prevention.	< 3 years old should consult a health professional to assess the child's risk category of developing tooth decay. If the child is at high risk (based on the CDA high risk criteria), then the CDA recommends that children <3 years old should have their teeth brushed by an adult twice a day and that a minimal amount of fluoridated toothpaste be used (the size of a "grain of rice"). If the child less than 3 years old is not considered to be at high risk, then the CDA recommends that their teeth be brushed with a toothbrush moistened with water. Children 3 to 6 years old should be assisted by an adult and only a small ("pea-sized") amount of toothpaste should be used; fluoride supplements such as chewable tablets, lozenges or drops are not recommended for the majority of Canadians; fluoride mouth rinsing is not recommended for children under 6 years of age.		
Canadian Pediatric Society Nutrition Committee. **The use of fluoride in infants and children**. Paediatr Child Health. 2002;7(8):569-72. Reaffirmed 2016. Available from: CPS.	**Subjects:** Infants and children **Design:** Position statement **Methods:** Review of the evidence for the use of fluoride in infants and children.	Fluoride is supplemented in drinking water and toothpaste. Too much fluoride can result in fluorosis. According to the CPS statement, 1) no fluoride should be given before teeth have erupted; 2) no supplemental fluoride should be given to children <6 months old; 3) only children >6 months of age should receive supplemental fluoride if they are at high-risk for caries, or if the concentration of fluoride in the drinking water is <0.3ppm, or if they do not brush their teeth twice a day.	III A	
Kagihara LE, Niederhauser VP, Stark M. **Assessment, management, and prevention of early childhood caries.** Journal of the American Academy of Nurse Practitioners. 2009.21:1-10. Abstract available from: PubMed	**Subjects:** Infants and children **Design:** Review **Methods:** Searched MEDLINE, PubMed, AAP and American Dental Association websites. Keywords: dental caries prevention, caries process, dental home, etc.	Dental caries is a preventable infectious disease, however, it is remains the most common chronic disease of childhood. According to this review, there has been a 15.2% increase in caries among children 2 to 5 years old. The authors report that physicians need to be informed in areas of caries risk assessment, intervention, education and referral. The review emphasizes that "The importance of early identification and intervention for infants and toddlers at high risk cannot be overestimated."	III A	

Marinho VCC, Higgins JPT, Logan S, Sheiham A. **Fluoride toothpastes for preventing dental caries in children and adolescents.** Cochrane Database of Systematic Reviews. 2003, Issue 1. Art. No.: CD002278. Abstract available from: PubMed	**Subjects:** 0 to 16 years old **Design:** Systematic review and meta-analysis **Methods:** Searched the Cochrane Oral Health Group's Trials Register, The Cochrane Central Register of Controlled Trials, MEDLINE, and several other databases.	Seventy-four studies were included in the systematic review, and 70 in the meta-analysis. The results of the review reaffirm the benefits of fluoride toothpastes in preventing caries. The authors report that "Children who brush their teeth at least once a day with toothpaste that contains fluoride will have less tooth decay." However, as the AAP suggests, twice a day can increase the benefit.	I A	

5.0 DEVELOPMENTAL MILESTONE ACQUISITION*

***A systematic review of the literature on developmental milestone attainment to discern level of evidence and strength of recommendation poses significant challenges.**

The main questions under review are:

1. What is the level of evidence that supports the "conventional" acquisition of developmental milestones that is generally accepted?

The literature on developmental milestone attainment utilizes well-validated standardized formal assessment tools that have been developed from large population samples and used widely for clinical and research purposes.

These scales and inventories identify the upper (90th) and lower (5th) percentiles for gross and fine motor milestone attainment at specific ages. For each milestone, a median age is the age at which half a population of children acquire a skill.
Communication, cognitive and social-emotional milestone ages are more difficult to stratify in percentiles.

This body of literature does not lend itself well to the assignment of levels of evidence and therefore is not presented here in that fashion. However, some of the resources that are pertinent to developmental items included in the Rourke Baby Record (RBR) are listed below.

The RBR has utilized this broad literature and knowledge base to select the oldest age by which the skill should have been achieved, or the "red flag approach". This is designed to prevent unnecessary referrals, while maximizing the positive identification of developmental delays.

2. What is the more effective and efficient way of detecting developmental delays - developmental surveillance or specific screening with a standardized tool?

How do we define these terms?
Screening: Use of a standardized tool to search for developmental delay in asymptomatic populations.
Developmental surveillance: Ongoing monitoring of development, identification of risk factors and elicitation of parental and caregiver concerns.
Case finding: Identification of developmental delay in populations that are at increased risk of developmental delays.

A recent publication by the CTFPHC recommended against screening for developmental delay using standardized tools in children aged one to four years with no apparent signs of developmental delay and whose parents and clinicians have no concerns about development.

Currently the RBR uses broad developmental surveillance. Health care providers ask parents about the acquisition of developmental milestones using a list of predefined items. These items have been selected from various developmental surveillance tools from the literature described,

above. Failure to achieve these developmental milestones suggests the need for further evaluation of development, which may involve the use of a standardized tool or a referral to a specialist.

Standardized developmental screening tools are recommended by the American Academy of Pediatrics at the 9, 18, and 24 or 30-month visit.

Enhanced surveillance is recommended by the Canadian Paediatric Society (CPS) at 18 months. This involves the use of a physician-prompt health supervision guide with evidence-informed suggestions (such as the RBR) as well as a standardized developmental screening tool. This approach is currently used in Ontario and is being considered in several provinces and territories.

We present below a list of relevant references on the subject of developmental milestone attainment in children. This list is not comprehensive as a more formal literature review is still pending.

Developmental Milestones Acquisition/Screening Resources
1. CPS—Behavioural and General Developmental Screening Tools 2. Best Start Resource Centre 3. Encyclopedia of Early Childhood Development

Developmental Milestones Acquisition/Screening References		
Reference	**Methods**	**Outcomes**

Boychuk, Z. et al & The Prompt Group**. International expert recommendations of clinical features to prompt referral for diagnostic assessment of cerebral palsy**. Development Medicine & Child Neurology. 2020. 62(1):89-96 Retreived From: https://www.ncbi.nlm.nih.gov/pubmed/31025318	**Subjects:** **Methods:** An online Delphi survey was conducted with international experts in early identification and intervention for children with CP, to validate the results obtained in two previous consensus groups with Canadian content experts and knowledge users. We sent two rounds of questionnaires by e-mail. Participants rated their agreement using a 4-point Likert scale, along with optional open-ended questions for additional feedback. Additionally, a panel of experts and knowledge-users reviewed the results of each round and determined the content of subsequent surveys.	**Clinical features to prompt referral for diagnosis (one or more of the following)** 1. The child demonstrates a hand preference before 12mo of age 2. The child demonstrates stiffness or tightness in the legs between 6–12mo of age (e.g. unable to bring their toes to mouth when having their diaper/nappy changed) 3. The child keeps their hands fisted (closed/clenched) after the age of 4mo 4. The child demonstrates a persistent head lag beyond 4mo of age 5. The child is not able to sit without support beyond 9mo of age 6. The child demonstrates consistent asymmetry of posture and movements after the age of 4mo **'Warning Sign' features to prompt monitoring rather than referral for diagnosis (either of the following)** 1. The child demonstrates a persistent startle (Moro) reflex beyond 6mo of age 2. The child demonstrates consistent toe-walking or asymmetric-walking beyond 12mo of age Referral recommendations to occur simultaneously with referral to a medical specialist for diagnosis 1. All children should be referred to a motor intervention specialist (e.g. pediatric occupational therapist and/or pediatric physical therapist) 2. If the child manifests a delay in communication they should be referred to a speech-language pathologist 3. If the child manifests hearing concerns a referral should be made to an audiologist 4. If the child manifests vision difficulties (e.g. not fixating, following, and/or tracking) a referral should be made to an optometrist or an ophthalmologist, and to a functional vision specialist (e.g. occupational therapist with expertise in pediatric vision; early childhood vision consultants)\ 5. If the child manifests feeding difficulties (e.g. poor sucking, swallowing, choking, not gaining weight) a referral should be made to a feeding specialist (e.g. occupational therapist or speech-language pathologist)

Belanger, S.A, Caron, J., **Evaluation of the child with global developmental delay and intellectual disability.** Paediatrics & Child Health. 2018; 403-410 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/29630715	**Subjects:** Children **Design:** Position Statement **Methods:** This statement provides a framework for the clinical investigation of GDD/ID in children, along with an updated protocol for Canadian physicians to follow in the etiological investigation of GDD/ID. The revised protocol is based on current knowledge and existing guidelines. Key elements of investigation include formal vision and hearing testing, chromosomal microarray, Fragile-X DNA testing and first-tier testing for treatable inborn errors of metabolism. Brain imaging is recommended in the presence of specific neurological findings	**RECOMMENDATIONS:** The following recommendations are based on evidence-based clinical practice guidelines and expert opinion. • History and physical examination are still the best first steps for establishing a diagnosis and should be systematically conducted for each child with suspected global developmental delay (GDD) and intellectual disability (ID). When a more specific diagnosis is suspected following clinical evaluation, investigation to confirm that etiology should be ordered first. • When a specific diagnosis is not suspected following clinical evaluation, consider a stepwise approach to investigation. The scope of investigation will depend on paediatric experience, the accessibility of subspecialists and the availability of resources. • To promote an evidence-based approach to evaluating children with GDD/ID, coordinating physician efforts with testing at provincial/territorial or regional referring centres is essential. • Formal vision and hearing testing is critical for all patients with suspected GDD/ID. • When no etiological diagnosis has been identified following history and physical examination, Fragile X, chromosomal microarray, Tier-1 metabolic testing, +/- brain imaging is recommended. If the diagnosis is not established, consider consultation with genetics/metabolic specialist. • Chromosomal microarray and Fragile X DNA testing are firstline investigations for children with unexplained GDD/ID. • Evidence supports Tier-1 (Table 5) testing for treatable inborn errors of metabolism (IEMs) in children with unexplained GDD/ID, even when clinical red flags are absent and a normal newborn screen has been obtained. • Brain imaging is recommended as a first-line investigation for patients with microcephaly, macrocephaly, seizures or abnormal neurological findings. For others, imaging may be postponed until first-line genetic and metabolic investigations have been performed. Consider the risks and benefits of sedation in each case. Magnetic resonance imaging (MRI) is the modality of choice. • Order lead level and iron studies for children at risk. • Whole-exome or -genome sequencing may be indicated in the clinical setting in future, when these tests are more readily available

Vitrikas, K., Savard, D., Bucaj, M. **Developmental Delay: When and How to Screen.** American Family Physician. 2017. 96(1) Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/28671370	**Subjects:** Children **Methods**: A PubMed search was completed in Clinical Queries using the key terms developmental screening, developmental delay screening, and developmental screening tools. Also searched were the Agency for Healthcare Research and Quality, the Canadian Task Force on Preventive Health, the Cochrane database, Essential Evidence Plus, the Centers for Disease Control and Prevention, and UpToDate. Search dates: October 15, 2015, and December 23, 2016.	**Clinical Recommendation:** Early intervention services should be used when a developmental delay is identified because they improve cognitive development and academic performance, and decrease engagement in risky behaviors The AAP recommends surveillance at all well-child visits, and screening for developmental delay at nine, 18, and 30 (or 24) months of age using a standardized developmental screening tool. However, the USPSTF and AAFP found insufficient evidence to assess the balance of benefits and harms of screening for autism or speech and language delays in asymptomatic young children. The USPSTF has not addressed broad developmental screening Validated screening tools should be used instead of surveillance alone to assess for developmental delay A parent-completed tool (e.g., Parents' Evaluation of Developmental Status; Ages and Stages Questionnaire, 3rd ed.) should be used initially instead of a directly administered tool when screening for developmental delay

Cairney J, Clinton J, Veldhuizen S, Rodriguez C, Missiuna C, Wade T, Szatmari P, Kertoy M. **Evaluation of the revised Nipissing District Developmental Screening (NDDS) tool for use in general population samples of infants and children.** BMC Pediatrics**.** 2016. 12(42) Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/26983782	**Subjects:** parent–child pairs **Method**: 812 children and their families were recruited from the community. Parents (most often mothers) completed the NDDS. A sub-sample (n=111) of parents completed the NDDS again within a two-week period to assess test-retest reliability. For children 3 or younger, the criterion measure was the Bayley Scales of Infant Development, 3rd edition; for older children, a battery of other measures was used. All criterion measures were administered by trained assessors. Mild and severe delays were identified based on both published cut-points and on the distribution of raw scores. Sensitivity, specificity, positive and negative	**Conclusions** The modest test-retest reliability and generally poor agreement with criterion measures leads us to conclude that the NDDS should not be used on its own for the purposes of screening in 1 month to 6 year old children. At the same time, it is important to consider that reference instruments are themselves imperfect. Development is continuous and complex, and, except for clear cases of severe delay, it may be very difficult to construct an instrument relying solely on parental report that will accurately identify children who would benefit from an intervention. Longitudinal data, which make it possible to compare a screen with later health and development, may offer the best prospects in this regard.

	predictive values were calculated to assess agreement between tests.	
Council on Early Childhood, Council on School Health. **The Pediatrician's Role in Optimizing School Readiness.** PEDIATRICS 2016. 138 (3) Available from: https://www.ncbi.nlm.nih.gov/pubmed/27573085	**Subjects:** Children and Pediatricians **Design:** Policy Statement	**CONCLUSIONS** In summary, the concept of school readiness encompasses the entirety of a child's physical, cognitive, and social-emotional attributes, which serve as the foundation for early brain development and learning. A team effort among families, the medical home, child care/early intervention, schools, and communities provides the experiences, relationships, and interactions that shape the learning process and serve as building blocks for later success in school and in life. Pediatricians, in their role as medical home providers, have the opportunity to substantially influence school readiness. Not only do pediatricians address physical health concerns, but they also are uniquely suited to address developmental and behavioral health concerns of the child and family and to promote healthy relationships and interactions that encourage future resilience. Beyond the influence that pediatricians have on individual families, they can lend their voices as advocates for appropriate mental health, early education, and child care; basic health care services; and safe, healthy living conditions for children and families.
Canadian Task Force on Preventive Health Care. Tonelli, M., Parkin, P., Leduc, D., Brauer, P., Pottie, K., Garcia, A. J., ... & Thombs, B. D. (2016).	Systematic review involved search for evidence from RCTs and controlled cohort studies on benefits/harms if screening for developmental delay in	This guideline replaces the task force's 1994 guidance on well-baby care in the first two years of life and on preschool screening for developmental problems Outcomes: cognitive function, academic performance; incidence of mental health conditions; overall quality of life; survival; functionality as an adult; and improvements in gross and fine motor skills, language, adaptive functioning, and cognition and performance (for domain-specific delays).

Recommendations on screening for developmental delay. *Canadian Medical Association Journal*, cmaj-151437. Available from: CMAJ.	children aged 1-4 years without recognized signs of developmental delay and whose parents and clinicians have not raised specific concerns. Also RCTs on benefits/harms of treating developmental delay and studies on accuracy of screening tests.	• **Recommendation:** The CTFPHC recommends against screening for developmental delay using standardized tools in children aged one to four years with no apparent signs of developmental delay and whose parents and clinicians have no concerns about development (strong recommendation; low quality evidence). ➢ This recommendation does not apply to children who present with signs, symptoms or parental concern that could indicate developmental delay or whose development is being closely monitored because of identified risk factors, such as premature birth or low birth weight ➢ The systematic review did not find any evidence from RCTs or controlled cohort studies to show that screening for developmental delay in children aged one to four years with no known developmental concerns improved health outcomes. • In summary, there was no evidence from controlled studies that population-based screening improves health outcomes for children with developmental delay. • In the judgment of the task force, the lack of RCT evidence demonstrating any clinical benefits associated with screening for developmental delay and the relatively poor diagnostic properties of available screening tests warrant a strong recommendation against population-based screening. • **Implementation:** ➢ Clinicians should perform developmental surveillance on an ongoing basis and consider the possibility of developmental delay in children with signs that may suggest a delay in a developmental domain, as well as in those whose parents, caregivers or clinicians have concerns about development and those with important risk factors. ➢ Clinicians should remain alert for any social, economic or environmental factors (such as lower maternal education level, mental illness, neglect or maltreatment, poverty and English as a second language) that might reduce the likelihood of parents to raise concerns about their child's development. ➢ Among children in whom developmental delay is suspected, clinicians should consider further assessment (or specialist evaluation) as clinically indicated. Although the task force does not recommend routine screening for developmental delay using a standardized tool in children without developmental concerns at these visits, the 18-month visit is an important

		opportunity for practitioners to discuss development with parents and to identify any abnormalities in the developmental trajectory, through a careful evaluation of the child's achievement of developmental milestones ➢ Detailed systematic review available from: CMAJ Open.
Thomas RE, Spragins W, Mazloum G, Cronkhite M, Maru G. **Rates of detection of developmental problems at the 18-month well-baby visit by family physicians' using four evidence-based screening tools compared to usual care: a randomized controlled trial.** Child: Care, Health and Development. 2016. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/26983782	**Subjects:** 18 month old infants **Design:** Randomized Control Trial **Methods:** We reviewed screening forms which use parental input to assess child development (Table 1) and parental input to assess behavioral and emotional concerns (Table 2). We needed forms that were short enough to be used in busy family physicians' offices yet had high sensitivities and specificities. We chose the PEDS, PEDS-DM, M-CHAT and PHQ9 (to measure maternal depression).	**Key messages** • Detection rates of developmental problems at the 18-month well-baby visit by family physicians' using four evidencebased screening tools are much higher than with 'usual care.' • Mothers offered the opportunity to state in open text concerns about 10 developmental domains were enabled to identify many more concerns. • Four evidence based tools (the Parents Evaluation of Developmental Status (PEDS), the PEDS-Developmental Milestones (PEDS-DM), the Modified Checklist for Autism in Toddlers (M-CHAT) and PHQ9 (maternal depression)) can be answered on a computer by parents within 10min before their child's appointment. • Although many more problems were identified using evidence-based tools, the family physicians after discussion with the parents overrode the screening tools and identified few children in each group who needed follow-up within 3months. • Possible solutions are (1) to improve the quality of information obtained from the screening process by training, (2) improved training of physicians in understanding evidence-based screening tools, (3) qualitative studies on how physicians understand evidence-based screens, and the discussion between physicians and patients about which problems have been identified and need referral, (4) improved support for individual practices and (5) acceptance by the regional health authority for overall responsibility for screening and creation of a comprehensive network.

Siu, A. L. (2015). **Screening for speech and language delay and disorders in children aged 5 years or younger: US Preventive Services Task Force Recommendation Statement**. *Pediatrics*, *136*(2), e474-e481. Available from: Pediatrics.		• This recommendation replaces the 2006 USPSTF recommendation on screening for speech and language delay in preschool-aged children. • Population: This recommendation applies to asymptomatic children aged 5 years or younger whose parents or clinicians do not have specific concerns about their speech, language, hearing, or development. • **Recommendation:** The current recommendation is consistent with the previous recommendation, which concluded that the evidence on the routine use of brief, formal screening instruments in primary care settings to detect speech and language delay in children aged 5 years or younger is insufficient (I statement) • **Conclusion:** Several screening tools can accurately identify children for diagnostic evaluations and interventions, but evidence is inadequate regarding applicability in primary care settings. Some treatments for young children identified with speech and language delays and disorders may be effective.
Madhavi Moharir M, Barnett N, Taras J, Cole M, Ford-Jones EL, Levin L. (2014) **Speech and language support: How physicians can identify and treat speech and language delays in the office setting.** *Paediatr Child Health.* 2014;19(1):13-18. Available from: https://academic.oup.com/pch/article/19/1/13/2647148		Abstract: Failure to recognize and intervene early in speech and language delays can lead to multifaceted and potentially severe consequences for early child development and later literacy skills. While routine evaluations of speech and language during well-child visits are recommended, there is no standardized (office) approach to facilitate this. Furthermore, extensive wait times for speech and language pathology consultation represent valuable lost time for the child and family. Using speech and language expertise, and paediatric collaboration, key content for an office-based tool was developed. The tool aimed to help physicians achieve three main goals: early and accurate identification of speech and language delays as well as children at risk for literacy challenges; appropriate referral to speech and language services when required; and teaching and, thus, empowering parents to create rich and responsive language environments at home. Using this tool, in combination with the Canadian Paediatric Society's Read, Speak, Sing and Grow Literacy Initiative, physicians will be better positioned to offer practical strategies to caregivers to enhance children's speech and language capabilities. The tool represents a strategy to evaluate speech and language delays. It depicts age-specific linguistic/phonetic milestones and suggests interventions. The tool represents a practical interim treatment while the family is waiting for formal speech and language therapy consultation.

Glascoe, F. P., & Trimm, F. (2014). **Brief approaches to developmental-behavioral promotion in primary care: updates on methods and technology. https://doi.org/10.1542/peds.2013-1859.. Available from** Pediatrics.	**Subjects:** Children **Design:** Review **Methods:** A total of 239 articles and 52 Web sites on parent/patient education were reviewed for this study.	Outlines communication skills, instructional methods, and resource options that enable clinicians to best assist families with developmental-behavioural promotion Discuss methods clinicians can use across well-baby visits: facilitating parent-provider communication and creating "teachable moments;" methods in parent/patient education (verbal advice, written info, etc); multimedia methods for parent education (videos, interactive tech, etc.) 6 tables—Overall goals for dev-beh promotion across well visits (table 1); facilitating parent-provider collaboration and defining "teachable moment" (table 2); methods for improving recall of spoken directives (table 3); effective use of written info (table 4), developmental-behavioural promotion resources for professionals (table 5); developmental-behavioural promotion resources for parents and patients (table 6)
Oberklaid F, Baird G, Blair M, Melhuish E, Hall D.	**Subjects:** Children **Design:** Narrative review	The general findings of this review suggest an association between developmental vulnerability at school entry and a well-documented series of parent and family risk

Children's health and development: approaches to early identification and intervention. Arch Dis Child. 2013 Aug 22. Abstract available from PubMed	**Methods:** The authors summarize the evidence in support of a more broad-based and multidisciplinary approach to causation prevention, early identification for development problems. The authors also discuss interventions to improve development outcomes and how these might be implemented follows.	factors, often linked to social disadvantage. The authors note that strategies that are likely to make a difference to these children and improve outcomes include family support, high-quality early education and care programs in the preschool years, and early detection of emerging problems and risk factors. Further, the authors found evidence that suggests that these services and programs are best delivered within a framework of progressive universalism—a universal basket of services for all children and families, with additional support commensurate with additional needs.
Guevara JP, Gerdes M, Localio R, Huang YV, Pinto-Martin J, Minkovitz CS, Hsu D, Kyriakou L, Baglivo S, Kavanagh J, Pati S. **Effectiveness of developmental screening in an urban setting.** Pediatrics. 2013 Jan;131(1):30-7. Abstract available from Pubmed	**Subjects:** Children < 30 months old **Design:** Randomized controlled trial (n=2,103) **Methods:** The trial aimed to determine the effectiveness of developmental screening on the identification of developmental delays, early intervention (EI) referrals, and EI eligibility. Children without congenital malformations or genetic syndromes, not in foster care, and not enrolled in EI were eligible. Children were randomized to receive 1 of the following: (1) developmental screening using Ages and Stages Questionnaire-II (ASQ-II and	Most enrolled children were African-American with family incomes less than $30,000. Children in either screening arm were more likely to be identified with delays (23.0% and 26.8% vs 13.0%; P < .001), referred to EI (19.9% and 17.5% vs 10.2%; P < .001), and eligible for EI services (7.0% and 5.3% vs 3.0%; P < .001) than children in the surveillance arm. Children in the screening arms incurred a shorter time to identification, EI referral, and EI evaluation than children in the surveillance arm. **Conclusion:** Children who participated in a developmental screening program were more likely to be identified with developmental delays, referred to EI, and eligible for EI services in a timelier fashion than children who received surveillance alone.

	Modified Checklist for Autism in Toddlers (M-CHAT) with office staff assistance, (2) developmental screening using ASQ-II and M-CHAT without office staff assistance, or (3) developmental surveillance using age-appropriate milestones at well visits. Outcomes were assessed using an intention-to-treat analysis.	
Bellman M, Byrne O, Sege R. **Developmental assessment of children.** BMJ 2013;346:e8687.	**Subjects:** Children **Design:** Clinical review **Methods:** This article reviews the literature on the assessment of child development. It aims to highlight what normal developmental parameters are, when and how to assess a child, and when to refer for specialist assessment.	Growth and development of the brain and central nervous system is divided into four domains: gross and fine motor skills, speech and language, social and personal and activities of daily living, and performance and cognition. The review attempts to answer clinically relevant questions on development. These include topics like normal development, developmental delay, developmental problems, assessment, and tools for assessing development. The authors summarize their findings as follows: 1) every consultation is an opportunity to ask flexible questions about a child's development as part of comprehensive medical care; 2) parents who voice concerns about their child's development are usually right; 3) loss of previously acquired skills (regression) is a red flag and should prompt rapid referral for detailed assessment and investigation; 4) parents and caregivers are usually more aware of norms for gross motor milestones, such as walking independently, than for milestones and patterns of normal speech, language acquisition, and play skills; consider targeted questioning; 5) consider use of developmental screening questionnaires and measurement tools to supplement clinical judgment.
Dosman CF, Andrews D, Goulden KJ. **Evidence-based milestone ages as a**	**Subjects:** Children birth to 5 years **Design:** Narrative review	'Red flags' developmental milestones are presented with the associated levels of evidence. Developmental sector headings include the following: gross motor, fine motor, speech-language, cognitive and social-emotional.

framework for developmental surveillance. Paediatrics and Child Health. 2012;17(10):561-568. Available from Pulsus	**Methods:** The authors present a five-sector milestone framework with upper limits, referenced to the best available level of evidence.	
Marks KP, LaRosa AC. **Understanding developmental-behavioral screening measures.** Pediatr Rev. 2012 Oct;33(10):448-57; quiz 457-8. Reference available at PubMed	**Subjects:** Young children **Design:** Narrative review **Methods:** None reported	This article is an overview of the considerations and recommendations regarding developmental and behavioral screening measures. The authors offer summary points: 1) Although development and behavior are more complex than most anthropomorphic functions that are measured in clinical practice, they are quantifiable, even when applied to a busy primary care setting. 2) Informal approaches to eliciting concerns or measuring milestones, such as yes/no checklists extrapolated from lengthier measures, surely contribute to low detection rates of developmental-behavioral problems discerned by primary care providers. 3) The periodic use of screening tools that better adhere to core psychometric and feasibility standards (eg, Ages & Stages Questionnaire, Third Edition [ASQ-3], Parents' Evaluation of Developmental Status [PEDS] and/or Parents' Evaluation of Developmental Status–Developmental Milestones [PEDS:DM], Ages & Stages Questionnaire: Social-Emotional, Pediatric Symptom Checklist) helps practitioners to optimize their early identification rates for children who have developmental-behavioral problems, which leads to more effectively and efficiently enrolling greater numbers in early intervention (EI), early childhood special education (ECSE), and other beneficial community services. 4) Nevertheless, to achieve a screening tool's reported reliability and accuracy, it is essential that the tool be administered and interpreted thoughtfully as described in its user's manual or official Web site. 5) Careful attention to proper implementation and interpretation also leads to a more collaborative conversation between parents and practitioners. 6) When screening results are concerning, proper implementation and same-day interpretation ensure that referrals occur in a 1) safe, 2) equitable, 3) effective, 4) timely, 5) parent- and patient-centered, and 6) efficient manner, fulfilling the six quality aims of the Institute of Medicine. 7) If a practice has failed to implement the periodic use of evidence-based screening measures successfully, then the clinicians should strongly consider selecting some broad-band developmental, social-emotional/behavioral, and autism-specific screening tools for the practice.

Currie L, Dodds L, Shea S, Flowerdew G, McLean J, Walker R, Vincer M. **Investigation of test characteristics of two screening tools in comparison with a gold standard assessment to detect developmental delay at 36 months: A pilot study.** Paediatr Child Health. 2012 Dec;17(10):549-52. Available from Paediatrics and Child Health	**Subjects:** 3-year olds **Design:** Cross-sectional **Methods:** The goal was to determine the test characteristics of the Rourke and NDDS compared with the Bayley Scales of Infant and Toddler Development III for detecting developmental delay in high-risk children. Three-year-olds were recruited from the IWK Health Centre (Halifax, Nova Scotia). Two cut-points were evaluated (one and two or more areas of concern) from the Rourke and NDDS, and were compared with a score of ≤85 on the Bayley Scales of Infant and Toddler Development III.	The majority (67.7%) of the 31 participants reported no concern. At one area of concern, sensitivity was 75% for both the Rourke and NDDS. When two areas of concern were noted, specificity was 93% for the Rourke and 96% for NDDS.
R Williams, J Clinton; Canadian Paediatric Society, Early Years Task Force. **Getting it right at 18 months: In support of an enhanced well-baby visit.** Paediatr Child Health 2011;16(10):647-50. Available from CPS	**Subjects:** 18-month olds **Design:** Position Statement **Methods:** This statement demonstrates the need for measuring/monitoring key indicators of early childhood health and well-being. It offers specific recommendations to physicians, governments and organizations for a universally established and	See Position Statement for specific recommendations.

	supported assessment of every Canadian child's developmental health at 18 months.	
C Hertzman, J Clinton, A Lynk; Canadian Paediatric Society, Early Years Task Force. **Measuring in support of early childhood development.** Paediatr Child Health 2011;16(10):655-7. Available from CPS	**Subjects:** young children **Design:** Position Statement **Methods:** The statement explores the objectives for collecting quality information about early child development, its determinants and long-term outcomes. It also examines four approaches to collecting population-based, person-specific and longitudinal data, both in young children and later in life. A key outcome of monitoring development is timely intervention. Linking individual data to the home and community levels is a critical step, so that communities and governments can monitor and take actions that support early child development.	See Position Statement for specific recommendations.

Radecki L, -Loud N, O'Connor KG, Sharp S, Olson LM. **Trends in the use of standardized tools for developmental**	**Subjects:** Paediatricians **Design:** Survey **Methods:** The goal of this study was to compare paediatricians' use of	Paediatricians' use of standardized screening tools increased significantly between 2002 and 2009. The percentage of those who self-reported always/almost always using ≥1 screening tools increased over time (23.0%-47.7%), as did use of specific instruments (eg, Ages & Stages Questionnaire, Parents' Evaluation of Developmental Status). No differences were noted on the basis of physician or practice characteristics.

screening in early childhood: 2002-2009. Pediatrics. 2011 Jul;128(1):14-9. Available from Pediatrics	standardized screening tools from 2002 to 2009. A national, random sample of nonretired US AAP members were mailed Periodic Surveys (2002: N=1617, response rate: 55%; 2009: N=1620, response rate: 57%). χ(2) analyses were used to examine responses across survey years; a multivariate logistic regression model was developed to compare differences in using ≥1 formal screening tools across survey years while controlling for various individual and practice characteristics.	
Sheldrick RC, Merchant S, Perrin EC. **Identification of developmental-behavioral problems in primary care: a systematic review.** Pediatrics. 2011 Aug;128(2):356-63. Available from Pediatrics	**Subjects:** Children **Design:** Systematic review **Methods:** Authors searched Medline to identify studies that (1) were conducted in the United States, (2) were published in peer-reviewed journals, (3) included data that addressed pediatric care providers' identification of developmental-behavioral problems in individual patients, (4) included an independent assessment of	Sensitivities for pediatric care providers ranged from 14% to 54%, and specificities ranged from 69% to 100%. The authors of 1 outlier study reported a sensitivity of 85% and a specificity of 61%.

	patients' developmental-behavioral problems, such as diagnostic interviews or validated screening instruments, and (5) reported data sufficient to calculate sensitivity and specificity. Eleven articles met these criteria.	
Bethell C, Reuland C, Schor E, Abrahms M, Halfon N. **Rates of parent-centered developmental screening: disparities and links to services access.** Pediatrics. 2011 Jul;128(1):146-55. Available from Pediatrics	**Subjects:** Children 10 to 71 months old **Design:** Cross-sectional analysis of the 2007 National Survey of Children's Health (US) **Methods:** The objective was to assess the national and state prevalence of standardized, parent-completed developmental screening (DS-PC) in the previous 12 months and evaluate associations between screening and receipt of an early-intervention plan or mental health services for children at higher risk.	Across the United States, 19.5% of children received a DS-PC in the previous 12 months, although the figure varied from 10.7% to 47% across the United States. Prevalence did not rise above 26.7% for any socioeconomic subgroup of children and was highest for younger, black, and publicly insured children and lowest for uninsured children and children with gaps in insurance coverage. Equally high-risk children varied twofold in their probability of receiving early intervention or needed mental health services according to whether they had received a DS-PC.
Three-part series in *Pediatrics in Review:* 1. Gerber RJ, Wilks T, Erdie-Lalena C. **Development Milestones: Motor**	**Subjects:** Children **Design:** Narrative review **Methods:** None reported.	These three articles provide information on developmental milestones. The specific objectives of each are shown below. 1. Motor development: 1. Identify the milestones for gross and fine motor development. 2. Recognize the child whose development falls outside of the expected range. 3. Describe the sequences involved in gross and fine motor development.

Development. Pediatrics in Review. 2010; 31:267-277. 2. Wilks T, Gerber RJ, Erdie-Lalena C. **Development Milestones: Cognitive Development.** Pediatrics in Review. 2010;31:364-367. 3. Gerber RJ, et al. **Developmental Milestones 3: Social-Emotional Development.** Pediatrics in Review 2011;32:533-536.		2. Cognitive development: 1. List the foundational aspects of cognitive development. 2. Characterize object permanence, causality, and symbolic thinking. 3. Discuss the steps of problem-solving development. 4. Describe methods of assessing language development. 5. Review language milestones. 3. Social-emotional development: 1. Know the sequence through which social abilities develop in the infant and young child. 2. Understand the concept of joint attention. 3. Be aware of the ways in which infants and young children mature in their emotional development. 4. Recognize when a child is not achieving the appropriate social or emotional milestones and requires further evaluation.
King TM, Tandon SD, Macias MM, Healy JA, Duncan PM, Swigonski NL, Skipper SM, Lipkin PH. **Implementing developmental screening and referrals: lessons learned from a national project.** Pediatrics. 2010 Feb;125(2):350-60. Available from Pediatrics	**Subjects:** Pediatric practices **Design:** Cross-sectional study **Methods:** The objective was to assess the degree to which a national sample of pediatric practices could implement American Academy of Pediatrics (AAP) recommendations for developmental screening and referrals, and to identify factors that contributed to the successes and shortcomings of these efforts. The authors used quantitative data from chart reviews to calculate rates of screening and referral. Qualitative data on practices'	Nearly all practices selected parent-completed screening instruments. Instrument selection was frequently driven by concerns regarding clinic flow. At the project's conclusion, practices reported screening more than 85% of patients presenting at recommended screening ages. They achieved this by dividing responsibilities among staff and actively monitoring implementation. Despite these efforts, many practices struggled during busy periods and times of staff turnover. Most practices were unable or unwilling to adhere to 3 specific AAP recommendations: to implement a 30-month visit; to administer a screen after surveillance suggested concern; and to submit simultaneous referrals both to medical subspecialists and local early-intervention programs. Overall, practices reported referring only 61% of children with failed screens. Many practices also struggled to track their referrals. Those that did found that many families did not follow through with recommended referrals.

	implementation efforts were collected through semi-structured telephone interviews and inductively analyzed to generate key themes.	
Sices L, Stancin T, Kirchner L, Bauchner H. **PEDS and ASQ developmental screening tests may not identify the same children.** Pediatrics. 2009 Oct;124(4):e640-7. Available from Pediatrics	**Subjects:** Children and parents **Design:** Cross-sectional study **Methods:** The objective of this study was to describe the agreement between two developmental screening tools (Parents' Evaluation of Developmental Status [PEDS; parent concern questionnaire] and Ages & Stages Questionnaires [ASQ; parent report of developmental skills]) delivered to children at the same visit in primary care. Parents of 60 children aged 9 to 31 months completed PEDS and ASQ screens at the same visit. Concordance (PEDS and ASQ results agree) and discordance (results differ) for the 2 screens were determined.	The mean age of children was 17.6 months, 77% received Medicaid, and 50% of parents had a high school education or less. Overall, 37% failed the PEDS and 27% failed the ASQ. Thirty-one children passed (52%) both screens; 9 (15%) failed both; and 20 (33%) failed 1 but not the other (13 PEDS and 7 ASQ). Agreement between the 2 screening tests was only fair, statistically no different from agreement by chance. **Conclusion:** There was substantial discordance between PEDS and ASQ developmental screens. The choice of screening instrument may affect which children are likely to be identified for additional evaluation.

5.1 AUTISM SPECTRUM DISORDER (ASD)

Autism Spectrum Disorder (ASD) Recommendations	Strength of Recommendation
1. Specific screening for ASD at 18-24 months should be performed on all children with any of the following risk factors: failed items on the social/emotional/communication skills inquiry, sibling with autism, or developmental concern by parent, caregiver, or physician.	Consensus
2. Increased prevalence for ASD is also associated with prematurity, and certain chromosomal, genetic and neurological disorders. Standardized, evidence-based screening tools for detection of early ASD symptoms should be used as per guidelines	Consensus

Autism Spectrum Disorder (ASD) Resources
1. **ASD(CPS) Early Detection, Diagnostic Assessment, Management** 2. **M-CHAT**

Autism Spectrum Disorder (ASD) References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Siu, A. L., Bibbins-Domingo, K., Grossman, D. C., Baumann, L. C., Davidson, K. W., Ebell, M., ... & Krist, A. H. (2016). Screening for autism spectrum disorder in young children: US	**Subjects:** Children 18-30 months who have not been diagnosed with ASD or developmental delay and for whom no concerns have been raised by parents, other caregivers,	**Recommendation:** The USPSTF concludes that the current evidence is insufficient to assess the balance of benefits and harms of screening for ASD in young children for whom no concerns of ASD have been raised by their parents or a clinician.		

Preventive Services Task Force Recommendation Statement. JAMA, 315(7), 691-696. Available from: JAMA.	or health care professionals **Design:** USPSTF recommendation statement **Methods:** The USPSTF reviewed the evidence on the accuracy, benefits, and potential harms of brief, formal screening instruments for ASD administered during routine primary care visits and the benefits and potential harms of early behavioral treatment for young children identified with ASD through screening.			

Chlebowski, C., Robins, D. L., Barton, M. L., & Fein, D. (2013). Large-scale use of the modified checklist for autism in low-risk toddlers. *Pediatrics*, *131*(4), e1121-e1127. Available from: Pediatrics.	**Subjects:** Toddlers **Design:** Screening study **Methods:** The M-CHAT and the M-CHAT Follow-Up (M-CHAT/F) were used to screen 18 989 toddlers at pediatric well-child visits in 2 US geographic regions. Pediatricians directly referred children to ascertain potential missed screening cases. Screen-positive children received the M-CHAT/F; children who continued to screen positive after the M-CHAT/F received a diagnostic evaluation	Results indicate that 54% of children who screened positive on the M-CHAT and MCHAT/F presented with an ASD, and 98% presented with clinically significant developmental concerns warranting intervention. **Conclusion:** This study provides empirical support for the utility of population screening for ASD with the use of the M-CHAT in a primary care setting. Results suggest that the M-CHAT continues to be an effective screening instrument for ASD when the 2-step screening process is used.		
Anagnostou, E., Zwaigenbaum, L., Szatmari, P., Fombonne, E., Fernandez, B. A., Woodbury-Smith, M., ... & Buchanan, J. A. (2014). Autism spectrum disorder: advances in evidence-based practice. Canadian Medical	**Subjects:** Children **Design:** Review **Methods:** This review outlined the current understanding of ASD and suggests best practices for primary care and specialized clinics based on evidence from randomized	This review covered causes of autism, how ASD is diagnosed, recommended clinical workup for ASD, how to detect ASD early including red flags for autism in 12-18 month old children, comorbidities that characterize ASD, treatments and interventions available and whether they're effective.		

Association Journal, 186(7), 509-519. Available from: CMAJ.	controlled trials or systematic reviews			
Al-Qabandi M, Willem Gorter J, Rosenbaum P. **Early Autism Detection: Are we ready for routine screening?** Pediatrics 2011; 128:e211. Available from: http://pediatrics.aappublications.org/content/early/2011/06/08/peds.2010-1881.full.pdf+html	**Subjects:** Children **Design:** Review **Methods:** Reviewed the literature to assess the effectiveness of community screening programs for autism	This article reviewed the appropriateness, feasibility, and value of a screening program for autism. In particular, the authors examined the effectiveness of screening programs in RCTs, efficacy of prevention and treatments, burden of disease, availability of good screening tests, ability of health systems to screen a large population and to handle the consequences of test results, and parents'/childrens' compliance with interventions. Good screening tools and efficacious treatments are lacking. There is a lack of evidence to support the implementation of a population-based screening program for autism.	III	
Johnson CP, Myers SM; American Academy of Pediatrics Council on Children With Disabilities. **Identification and evaluation of children with autism spectrum disorders.** Pediatrics. 2007 Nov;120(5):1183-215. Abstract available from: PubMed	**Subjects:** Children with ASD **Design**: clinical report **Methods:** This report addresses background information, including definition, history, epidemiology, diagnostic criteria, early signs, neuropathologic aspects, and etiologic possibilities in autism spectrum disorders. In addition, this report provides an algorithm to help the pediatrician develop a strategy for early identification of children with autism spectrum disorders.	On surveillance and screening: early identification of ASDs is important, because it allows early intervention, etiologic investigation, and counselling regarding recurrence risk. Developmental surveillance should occur at every preventive visit throughout childhood and includes the following components: eliciting and attending to the parents' concerns; maintaining a developmental history; making accurate and informed observations of the child; identifying the presence of risk and protective factors; and documenting the process and findings. Screening with a standardized developmental tool should be performed whenever concerns are raised through the ongoing surveillance process. **Recommendation:** The AAP also recommends that all children be screened with a standardized developmental tool at specific intervals (ie, at the 9-, 18-, and 24- or 30-month visits) regardless of whether a concern has been raised or a risk has been identified during the surveillance process. Surveillance and screening algorithm for ASDs is available at http://pediatrics.aappublications.org/content/120/5/1183/F1.expansion.html.	III B	C

NICE Guideline. **Autism spectrum disorder in under 19s: Autism spectrum disorder in under 19s: recognition, referral and diagnosis.** National Institute for Health and Care Excellence. 2011. Retrieved from: https://www.nice.org.uk/Guidance/CG128	**Subjects:** children and young people from birth up to 19 years **Design:** Guideline This guideline covers recognising and diagnosing autism spectrum disorder in children and young people from birth up to 19 years. It also covers referral. It aims to improve the experience of children, young people and those who care for them.	For specific recommendations see Guideline.		
Baduel S, Guillon Q, Afzali MH, Foudon N, Kruck J, Rogé B. **The French Version of the Modified-Checklist for Autism in Toddlers (M-CHAT): A Validation Study on a French Sample of 24 Month-Old Children.** J Autism Dev Disord. 2017. 47:297-304. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/27817161	**Subjects:** Children **Methods:** This study included a low-risk sample of 1227 children. A total of 20 children screened positive on the M-CHAT. Twelve out of 20 of these children received a diagnosis of ASD at 36 months, yielding a PPV of 0.60. These results add to the evidence that the M-CHAT is a useful screening instrument and further	**Conclusion** This study is the first to validate an ASD-specific screening instrument, the M-CHAT, for young children in France, providing French practitioners with guidelines regarding its use in primary care setting. When used in a general low risk population, our results add to the evidence that the M-CHAT alone is not recommended. The FUI should systematically be administered to children who initially screen negative. With this 2-step screening procedure, the M-CHAT is an effective and useful screening instrument that correctly identifies the majority of children with ASD. The M-CHAT has the potential to facilitate early screening of ASD in primary care settings. However, our results also suggest that further studies are needed to investigate the feasibility and acceptability of the M-CHAT in clinical practice in order to identify factors that would encourage ASD screening. Ultimately, this would help guide	C	

	demonstrates the importance of the follow-up interview in primary care settings.	appropriate political decisions regarding the implementation of ASD screening in France.		
Yuen T1, Penner M1, Carter MT, Szatmari P, Ungar WJ. **Assessing the accuracy of the Modified Checklist for Autism in Toddlers: a systematic review and meta-analysis.** Developmental Medicine & Child Neurology. 2018. 60(11); 1093-1100 Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/29992541	**Subjects:** Children **Design:** Systematic Review **Methods**: Four electronic databases (MEDLINE, PsycINFO, CINAHL, and Embase) were searched to identify articles published between January 2001 and May 2016. Bayesian regression models pooled study-specific measures. Meta-regressions covariates were age at screening, study design, and proportion of males.	**CONCLUSION** This meta-analysis provided quantitative evidence that the M-CHAT performs with moderate sensitivity and low specificity in children with developmental concerns. Although the intended use of the M-CHAT coincides with universal screening at 18 months and 24 months, there was a lack of evidence on its accuracy in low-risk children or at age 18 months. Identified heterogeneity in accuracy measures emphasizes that clinicians should account for a child's age and presence of developmental concern when interpreting their M-CHAT score. Validation studies with methodological rigor both in low- and high-risk children are needed before the M-CHAT can be recommended for use on a population-level.		
Zwaigenbauum L., et al. Early Identification of Autism Spectrum Disorder: Recommendations for Practice and Research. Pediatrics. 2015. 136(S1):S10-40. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/26430168	**Subjects:** Children **Design:** Review **Methods:** an updated review of the state of the science of early identification of ASD was needed to inform best practice. These issues were the focus of a multidisciplinary panel of clinical	Statement 1: Evidence indicates substantial heterogeneity in the presentation and natural history of clinical features associated with ASDs. This heterogeneity has ramifications for the interpretation of research literature as well as for clinical practice. Statement 2: There is evidence that reduced levels of social attention and social communication, as well as increased repetitive behavior with objects, are early markers of ASD between 12 and 24 months of age. Additional potential markers include abnormal body movements and temperament dysregulation.		

	practitioners and researchers who completed a literature review and reached consensus on current evidence addressing the question "What are the earliest signs and symptoms of ASD in children aged #24 months that can be used for early identification?" Summary statements address current knowledge on early signs of ASD, potential contributions and limitations of prospective research with high-risk infants, and priorities for promoting the incorporation of this knowledge into clinical practice and future research	Statement 3: Reliable behavioral markers for ASD in children aged ,12 months have not yet been consistently identified Statement 4: Developmental trajectories may also serve as risk indicators of ASD Statement 5: Caution should be exercised in drawing conclusions about early risk markers of ASD from studies that do not include individual-level outcome data. Statement 6: Caution should be exercised in generalizing findings from studies of high-risk infants.		

6.0 PHYSICAL EXAMINATION

6.1 JAUNDICE

Jaundice Recommendation	Strength of Recommendation
Jaundice: Bilirubin testing (total and conjugated) if persists beyond 2 wks of age.	*Fair*

Jaundice References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Wang KS, THE SECTION ON SURGERY, THE COMMITTEE ON FETUS AND NEWBORN and THE CHILDHOOD LIVER DISEASE RESEARCH NETWORK. Newborn screening for biliary atresia. Pediatrics 2015, 136 (6) e1663-e1669; DOI: https://doi.org/10.1542/peds.2015-3570		Abstract: Biliary atresia is the most common cause of pediatric end-stage liver disease and the leading indication for pediatric liver transplantation. Affected infants exhibit evidence of biliary obstruction within the first few weeks after birth. Early diagnosis and successful surgical drainage of bile are associated with greater survival with the child's native liver. Unfortunately, because noncholestatic jaundice is extremely common in early infancy, it is difficult to identify the rare infant with cholestatic jaundice who has biliary atresia. Hence, the need for timely diagnosis of this disease warrants a discussion of the feasibility of screening for biliary atresia to improve outcomes. Herein, newborn screening for biliary atresia in the United States is assessed by using criteria established by the Discretionary Advisory Committee on Heritable Disorders in Newborns and Children. Published analyses indicate that newborn screening for biliary atresia by using serum bilirubin concentrations or stool color cards is potentially life-saving and cost-effective. Further studies are necessary to evaluate the feasibility, effectiveness, and costs of potential screening strategies for early identification of biliary atresia in the United States.		

Newman, J. **Guidelines for detection, management and prevention of hyperbilirubinemia in term and late preterm newborn infants.** Paediatr Child Health. 2007; 12(5): 401-7. Reaffirmed: February 1 2016.	**Subjects:** Children **Design**: CPS Position statement **Methods:** A MEDLINE and the Cochrane library search was carried out and updated in January 2007 with the aim of developing guidelines for the prediction, prevention, identification, monitoring and treatment of severe hyperbilirubinemia	Severe hyperbilirubinemia in relatively healthy term or late preterm newborns (greater than 35 weeks' gestation) continues to carry the potential for causing long-term neurological impairment. Careful assessment of the risk factors involved, a systematic approach to the detection and follow-up of jaundice with the appropriate laboratory investigations, along with phototherapy and exchange transfusion when indicated, are all essential to avoid these complications. The CPS provides the following recommendations for reducing the risk of severe hyperbilirubinemia: • A program for breastfeeding support should be instituted in every facility where babies are delivered. • Routine supplementation of breastfed infants with water or dextrose water is not recommended • Infants with a positive direct antiglobulin test (DAT) who have predicted severe disease based on antenatal investigation or an elevated risk of progressing to exchange transfusion based on the postnatal progression of TSB concentration should receive IVIG at a dose of 1 g/kg. • A TSB concentration consistent with increased risk should lead to enhanced surveillance for development of severe hyperbilirubinemia, with follow-up within 24 h to 48 h, either in hospital or in the community, and repeat estimation of TSB or TcB concentration in most circumstances. • Intensive phototherapy should be given according to the guidelines provided in Figure 2.		D B A C D D A

		• Conventional phototherapy is an option at TSB concentrations 35 µmol/L to 50 µmol/L lower than the guidelines. • Breastfeeding should be continued during phototherapy. • Supplemental fluids should be administered, orally or by intravenous infusion, in infants receiving phototherapy who are at an elevated risk of progressing to exchange transfusion. For further recommendations on who should have their bilirubin concentration measured, when and how, and for treatment options, refer directly to the document.		A

6.2 BLOOD PRESSURE

Blood Pressure Recommendation	Strength of Recommendation
Check BP at all visits for those at risk >3 years old. Some risk factors: obesity, sleep disordered breathing, prematurity, renal disease, congenital heart disease, diabetes or medications that increase blood pressure.	

Blood Pressure Resources
1. High blood pressure in children, including definitions: (NIH Working Group) (AAP)

Blood Pressure References

Reference	Methods	Outcomes	CTFPHC	GRADE
Flynn, J.T, et al. Clinical Practice Guideline for Screening and Management of High Blood Pressure in Children and Adolescents. American Academy of Pediatrics. 2017. 140(3). Retrieved from: https://pediatrics.aappublications.org/content/pediatrics/early/2017/08/21/peds.2017-1904.full.pdf	**Subjects:** Children and Adolescents **Design:** Clinical Practice Guideline	**Abstract** These pediatric hypertension guidelines are an update to the 2004 "Fourth Report on the Diagnosis, Evaluation, and Treatment of High Blood Pressure in Children and Adolescents." Significant changes in these guidelines include (1) the replacement of the term "prehypertension" with the term "elevated blood pressure, " (2) new normative pediatric blood pressure (BP) tables based on normal-weight children, (3) a simplified screening table for identifying BPs needing further evaluation, (4) a simplified BP classification in adolescents ≥13 years of age that aligns with the forthcoming American Heart Association and American College of Cardiology adult BP guidelines, (5) a more limited recommendation to perform screening BP measurements only at preventive care visits, (6) streamlined recommendations on the initial evaluation		

		and management of abnormal BPs, (7) an expanded role for ambulatory BP monitoring in the diagnosis and management of pediatric hypertension, and (8) revised recommendations on when to perform echocardiography in the evaluation of newly diagnosed hypertensive pediatric patients (generally only before medication initiation), along with a revised definition of left ventricular hypertrophy. These guidelines include 30 Key Action Statements and 27 additional recommendations derived from a comprehensive review of almost 15 000 published articles between January 2004 and July 2016. Each Key Action Statement includes level of evidence, benefit-harm relationship, and strength of recommendation. This clinical practice guideline, endorsed by the American Heart Association, is intended to foster a patient- and family-centered approach to care, reduce unnecessary and costly medical interventions, improve patient diagnoses and outcomes, support implementation, and provide direction for future research.		

National High Blood Pressure Education Program Working Group on High Blood Pressure in, C., & Adolescents. **The fourth report on the diagnosis, evaluation, and treatment of high blood pressure in children and adolescents**. Pediatrics. 2004; 114(2 Suppl 4th Report): 555-576.	**Subjects:** Children **Design**: NIH Report **Methods:** This publication is the fourth report from the National High Blood Pressure Education Program (NHBPEP) Working Group on Children and Adolescents and updates the previous 1996 publication, *Update on the Task Force Report (1987) on High Blood Pressure in Children and Adolescents.* It updates clinicians on the latest scientific evidence regarding blood pressure (BP) in children and provides recommendations for diagnosis, evaluation, and treatment of hypertension based on available evidence and consensus expert opinion, where evidence is lacking.	Children >3 years old who are seen in a medical setting should have their BP routinely measured. BP measurement in infants and children with specific risk conditions should be performed at visits before age 3 years. These conditions include: • History of prematurity, very low birth weight, or other neonatal complication(s) requiring intensive care • Congenital heart disease (repaired or non-repaired) • Recurrent urinary tract infections, hematuria, or proteinuria • Known renal disease or urologic malformations • Family history of congenital renal disease • Solid organ transplant • Malignancy or bone marrow transplant • Treatment with drugs known to raise BP • Other systemic illnesses associated with hypertension (neurofibromatosis, tuberous sclerosis, etc.) • Evidence of elevated intracranial pressure The preferred method of BP measurement is auscultation. Correct measurement requires a cuff that is appropriate to the size of the child's upper arm. It is recommended that standard cuff dimensions for children be adopted. Ideally, the child whose BP is to be measured should have avoided stimulant drugs or foods, have been sitting quietly for 5 minutes, and seated with his or her back supported, feet on the floor and right arm supported, cubital fossa at heart level. The right arm is preferred in repeated measures of BP. Use of automated devices is preferred for BP measurement in newborns and young infants, in whom auscultation is difficult. However, an elevated BP reading obtained with an oscillometric device should be repeated using auscultation. Elevated BP should be confirmed on repeated visits before characterizing a child as having hypertension. Hypertension in children is defined as systolic BP (SBP) and/or diastolic BP (DBP) that is, on repeated measurement, at or above the 95th percentile.		
Moyer, V. A., & Force, U. S. P. S. T. **Screening for primary hypertension in**	**Subjects:** Children and adolescent **Design**: USPSTF	The USPSTF found inadequate evidence on the diagnostic accuracy of screening for primary hypertension. There is also inadequate evidence that routine blood pressure measurement accurately		I

children and adolescents: U.S. Preventive Services Task Force recommendation statement. Pediatrics. 2013; 132(5): 907-914.	Recommendation Statement **Methods:** Update of the 2003 USPSTF recommendation on screening for high blood pressure (BP) in children and adolescents. This recommendation applies to children and adolescents who do not have symptoms of hypertension. The USPSTF reviewed the evidence on screening and diagnostic accuracy of screening tests for blood pressure in children and adolescents, the effectiveness and risks of treatment of screen-detected primary childhood hypertension, and the association of hypertension with markers of cardiovascular disease in childhood and adulthood.	identifies children and adolescents who are at increased risk for adult hypertension and other intermediate measures of cardiovascular disease in adulthood. Furthermore, the USPSTF found inadequate evidence on the effectiveness of treatment and the harms of screening or treatment. Therefore, the balance of benefits and harms of screening for hypertension in children and adolescents cannot be determined. The USPSTF concludes that the evidence to support screening for primary hypertension in asymptomatic children and adolescents is insufficient. For a summary of the evidence systematically reviewed in making this recommendation, see the accompanying systematic review at http://www.ncbi.nlm.nih.gov/pubmed/23439904. The USPSTF recommends that clinicians should understand the evidence on screening for primary hypertension, but individualize decision-making to the specific patient or situation. The strongest risk factor for primary hypertension in children and adolescents is elevated body mass index. Other risk factors include low birth weight, male sex, ethnicity, and family history of hypertension. When deciding whether to screen children and adolescents for hypertension, clinicians should consider certain factors, including its potential preventable burden, possibility to identify secondary hypertension – more likely in younger children, and potential harms due to diagnostic inaccuracy. The USPSTF also states that several organizations recommend routine screening of BP at well-child visits starting at 3 years old, based on consensus. These include the American Academy of Pediatrics, American Heart Association, Bright Futures, and the National Heart, Lung, and Blood Institute's Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents.		

Thompson, M., Dana, T., Bougatsos, C., Blazina, I., & Norris, S. L. **Screening for hypertension in children and adolescents to prevent cardiovascular disease.** Pediatrics. 2013; 131(3): 490-525.	**Subjects:** Children and adolescent **Design**: Systematic review **Methods:** This systematic review was conducted for the USPSTF recommendation on the effectiveness of screening asymptomatic children and adolescents for hypertension in order to prevent cardiovascular disease. Eligible studies were identified from Medline and the Cochrane Library (through July 2012). These included trials, controlled observational studies and systematic reviews in asymptomatic children and adolescents on the effectiveness and harms of screening and treatment, as well as accuracy of blood pressure (BP) measurement.	34 studies were included in this systematic review. The authors assessed the overall strength of the body of evidence for each research question as good, fair, or poor by using methods developed by the USPSTF on the basis of the number, quality, and sample size of studies, as well as the consistency of results among studies and directness of the evidence. A meta-analysis could not be performed due to the limited number of studies and the heterogeneity of study designs. No studies evaluated the effects of screening for hypertension on health outcomes. Two studies on screening tests for elevated BP reported moderate sensitivities (0.65, 0.72) and specificities (0.75, 0.92), suggesting that many children who have elevated BP during screening will not have hypertension. Sensitivities and specificities of child hypertension for the later presence of adult hypertension (7 studies) were wide ranging (0–0.63 and 0.77–1.0, respectively), and associations between child hypertension and carotid intima media thickening and proteinuria in young adults (3 studies) were inconclusive. Seven studies reported that drug interventions effectively lowered BP in adolescents over short follow-up periods. No serious treatment-related adverse effects were reported. An important limitation of this review is the limited quantity and quality of evidence which inevitably limits the conclusions that can be drawn. Screening children for elevated BP or hypertension may potentially reduce future cardiovascular disease risk in adults. However, at present, the evidence needed to support these practices is limited.		

6.3 FONTANELLES

Fontanelles Recommendation	**Strength of Recommendation**
Check Fontanelles: The posterior fontanelle is usually closed by 2 months and the anterior by 18 months.	Consensus

Fontanelles References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Kiesler J, Ricer R. The abnormal fontanelle. Am Fam Phys 2003;67(12):2547-2552		Abstract: The diagnosis of an abnormal fontanel requires an understanding of the wide variation of normal. At birth, an infant has six fontanels. The anterior fontanel is the largest and most important for clinical evaluation. The average size of the anterior fontanel is 2.1 cm, and the median time of closure is 13.8 months. The most common causes of a large anterior fontanel or delayed fontanel closure are achondroplasia, hypothyroidism, Down syndrome, increased intracranial pressure, and rickets. A bulging anterior fontanel can be a result of increased intracranial pressure or intracranial and extracranial tumors, and a sunken fontanel usually is a sign of dehydration. A physical examination helps the physician determine which imaging modality, such as plain films, ultrasonography, computed tomographic scan, or magnetic resonance imaging, to use for diagnosis.		

6.4 VISION SCREENING

Vision Screening Recommendations	**Strength of Recommendation**
1. Check Red Reflex for serious ocular diseases such as retinoblastoma and cataracts.	**Good**
2. Corneal light reflex/cover-uncover test & inquiry for strabismus: With the child focusing on a light source, the light reflex on the cornea should be symmetrical. Each eye is then covered in turn, for 2 – 3 seconds, and then quickly uncovered. The test is abnormal if the uncovered eye "wanders" OR if the covered eye moves when uncovered.	**Good**
3. Check visual acuity at age 3-5 years.	**Good**

Vision Screening References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
U.S. Preventive Services Task Force. **Vision Screening for Children One to Five Years of Age: Recommendation Statement.** Clinical Review & Education. 2017. 318(9). Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/28873168	**Subjects:** Children Aged 6 Months to 5 Years **Design:** Recommendation Statement **Methods:** The USPSTF reviewed the evidence on the accuracy of vision screening tests and the benefits and harms of vision screening and treatment. Surgical interventions were considered to be out of scope for this review	**Conclusions and Recommendations** The USPSTF recommends vision screening at least once in all children aged 3 to 5 years to detect amblyopiaorits risk factors. (B recommendation) The USPSTF concludes that the current evidence is in sufficient to assess the balance of benefits and harms of vision screening in children younger than 3years.(I statement) See article for full recommendations		
Donahue, S. P., Baker, C. N., Committee On, P., Ambulatory, M., Section On, O., American Association Of Certified, O., . . . American Academy Of, O. **Procedures for the Evaluation of the Visual System by Pediatricians**. Pediatrics. 2016; 137(1): 1-9.	**Subjects:** Children 0 to 5 years old **Design:** Clinical report **Methods:** This clinical report supplements the AAP policy statement titled "Visual System Assessment in Infants, Children, and Young Adults by Pediatricians." It presents various evaluation procedures that are available for use by the pediatrician or primary care physician.	Vision screening is crucial for the detection of visual and systemic disorders in childhood. This clinical report details evaluation procedures for pediatricians and primary care physicians to use for screening purposes. These procedures include performing a visual system history assessment. This entails compiling a relevant family history regarding eye disorders, eye surgery, and the use of glasses during childhood in parents or siblings. Next, an ocular examination should be performed, consisting of an external examination, pupil examination, red reflex testing to assess ocular media, ocular alignment and motiliy assessment (corneal light reflex test, cover test), and examination of the ocular fundus by ophthalmoscopy. This document also addresses various methods in the assessment of visual function in both preverbal and older children, including threshold versus critical line evaluations. The importance of establishing a screening area conducive for assessing visual acuity and using the proper technique for different age groups is underlined. This report also provides information on instrument-based screening for children over 12 months. Refer to table 1 for		

		eye exam guidelines by age group.		

Committee On, P., Ambulatory, M., Section On, O., American Association Of Certified, O., American Association For Pediatric, O., Strabismus, & American Academy Of, O. **Visual System Assessment in Infants, Children, and Young Adults by Pediatricians.** Pediatrics. 2016; 137(1): 1-3.	**Subjects:** Children 0 to 5 years old **Design:** Policy statement **Methods:** This policy statement and its accompanying clinical report, "Procedures for the Evaluation of the Visual System by Pediatricians," supplant any previous AAP policy statements on visual screening	Evaluation of the visual system should begin in infancy and continue at regular intervals throughout childhood and adolescence to identify children who may benefit from early interventions to correct or improve vision. Preterm infants should be evaluated according to the AAP policy statement "Retinopathy of Prematurity Screening" and referred for a specialized eye examination by an ophthalmologist if required. Referral to a specialist should also be made for newborn infants with family histories of congenital cataracts, retinoblastoma, or metabolic disease or in whom systemic disease associated with serious ocular abnormalities is suspected. Because family history is an important risk factor for amblyopia and strabismus, consider referring children who have first-degree relatives with these conditions. Otherwise healthy children should be screened in the primary care setting at the intervals provided in Table 1 (see document). Instrument-based screening, if available, should be first attempted between 12 months - 3 years of age and at annual well-child visits until acuity can be tested directly. Using these techniques in children younger than 6 years can enhance detection of conditions that may lead to amblyopia and/or strabismus compared with traditional methods of assessment. Instrument-based screening may also be a helpful alternative in screening developmentally delayed children of any age. Direct testing of visual acuity can often begin by 4 years of age, using age-appropriate symbols (optotypes). Detailed procedures for an eye evaluation are provided in the accompanying clinical report.		
French, A. N., Ashby, R. S., Morgan, I. G., & Rose, K. A. **Time outdoors and the prevention of myopia**. Exp Eye Res. 2013; 114: 58-68.	**Subjects:** Children **Design:** Review **Methods:** This review provides an overview of the major epidemiological	There is strong evidence from both cross-sectional and longitudinal data that children who spend more time outdoors are less likely to be or become myopic, irrespective of how much near work they do, or whether their parents are myopic. These findings are supported by evidence from studies in a number of different		

	studies which have addressed the issue of time outdoors and the development of myopia, in addition to supporting studies, including animal studies, on the possible mechanism of protection.	locations and ethnic groups, including those with high prevalences of myopia. However, a small number of studies have failed to find a significant association between time outdoors and myopia. It is possible that in these studies the population characteristics affected the ability of these studies to detect significant effects. Overall, it is clear that time spent outdoors is important for normal refractive development in children, and that deficits in time spent outdoors are reflected in higher prevalences of myopia. It is however uncertain if time outdoors also blocks progression of myopia. The ability of time outdoors to prevent incident myopia suggests that it may be possible to reduce the number of children with school or acquired myopia. There are currently a few ongoing trials, and positive results would provide proof of principle for the use of interventions based on increasing time outdoors to prevent myopia.		
He, M., Xiang, F., Zeng, Y., Mai, J., Chen, Q., Zhang, J., . . . Morgan, I. G. **Effect of Time Spent Outdoors at School on the Development of Myopia Among Children in China: A Randomized Clinical Trial.** JAMA. 2015; 314(11): 1142-1148.	**Subjects:** First grade students **Design:** Cluster randomized trial **Methods:** School-based trial in Guangzhou, China, conducted between Oct 2010 – Oct 2013 to assess the efficacy of increasing time spent outdoors in preventing the development of myopia. 29 primary schools were stratified into 6 strata, and 2 schools were randomly selected from each stratum (1 to the intervention group and 1 to the control group). Data at baseline was	The Guangzhou Outdoor Activity Longitudinal Trial was conducted in 12 primary schools in Guangzhou, China, to assess the efficacy of increasing time spent outdoors in preventing the onset of myopia in first grade students over a 3-year period. For 6 intervention schools (n = 952 students), 1 additional 40-minute class of outdoor activities was added to each school day, and parents were encouraged to engage their children in outdoor activities after school hours, especially during weekends and holidays. Children and parents in the 6 control schools (n = 951 students) continued their usual pattern of activity. The cumulative incidence rate of myopia was 30.4% in the intervention group and 39.5% in the control group (difference of −9.1% [95% CI, −14.1% to −4.1%]; *P* < .001). There was also a significant difference in the 3-year change in spherical equivalent refraction for the intervention group (−1.42 D) compared with the control group (−1.59 D) (difference of 0.17 D [95% CI, 0.01 to 0.33 D]; *P* = .04). Elongation of axial length was not significantly different between the intervention group (0.95 mm) and the control group (0.98 mm) (difference of −0.03mm [95% CI, −0.07 to 0.003 mm]; *P* = .07). The authors conclude that among 6-		B

	gathered on first grade children (6-7 years), with annual follow-up to grade 4. The primary outcome measure was 3-year cumulative incidence rate of myopia among students without established myopia at baseline. Secondary outcome measures were changes in spherical equivalent refraction and axial length among all students, analyzed using mixed linear models and intention-to-treat principles.	year-old children in Guangzhou, China, the addition of 40 minutes of outdoor activity at school compared with usual activity resulted in a reduced incidence rate of myopia over the next 3 years, though further studies are needed to assess long-term follow-up of these children.		
Longmuir SQ, Boese EA, Pfeifer W, Zimmerman B, Short L, Scott WE. **Practical Community Photoscreening in Very Young Children.** Pediatrics. 2013 Feb 11. Available from: Pediatrics	**Subjects:** Children > 6 months old **Design:** Retrospective review **Methods:** Results from the Iowa KidSight database using MTI PhotoScreener containing results of children screened between May 1, 2000, and April 30, 2011 were reviewed.	During the 11 years of the study, 210,695 photoscreens on children were performed at 13,750 sites. In the <3-year age group, the unreadable rate was 13.0%, the referral rate was 3.3%, and the overall positive-predictive value was 86.6%. In the 3- to 6-year-old children, the unreadable rate was 4.1%, the referral rate was 4.7%, and the overall positive-predictive value was 89.4%. **Conclusion:** Early screening, before amblyopia is more pronounced, can reliably detect amblyogenic risk factors in children younger than 3 years of age. **Recommendation:** Photoscreening children should start at 1 year of age.	II-2 B	1C

Donahue SP. Ruben JB. American Academy of Ophthalmology. American Academy of Pediatrics, Ophthalmology Section. American Association for Pediatric Ophthalmology and Strabismus. Children's Eye Foundation. American Association of Certified Orthoptists.**US Preventive Services Task Force vision screening recommendations.** Pediatrics. 2011;127(3):569-70. Available from: Pediatrics	**Subjects:** Children 0 to 5 years old **Design:** Commentary **Methods:** This is a comment in response to the 2011 USPSTF vision screening recommendations.	Concerns about 1) the finding of "insufficient evidence" (I) for the recommendation to provide vision screening for children under the age of three, and 2) the use of new technologies to detect amblyopia risk factors (autorefractors and photoscreeners). The authors believe that there is now adequate evidence to support an earlier screening using photorefraction or autorefraction in younger children. **Recommendation:** Provide vision screening in children under 3 years of age.	III	2C
Canadian Pediatric Society. **Vision screening in infants, children and youth.** *Paediatr Child Health* 2009;	**Subjects:** 0 to 5 years old **Design**: Position statement **Methods:** Revision of the position statement on	This CPS statement reported that there are no robust randomized trials to detect the impact of vision screening. However, longitudinal cohort studies have shown that eyes should be checked regularly by physicians during well-child visits starting	~~II~~ ~~A~~	

14:246-248. Reaffirmed: February 1 2016. Abstract available from: Paediatrics & Child Health	vision screening from 1998. Performed searches of the Cochrane Library from 1966 to 2005.	from birth. The CPS provides recommendations for visual assessment at each infant and well-child visit: • Newborn to 3 months of age: – A complete examination of the skin and external eye structures including the conjunctiva, cornea, iris and pupils. – An inspection of the red reflex to rule out lenticular opacities or major posterior eye disease. – Failure of visualization or abnormalities of the reflex are indications for an urgent referral to an ophthalmologist. – High-risk newborns (at risk of retinopathy of prematurity and family histories of hereditary ocular diseases) should be examined by an ophthalmologist. • 6 to 12 months of age: – Conduct examination as above. – Ocular alignment should be observed to detect strabismus. The corneal light reflex should be central and the cover-uncover test should be normal. – Fixation and following a target are observed. • 3 to 5 years of age: – Conduct examination as above. – Visual acuity testing should be completed with an age appropriate tool. • 6 to 18 years of age – Screen as above whenever routine health examinations are conducted. – Examine whenever complaints occur.	BII BII AII BIII	
Tingley DH. **Vision screening essentials: Screening today for eye disorders in the pediatric patient.** Pediatrics in Review. 2007; 28(2):54-61. Abstract available from: PubMed	**Subjects:** Infants **Design**: Review **Methods:** This article discusses the role of screening for vision problems, as well as guidelines for screening	This review states that the red reflex testing should be the first eye examination that is done at birth and at all subsequent well-child visits; corneal light reflex should start to be tested at 6 months and visual acuity at 3 years. In order to catch possible abnormalities early and allow for the best chance of successful treatment, the authors report that visual screening should be done at each well-child visit and that abnormalities or high-risk patients should be referred to a specialist.	III A	

	patients with age-appropriate tests.			

6.5 HEARING INQUIRY/SCREENING

Hearing Inquiry/Screening Recommendations	Strength of Recommendation
1. *Language delay or parental concerns about hearing acuity should prompt a rapid referral for hearing assessment.* 2. *Formal audiology testing should be performed in all high-risk infants, including those with normal UNHS.* 3. Older children should be screened if clinically indicated.	*Fair* *Fair* Consensus

Hearing Inquiry/Screening References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Patel,H., Feldman, M., Canadian Paediatric Society, Community Paediatrics Committee. **Universal newborn hearing screening.** Pediatric Child Health. 2011. 16(5). Reaffirmed Feb 2018 Available from: https://www.cps.ca/en/documents/position/universal-hearing-screening-newborns	**Subjects:** Newborns **Design:** **Methods:** The present statement reviews the evidence for universal newborn hearing screening (UNHS). A systematic review of the literature was conducted using Medline and using search dates from 1996 to the third week of August 2009. The following search terms were used: neonatal screening AND hearing loss AND hearing disorders. The key phrase “universal newborn hearing screening” was also searched. The Cochrane Central Register of Controlled Trials and systematic reviews was searched. Three systematic reviews, one controlled	**Recommendations** Based on the available evidence, the Canadian Paediatric Society recommends hearing screening for all newborns. This should be provided universally to all Canadian newborns via a comprehensive and linked system of screening, diagnosis and intervention. Several provinces, including Ontario and British Columbia, offer excellent examples of integrated systems. Advocacy, at the provincial and federal levels, is required to ensure that all Canadian infants can benefit from the advantages of early hearing loss detection and intervention.		

	nonrandomized trial and multiple cohort studies were found.			
Foust, T., Eiserman, W., Shisler, L., & Geroso, A. **Using otoacoustic emissions to screen young children for hearing loss in primary care settings**. Pediatrics. 2013; 132(1): 118-123.	**Subjects:** Children 0 – 5 years old **Design:** Prospective study **Methods:** 846 children (842 children < 5 years of age and 4 older siblings) were screened during well-child visits using a distortion product otoacoustic emissions (OAE) instrument to assess the efficacy of implementing OAE screening in young children in community- and school-based clinics. A multistep screening and diagnostic protocol, incorporating middle ear evaluation and treatment, was followed when children did not pass the initial screening. Audiological evaluation was sought for children not passing a subsequent OAE screening.	OAE technology is widely used in newborn hearing screening programs. This study examined the efficacy of integrating OAE hearing screening into services routinely provided in healthcare settings to young children. 846 children being served during regularly scheduled well-child visits or visits to address specific health concerns in 3 US clinics took part in this 10-month study. Based on the multistep screening protocol, of the 846 children screened, 814 (96%) ultimately passed the screening or audiological assessment, 29 (3%) exited the study (did not come back for rescreening or follow-up), and 3 (0.35%) were identified with permanent hearing loss. 2 of the 3 children had previously passed the newborn hearing screening and were therefore documented as having true post-neonatal or late-onset hearing loss. The third child was born outside the United States with no documentation of screening at birth. In all 3 cases, speech and language concerns had not led to previous identification of a hearing loss. Furthermore, the children were not being seen at the clinics for hearing-related issues. This suggests that a hearing loss significant enough to cause disruption in language acquisition is not readily identified by parents or primary care physicians using subjective screening methods. The authors conclude that using OAE to screen the hearing of young children during routine well-child visits is feasible and can lead to the identification of permanent hearing loss overlooked by physicians relying solely on subjective methods.		C

Vohr BR, Carty LM, Moore PE, Letourneau K. **The Rhode Island Hearing Assessment Program: experience with state-wide hearing screening 1993-1996.** J Pediatr 1998;133(3):353-7. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/9738715	**Subjects:** Infants **Design**: Retrospective cohort study Hearing screen/rescreen referral data were collected prospectively for 53,121 infants born in Rhode Island over a 4 year period. Eight Rhode Island birthing hospitals were included in the sample.	Outcomes included: first-stage referral rates, rescreen compliance, diagnostic referral rates, identification rates and the age of amplification. Of infants who received the TEOAE (Transient evoked otoacoustic emissions) stage 1 screen, 10% were referred for the second-stage. Specificity was 90% for stage 1 and 87% for stage 2. No infants passed the TEOAE and were subsequently diagnosed with hearing loss. Mean age of identification for permanent hearing loss was 20 months. This study concluded that two stage hearing screening is effective to screen, track, identify and habilitate infants in NICUs and normal nurseries for permanent hearing loss.	II B	

6.6 CLEFT LIP/PALATE

Screening for Developmental Dysplasia of the Hips Recommendation	Strength of Recommendation
Check palate for cleft	Consensus

Cleft lip/palate References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Lewis CW, Jacob LS, Lehmann CU, and AAP Section on Oral health. The primary care pediatrician and the care of children with cleft lilp and/or cleft palate. Pediatrics 2017;139(5):e20170628		Abstract: Orofacial clefts, specifically cleft lip and/or cleft palate (CL/P), are among the most common congenital anomalies. CL/P vary in their location and severity and comprise 3 overarching groups: cleft lip (CL), cleft lip with cleft palate (CLP), and cleft palate alone (CP). CL/P may be associated with one of many syndromes that could further complicate a child's needs. Care of patients with CL/P spans prenatal diagnosis into adulthood. The appropriate timing and order of specific cleft-related care are important factors for optimizing outcomes; however, care should be individualized to meet the specific needs of each patient and family. Children with CL/P should receive their specialty cleft-related care from a multidisciplinary cleft or craniofacial team with sufficient patient and surgical volume to promote successful outcomes. The primary care pediatrician at the child's medical home has an essential role in making a timely diagnosis and referral; providing ongoing health care maintenance, anticipatory guidance, and acute care; and functioning as an advocate for the patient and a liaison between the family and the craniofacial/cleft team. This document provides background on CL/P and multidisciplinary team care, information about typical timing and order of cleft-related care, and recommendations for cleft/craniofacial teams and primary care pediatricians in the care of children with CL/P.		

6.7 SLEEP DISORDERED BREATHING/SNORING/OBSTRUCTIVE SLEEP APNEA

Sleep Disordered Breathing/Snoring/Obstructive Sleep Apnea Recommendation	Strength of Recommendation
1. Tonsil size/sleep-disordered breathing – Screen for sleep problems. Behavioural sleep problems and snoring in the presence of sleep-disordered breathing which warrants assessment regarding obstructive sleep apnea (OSA).	**Good**

Sleep Disordered Breathing/Snoring/Obstructive Sleep Apnea References				
Bonuck K, Rao T, Xu L. **Pediatric sleep disorders and special educational need at 8 years: a population-based cohort study.** Pediatrics. 2012 Oct;130(4):634-42. doi: 10.1542/peds.2012-0392. Abstract available from: Pediatrics	**Subjects:** Children 0 to 8 years old **Design:** Population-based cohort (N>10000) **Methods:** This study examined associations between sleep-disordered breathing (SDB) and behavioral sleep problems (BSPs) through 5 years of age and special educational need (SEN) at 8 years. Parents in the Avon Longitudinal Study of Parents and Children reported on children's snoring, witnessed apnea, and mouth-breathing at 6, 18, 30, 42, and 57 months, from which SDB symptom trajectories, or clusters, were derived. BSPs were based on report of ≥5 of 7	Controlling for 16 putative confounders, previous history of SDB and BSPs was significantly associated with an SEN. BSPs were associated with a 7% increased odds of SEN (95% confidence interval [CI] 1.01–1.15), for each ∼1-year interval at which a BSP was reported. SDB, overall, was associated with a near 40% increased odds of SEN (95% CI 1.18–1.62). Children in the worst symptom cluster were 60% more likely to have an SEN (95% CI 1.23–2.08). **Conclusion:** History of either SDB or BSPs in the first 5 years of life is associated with increased likelihood of SEN at 8 years of age. **Recommendation:** Paediatric sleep disorder screening is recommended.	II-2 B	1B

	sleep behaviours at each of the 18-, 30-, 42-, and 57-month questionnaires. Parent report of SEN (yes/no) at 8 years was available for 11 049 children with SDB data and 11 467 children with BSP data. Multivariable logistic regression models were used to predict SEN outcome by SDB cluster and by cumulative report of SEN.			
Byars KC, Yolton K, Rausch J, Lanphear B, Beebe DW. **Prevalence, patterns, and persistence of sleep problems in the first 3 years of life.** Pediatrics. 2012 Feb;129(2):e276-84. Abstract available from: Pediatrics	**Subjects:** Infants and toddlers **Design:** Prospective birth cohort (N=359 mother/child pairs) **Methods:** Sleep questionnaires were administered to mothers when children were 6, 12, 24, and 36 months old. Sleep variables included parent response to a nonspecific query about the presence/absence of a sleep problem and 8 specific sleep outcome domains: sleep onset latency, sleep maintenance, 24-hour sleep duration, daytime	Prevalence of a parent-reported sleep problem was 10% at all assessment intervals. Night wakings and shorter sleep duration were associated with a parent-reported sleep problem during infancy and early toddlerhood (6–24 months), whereas nightmares and restless sleep emerged as associations with report of a sleep problem in later developmental periods (24–36 months). Prolonged sleep latency was associated with parent report of a sleep problem throughout the study period. In contrast, napping, sleep location, and snoring were not associated with parent-reported sleep problems. Twenty-one percent of children with sleep problems in infancy (compared with 6% of those without) had sleep problems in the third year of life. **Recommendation:** Sleep problems should be screened by using a flexible family-centered approach while addressing specific sleep behaviours and symptoms that have known clinical significance.	II-2 B	1C

	sleep/naps, sleep location, restlessness/vocalization, nightmares/night terrors, and snoring.			
American Academy of Pediatrics. **Clinical Practice Guideline: Diagnosis and Management of Childhood Obstructive Sleep Apnea Syndrome.** Pediatrics. 2002;109(4): 704-712. Revision: September 2012. Abstract available from: Pediatrics	**Subjects:** Children **Design:** Clinical practice guidelines **Methods:** Guidelines were generated based on available medical literature. Performed computerized search of PubMed database with keywords: sleep apnea syndrome, apnea, sleep disorders, snoring, polysomnography, airway obstruction, adenoidectomy, tonsillectomy (adverse effects mortality), and sleep-disordered breathing. The search was updated to 2011.	There were very few RCTs. The AAP recommendations include the following: 1) all children should be screened for snoring; 2) complex or high-risk patients should be referred to a specialist; 3) thorough diagnostic evaluation should be performed; 4) adenotonsillectomy is the first line of treatment for children with OSAS; 5) all surgical patients should receive post-operative re-evaluation to determine whether additional treatment is necessary. Since the 2002 guidelines, there has been an improvement in the quality of OSAS studies, yet still few RCTs. The clinical guidelines for screening were revised and clinical guidelines for management are also presented in the revision statement. **Recommendations:** 1) All children /adolescents should be screened for snoring. 2) Polysomnography should be performed in children/adolescents with snoring and symptoms/signs of OSAS; if polysomnography is not available, then alternative diagnostic tests or referral to a specialist for more extensive evaluation may be considered.	III B, B-C	1C 2C

6.8 DENTAL

Dental Recommendation	Strength of Recommendation
Examine for problems including caries, oral soft tissue infections or pathology; and for normal teeth eruption sequence	*Fair*

6.9 NECK/TORTICOLLIS

Neck/Torticollis Recommendation	Strength of Recommendation
Check neck for torticollis	Consensus

Neck/Torticollis References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Kuo, A. A., Tritasavit, S., & Graham, J. M., Jr. **Congenital muscular torticollis and positional plagiocephaly**. Pediatr Rev. 2014; 35(2): 79-87. doi:10.1542/pir.35-2-79	**Subjects:** Children **Design:** Review **Methods:** This article provides information on the prevalence of congenital muscular torticollis (CMT) and its association with positional plagiocephaly, recommendations for the treatment of CMT and prevention of positional plagiocephaly, including the importance of tummy time, as well as guidelines for a referral.	The incidence of torticollis is as high as 16% in a normal newborn population. In summary, child health practitioners in primary care settings should consider the diagnosis of CMT in infants with risk factors from birth history for intrauterine malpositioning or constraint. CMT is often associated with other conditions, including positional plagiocephaly and gross motor delays from weakened truncal muscles and/or lack of head control in early infancy. Child health practitioners should counsel parents that infants should be on their stomachs frequently whenever they are awake and under direct adult supervision to develop their prone motor skills. Early identification of torticollis and referral to early intervention services by a physical therapist could result in complete correction of torticollis and positional plagiocephaly and prevent the need for cranial orthoses or surgery.		
Nichter, S. **A Clinical**	**Subjects:** Chidren	Due to the high risk of developing secondary sequelae, and the		

Algorithm for Early Identification and Intervention of Cervical Muscular Torticollis. Clin Pediatr (Phila). 2016; 55(6): 532-536.	**Design:** Expert opinion **Methods:** This article provides a clinical algorithm for pediatric clinicians for prompt identification and	effectiveness of early intervention, it is important for clinicians to incorporate screening for CMT as part of any physical exam of a newborn. This article describes a screening and referral algorithm for CMT that can be utilized for all newborns through 4 months of age by any pediatric clinician (eg, lactation specialists, nurses, physicians, therapists) to promote prompt identification and intervention of		

doi:10.1177/000992281560396	intervention of infants with congenital muscular torticollis (CMT). The clinical algorithm proposed here incorporates the American Physical Therapy Association guideline for CMT.	infants with CMT. The American Physical Therapy Association recommends that all infants up to 4 months of age be screened for CMT during each contact with a pediatric clinician. The screening examination includes an assessment of the newborn's head and neck symmetry, cervical spine range of motion, possible skeletal anomalies, palpable masses, and CNS dysfunction. If neither muscular nor nonmuscular CMT are identified, or suspected, the clinician should educate the parent/caregiver on CMT, typical motor development and positioning related to symmetrical head control, and the prevention of plagiocephaly and muscular CMT. If any dysfunction or anomalies are identified or suspected, the clinician should complete a referral to a pediatric physical therapist. The physical therapist will repeat a full infant motor evaluation, and if muscular CMT is confirmed, the appropriate treatment will be given. Reassessment by the physical therapist should occur after discharge.		

6.10 UMBILICUS

Umbilicus Recommendation	Strength of Recommendation
Gently pat dry and review S&S of infection	Consensus

Umbilicus References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Imdad A, Bautista RMM, Sene KAA, Uy MEV, Mantaring 3rd JB, Bhutta ZA. Umbilical cord antiseptics for preventing sepsis and death among newborns. Cochrane Database Sys Rev. 2013 May 31(5): CD008635. doi: 10.1002/14651858.CD008635.pub2.		Abstract: **Background:** The umbilical cord is a structure made of blood vessels and connective tissue that connects the baby and placenta in utero. The umbilical cord is cut after birth, which separates the mother and her baby both physically and symbolically. Omphalitis is defined as infection of the umbilical cord stump. Tracking of bacteria along the umbilical vessels may lead to septicaemia that can result in neonatal morbidity and mortality, especially in developing countries. **Objectives:** To determine the effect of application of antimicrobials on newborn's umbilical cord versus routine care for prevention of morbidity and mortality in hospital and community settings. **Search methods:** We searched the Cochrane Pregnancy and Childbirth Group's Trials Register (1 October 2012). In addition, we also searched LILACS (1982 to 11 October 2012) and HERDIN NeON (October 2012) **Selection criteria:** We included randomized, cluster-randomized and quasi-randomized controlled trials of topical cord care compared with no topical care, and comparisons between different forms of care. **Data collection and analysis:** Two review authors independently assessed trials for inclusion, trial quality and subsequently extracted data. Data were checked for accuracy. **Main results:** The search identified 77 trials. We included 34 trials in the review involving 69,338 babies, five studies are awaiting classification and there are two ongoing community trials. Included studies were conducted in both developed and developing countries. Among the 34 included trials, three were large, cluster-randomized		

		trials conducted in community settings in developing countries and 31 studies were conducted in hospital settings mostly in developed countries. Data for community and hospital studies were analyzed separately. The three trials conducted in community settings contributed 78% of the total number of children included in this review. Of the trials conducted in hospital settings, the majority had small sample sizes. There were 22 different interventions studied across the included trials and the most commonly studied antiseptics were 70% alcohol, triple dye and chlorhexidine.Only one antiseptic, chlorhexidine was studied in community settings for umbilical cord care. Three community trials reported data on all-cause mortality that comprised 1325 deaths in 54,624 participants and combined results showed a reduction of 23% (average risk ratio (RR) 0.77, 95% confidence interval (CI) 0.63 to 0.94, random-effects, $T^2 = 0.02$, $I^2 = 50\%$) in the chlorhexidine group compared with control. The reduction in omphalitis ranged from 27% to 56% depending on the severity of infection. Cord separation time was increased by 1.7 days in the chlorhexidine group compared with dry cord care (mean difference (MD) 1.75 days, 95% CI 0.44 to 3.05, random-effects, $T^2 = 0.88$, $I^2 = 100\%$). Washing of umbilical cord with soap and water was not advantageous compared with dry cord care in community settings.Among studies conducted in hospital settings, no study reported data for mortality or tetanus. No antiseptic was advantageous to reduce the incidence of omphalitis compared with dry cord care in hospital settings. Topical triple dye application reduced bacterial colonization with Staphylococcus aureus compared with dry cord care (average RR 0.15, 95% CI 0.10 to 0.22, four studies, n = 1319, random-effects, $T^2 = 0.04$, $I^2 = 24\%$) or alcohol application (average RR 0.45, 95% CI 0.25 to 0.80, two studies, n = 487, random-effects, $T^2 = 0.00$, $I^2 = 0\%$). There was no advantage of application of alcohol and triple dye for reduction of colonization with streptococcus. Topical alcohol application was advantageous in reduction of colonization with Enterococcus coli compared with dry cord care (average RR 0.73, 95% CI 0.58 to 0.92, two studies, n = 432, random-effects, $T^2 = 0.00$, $I^2 = 0\%$) and in a separate analysis, triple dye increased the risk of colonization compared with alcohol (RR 3.44, 95% CI 2.10 to 5.64, one study, n = 373). Cord separation time was significantly increased with topical		

		application of alcohol (MD 1.76 days, 95% CI 0.03 to 3.48, nine studies, n = 2921, random-effects, $T^2 = 6.54$, $I^2 = 97\%$) and triple dye (MD 4.10 days, 95% CI 3.07 to 5.13, one study, n = 372) compared with dry cord care in hospital settings. The number of studies was insufficient to make any inference about the efficacy of other antiseptics. **Authors' conclusions:** There is significant evidence to suggest that topical application of chlorhexidine to umbilical cord reduces neonatal mortality and omphalitis in community and primary care settings in developing countries. It may increase cord separation time however, there is no evidence that it increases risk of subsequent morbidity or infection.There is insufficient evidence to support the application of an antiseptic to umbilical cord in hospital settings compared with dry cord care in developed countries.		

6.11 SCREENING FOR DEVELOPMENTAL DYSPLASIA OF THE HIPS

Screening for Developmental Dysplasia of the Hips Recommendation	**Strength of Recommendation**
1. There is insufficient evidence to recommend routine screening for developmental dysplasia of the hips, but examination of the hips should be included until at least one year, or until the child can walk. 2. Exam includes assessing limb length discrepancy and asymmetric thigh or buttock (gluteal) creases; performing Ortolani manoeuvre (usually negative after 3 mos); and testing for limited abduction (usually positive after 3 mos). Consider selective imaging between 6 wks and 6 mos if risk factor (i.e. breech, family history, hip instability on physical exam).	Consensus

Screening for Developmental Dysplasia of the Hips References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Shaw BA, Segal LS; AAP SECTION ON ORTHOPAEDICS. **Evaluation and Referral for Developmental Dysplasia of the Hip in Infants.** Pediatrics. 2016 Dec;138(6). pii: e20163107. Epub 2016 Nov 21.	**Subjects:** Infants **Design:** Clinical report **Methods:** This clinical report by the AAP Section on Orthopedics	Abstract: Developmental dysplasia of the hip (DDH) encompasses a wide spectrum of clinical severity, from mild developmental abnormalities to frank dislocation. Clinical hip instability occurs in 1% to 2% of full-term infants, and up to 15% have hip instability or hip immaturity detectable by imaging studies. Hip dysplasia is the most common cause of hip arthritis in women younger than 40 years and accounts for 5% to 10% of all total hip replacements in the United States. Newborn and periodic screening have been practiced for decades, because DDH is clinically silent during the first year of life, can be treated more effectively if detected early, and can have severe consequences if left untreated. However, screening programs and techniques are not uniform, and there is little evidence-based literature to support current practice, leading to controversy. Recent literature shows that many mild forms of DDH resolve without treatment, and there is a lack of agreement on ultrasonographic diagnostic criteria for DDH as a disease versus developmental variations. The AAP has not published any policy statements on DDH since its 2000 clinical practice guideline and accompanying technical report. Developments since then include a controversial US Preventive Services Task Force “inconclusive” determination regarding usefulness of DDH screening, several prospective studies supporting observation over treatment of minor ultrasonographic hip variations, and a recent evidence-based clinical practice guideline from the American Academy of Orthopaedic Surgeons on the detection and management of DDH in infants 0 to 6 months of age. The purpose of this clinical report was to provide literature-based updated direction for the clinician in screening and referral for DDH, with the primary goal of preventing and/or detecting a dislocated hip by 6 to 12 months of age in an otherwise healthy child, understanding that no screening program has eliminated late development or presentation of a dislocated hip and that the diagnosis and treatment of milder forms of hip dysplasia remain controversial.		

Jackson, J. C., Runge, M. M., & Nye, N. S. **Common questions about developmental dysplasia of the hip.** Am Fam Physician. 2014; 90(12): 843-850.	**Subjects:** Children **Design:** Review **Methods:** This article reviews current evidence and opinions regarding screening for DDH, with a focus on universal screening in newborns and a discussion on the current approach to treatment of DDH.	Evidence to support universal screening by physical examination or ultrasonography is limited and often conflicting. This review briefly summarizes incidence and risk factors for DDH, with the strongest risk factors being breech position, female sex, and first gestation. It also reviews screening methods used in the US. The Ortolani (reducing a dislocated hip) and Barlow (dislocating an unstable hip) maneuvers are the physical examination tests most commonly performed for detection of DDH in early infancy. By 2-3 months of age, an assessment for limited hip abduction becomes the preferred examination method. Ultrasonography has also been used for DDH screening. Several ultrasound methods have been described, but in general, the evaluation involves a coronal view and a transverse view with the hip in flexion. Little data exists on the accuracy and inter-examiner consistency of the Ortolani and Barlow maneuvers, although the training and experience of the physician have been shown to influence accuracy. Similarly, evidence to support limited hip abduction is mixed. Performing screening ultrasonography finds more abnormalities, thus leading to increased diagnosis of DDH. Nevertheless, the USPSTF and the American Academy of Family Physicians found insufficient evidence to recommend routine screening for DDH as a means of preventing adverse outcomes. Other American expert groups, including the AAP and Pediatric Orthopaedic Society of North America, recommend screening all newborns for DDH with physical examination maneuvers, and targeted screening ultrasonography for infants with multiple risk factors, regardless of physical examination findings. Thus, despite lack of clarity of benefits and risks of screening and treatment, physical examination screening of newborn hips remains the standard of care.		

Laborie LB, Engesæter IØ, Lehmann TG, Eastwood DM, Engesæter LB, Rosendahl K. **Screening strategies for hip dysplasia: long-term outcome of a randomized controlled trial.** Pediatrics. 2013 Sep;132(3):492-501. Abstract available from: PubMed	**Subjects:** Newborns and adolescents (age 18-20years) **Design:** Long-term follow-up of RCT (follow-up n=2,038; baseline n=11,925) **Methods:** A previous RCT revealed that adding universal or selective ultrasound to routine clinical examination gave a nonsignificant reduction in rates of late presenting cases, but with higher treatment rates. This study assesses differences in outcome at skeletal maturity for the 3 newborn screening strategies (universal, selective, clinical groups). A standardized weight-bearing anteroposterior view was obtained. The outcomes evaluated were the radiographic findings of dysplasia (center-edge angle, femoral head extrusion-index, acetabular depth-width ratio, Sharp's angle, subjective evaluation of dysplasia) and degenerative change	Of the 3935 subjects invited, 2038 (51.8%) attended the maturity review, of which 2011 (58.2% female patients) were included: 551, 665, and 795 subjects from the universal, selective, and clinical groups, respectively. Rates per group of positive radiographic findings associated withdysplasia or degenerative change varied depending on radiographic marker used. No statistically significant differences were detected between groups. No AVN was seen. **Conclusion:** Although both selective and universal ultrasound screenings gave a nonsignificant reduction in rates of late cases when compared with expert clinical programs, we were unable to demonstrate any additional reduction in the rates of radiographic findings associated with acetabulardysplasia or degenerative change at maturity. Increased treatment rates were not associated with AVN.	I C	2A

	(joint-space width). Signs of AVN were documented.			
ShorterD, Hong T, OsbornDA. **Screening programmes for developmental dysplasia of the hip in newborn infants.** Cochrane Database of Systematic Reviews 2011, Issue 9. Art. No.: CD004595. Abstract available at: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD004595.pub2/abstract	**Subjects:** Newborn infants **Design**: Cochrane review **Methods:** Systematically searched the literature for randomized, quasi-randomized or cluster trials assessing the effect of different screening programmes for developmental dysplasia of the hip (DDH) on the incidence of late presentation of congenital hip dislocation.	No study examined the effect of screening (clinical and/or ultrasound) and early treatment versus not screening and later treatment. One study reported universal ultrasound compared to clinical examination alone did not result in a significant reduction in late diagnosed DDH or surgery but was associated with a significant increase in treatment. One study reported targeted ultrasound compared to clinical examination alone did not result in a significant reduction in late diagnosed DDH or surgery, with no significant difference in rate of treatment. Meta-analysis of two studies found universal ultrasound compared to targeted ultrasound did not result in a significant reduction in late diagnosed DDH or surgery. There was heterogeneity between studies reporting the effect on treatment rate. Meta-analysis of two studies found delayed ultrasound and targeted splinting compared to immediate splinting of infants with unstable (but not dislocated) hips resulted in no significant difference in the rate of late diagnosed DDH. Both studies reported a significant reduction in treatment with use of delayed ultrasound and targeted splinting. One study reported delayed ultrasound and targeted splinting compared to immediate splinting of infants with mild hip dysplasia on ultrasound resulted in no significant difference in late diagnosed DDH but a significant reduction in treatment. No infants in either group received surgery.	I C	A
US Preventive Services Task Force. **Screening for Developmental Dysplasia of the Hip: Recommendation Statement.** Pediatrics. 2006; 117(3):898-902. Abstract available from: PubMed	**Subjects:** Infants **Design:** Review **Methods**: Recommendations for screening infants for developmental dysplasia of the hip (DDH).	The USPSTF reports that screening tests for DDH have limited accuracy with poor sensitivity or specificity. USPSTF concludes there is insufficient evidence to recommend routine screening for DDH in infants.	III I	

Patel H and the Canadian Task Force on Preventive Health Care. **Preventive health care, 2001 update: screening and management of developmental dysplasia of the hip in newborns.** CMAJ. 2001; 164(12):1669-77. Abstract available from: PubMed	**Subjects:** Newborns and high-risk infants **Design**: Review **Methods:** Reviews evidence to give recommendations for screening and management of developmental dysplasia of the hip (DDH) in newborns.	This review used rates of operative intervention, abduction splinting, delayed diagnosis of DDH (beyond 3 to 6 months), treatment complications and false diagnosis labelling. Long-term functional outcomes were considered important. The harm associated with some screening tools and resource consumption is substantial. There is fair evidence supporting the inclusion of a serial clinical examination of the hips for all infants. However, there is fair evidence against the use of general ultrasound screening.	III B (physical exam) D (ultrasound screening)	

6.12 MUSCLE TONE

Muscle tone recommendation	Strength of Recommendation
Assessment should be performed for abnormal tone or deep tendon reflexes, or for asymmetric movements (moving one side more than other). These may be early signs of cerebral palsy or neuromotor disorder and suggest the need for further assessment.	Consensus

Muscle tone References

Reference	Methods	Outcomes	CTFPHC	GRADE
Boychuk, Z. et al & The Prompt Group**. International expert recommendations of clinical features to prompt referral for diagnostic assessment of cerebral palsy**. Development Medicine & Child Neurology. 2020. 62(1):89-96 Retreived From: https://www.ncbi.nlm.nih.gov/pubmed/31025318	**Subjects:** **Methods:** An online Delphi survey was conducted with international experts in early identification and intervention for children with CP, to validate the results obtained in two previous consensus groups with Canadian content experts and knowledge users. We	**Clinical features to prompt referral for diagnosis (one or more of the following)** 1. The child demonstrates a hand preference before 12mo of age 2. The child demonstrates stiffness or tightness in the legs between 6–12mo of age (e.g. unable to bring their toes to mouth when having their diaper/nappy changed) 3. The child keeps their hands fisted (closed/clenched) after the age of 4mo 4. The child demonstrates a persistent head lag beyond 4mo of age 5. The child is not able to sit without support beyond 9mo of age 6. The child demonstrates consistent asymmetry of posture and movements after the age of 4mo **'Warning Sign' features to prompt monitoring rather than referral for diagnosis (either of the following)**		

	sent two rounds of questionnaires by e-mail. Participants rated their agreement using a 4-point Likert scale, along with optional open-ended questions for additional feedback. Additionally, a panel of experts and knowledge-users reviewed the results of each round and determined the content of subsequent surveys.	1. The child demonstrates a persistent startle (Moro) reflex beyond 6mo of age 2. The child demonstrates consistent toe-walking or asymmetric-walking beyond 12mo of age Referral recommendations to occur simultaneously with referral to a medical specialist for diagnosis 1. All children should be referred to a motor intervention specialist (e.g. pediatric occupational therapist and/or pediatric physical therapist) 2. If the child manifests a delay in communication they should be referred to a speech-language pathologist 3. If the child manifests hearing concerns a referral should be made to an audiologist 4. If the child manifests vision difficulties (e.g. not fixating, following, and/or tracking) a referral should be made to an optometrist or an ophthalmologist, and to a functional vision specialist (e.g. occupational therapist with expertise in pediatric vision; early childhood vision consultants)\ 5. If the child manifests feeding difficulties (e.g. poor sucking, swallowing, choking, not gaining weight) a referral should be made to a feeding specialist (e.g. occupational therapist or speech-language pathologist)

6.13 GENITALIA

Genitalia References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

Sorokan, S. T., Finlay, J. C., Jefferies, A. L., Canadian Paediatric Society, F., Newborn Committee, I. D., & Immunization, C. **Newborn male circumcision.** Paediatr Child Health. 2015; 20(6): 311-320. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/26435672	**Subjects:** Male newborns **Design**: CPS Position statement **Methods:** This statement provides guidance and up-to-date information for healthcare providers and parents of male newborns, to enable them to make informed decisions regarding circumcision. A Medline search using the MESH heading "circumcision, male" was performed, yielding 1 596 articles. These articles were subsequently reviewed, as were their references where appropriate. The focus was on neonatal and infant male circumcision and its outcomes. The hierarchy of evidence from the Centre for Evidence-Based Medicine was applied, using levels of evidence for therapy and prognosis.	The medical risk:benefit ratio of routine newborn male circumcision is closely balanced when current research is reviewed. Current evidence indicates that there are potential health benefits associated with male circumcision, particularly in high-risk populations. Infant circumcision reduces the incidence of UTI in young boys and eliminates the need for medical circumcision in later childhood to treat recurrent balanoposthitis, paraphimosis and phimosis. Circumcision in adult men can reduce the risk of acquiring an STI (specifically HIV, HSV and HPV). Circumcised men have a lower risk of developing penile cancer, while the incidence of trichomonas, bacterial vaginosis and cervical cancer in the female partners of circumcised men is also reduced. However, most data regarding the benefits and outcomes following circumcision come from elsewhere and it remains unclear whether these conclusions can be applied to Canada. Minor complications of circumcision (bleeding, local infection, unsatisfactory cosmetic result) can occur, although severe complications (partial amputation of the penis, death from hemorrhage or sepsis) are rare. The risk of complications is lower in infants than in older children. The complication rate decreases significantly when the procedure is performed by experienced healthcare professionals, with close follow-up in the days post-procedure to ensure that bleeding does not increase. In addition, surgical procedures, including circumcision, involve post-procedural pain that must be treated. Healthcare providers should also be aware of potential contraindications to neonatal circumcision, such as hypospadias or any risk of bleeding diathesis. **Recommendations:**		

		• The CPS does not recommend the routine circumcision of every newborn male. • Physicians and other health care professionals caring for newborns must stay informed about circumcision and assist parents in understanding potential risks and benefits of the procedure. • The parents of male newborns must receive the most up-to-date, unbiased and personalized medical information available about neonatal circumcision, so that they can weigh specific risks and benefits of circumcision in the context of their own familial, religious and cultural beliefs. • Parents who choose to have their sons circumcised should be referred to a practitioner who is trained in the procedure. • Neonatal male circumcisions must be performed by trained practitioners whose skills are up-to-date and strictly adhere to hygienic and analgesic best practices. • Close follow-up in the early post-circumcision time period is critical. The parents of circumcised boys must be thoroughly and accurately informed about post-procedural care and possible complications. • At the time of hospital discharge, health professionals should ensure that the parents of uncircumcised newborn boys know how to appropriately care for their son's penis and are aware that the normal foreskin can remain non-retractile until puberty.		
Community Paediatrics Committee, Canadian Paediatric Society. **Ethical approach to genital examination in children.** Paediatr Child Health. 1999; 4(1): 71-72. Reaffirmed: February 1 2016. Retrieved from	**Subjects:** Children **Design**: CPS Position statement **Methods:** This statement provides healthcare providers with practices recommended for the genital examination of the paediatric patient.	Ethical standards are important in a physician's practice during a genital examination, particularly respect for the child, sensitivity to the child's needs, and patience in performing the examination. **Recommendations**: 1. Examination of the genitalia should be performed only when specifically indicated, such as during the periodic health exam to check for normal development of the external genitalia, to look for		

http://www.ncbi.nlm.nih.gov/pubmed/20212992		endocrine anomalies, to check for physical signs of suspected abuse, or if requested by the parents; 2. Patients should not be touched on the genitals or breasts except when required as part of the physical examination. They should always be advised before being touched; 3. If the child is not at ease with a genital examination, neither force nor restraint should ever be used. The reason for the examination should be clearly explained to the parents and the child (e.g. cases of alleged sexual abuse, trauma, infection). If the child refuses to cooperate, the examination should be postponed; 4. For infants and school-aged children, the child's parent(s) or caregiver should remain close to the child throughout the examination. The child should be assisted with undressing as necessary and be allowed to dress as soon as the physical examination is completed. The examination should be done slowly and carefully so as to minimize discomfort and pain. Girls can sit on the parent's or caregiver's lap in the supine frog-legged position. This allows for adequate visualization of the introitus and anus, and is less anxiety-provoking than other positions. The knee-chest position, where the child is on her hands and knees, allows for better views of the hymen and vaginal vault but may be frightening because the examiner is out of view. In boys, the lateral decubitus position allows for an adequate examination.		

6.14 BACK EXAM/SACRAL DIMPLE/ANUS

Back exam/sacral dimple/anus recommendation	Strength of Recommendation
Spine/Anus: Examine spine for cutaneous signs of occult spinal dysraphism. Check anal patency.	Consensus

Anal Patency in Newborns Reference
See report of a case review by the Office of the Chief Coroner Pediatric Death Review Committee.

Back Exam/Sacral Dimple References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Holmes LC, Li V. Occult spinal dysraphisms. Pediatrics in Review;2019; 40 (12) 650-652.		Review article.		
Albert G. Spine ultrasounds should not be routinely performed for patients with simple sacral dimples. Acta Paediatrica; 2016:105(8) 890-894.		**Abstract** Primary care providers commonly obtain spine ultrasounds for neonates with simple sacral dimples due to perceived concerns about underlying spinal dysraphism, despite a lack of scientific evidence. Nine papers addressing routine spine ultrasounds for children with sacral dimples showed that 3.4% of the 5166 patients had abnormal spine ultrasounds, compared with the 4.8% reported by another study for children without sacral dimples. Most of the abnormal findings in patients with sacral dimples were of no clinical significance. Conclusion Sacral dimples do not predict underlying spinal cord malformations,		

		and spine ultrasounds should not be performed for neonates with simple sacral dimples.		
Dias M, Partington M. Congenital Brain and Spinal Cord Malformations and Their Associated Cutaneous Markers. **Pediatrics October 2015, 136 (4) e1105-e1119; DOI: https://doi.org/10.1542/peds.2015-2854**		**Abstract:** The brain, spinal cord, and skin are all derived from the embryonic ectoderm; this common derivation leads to a high association between central nervous system dysraphic malformations and abnormalities of the overlying skin. A myelomeningocele is an obvious open malformation, the identification of which is not usually difficult. However, the relationship between congenital spinal cord malformations and other cutaneous malformations, such as dimples, vascular anomalies (including infantile hemangiomata and other vascular malformations), congenital pigmented nevi or other hamartomata, or midline hairy patches may be less obvious but no less important. Pediatricians should be aware of these associations, recognize the cutaneous markers associated with congenital central nervous system malformations, and refer children with such markers to the appropriate specialist in a timely fashion for further evaluation and treatment.		
Zywicke HA, Rozzelle CJ. Sacral dimples. Pediatrics in Review; 2011, 32 (3) 109-114		Review article.		

7.0 INVESTIGATIONS

7.1 ANEMIA SCREENING

Anemia Screening Recommendation	Strength of Recommendation
1. *Screening for iron deficiency anemia should be considered between 6 and 18 months of age for infants/children from high risk groups: E.g. Low SES; Indigenous communities; newly arrived refugee, internationally adopted and immigrant children from resource-poor countries; low-birth-weight and premature infants; infants/children fed whole cow's milk before 9 months of age or at quantities > 500 mls/day; prolonged bottle feeding beyond 15 months of age; or sub-optimal intake of iron-containing foods. Beyond this age, anemia screening as per additional risk factors*	*Fair*

Anemia Screening Resources
1. Iron requirements (CPS)

Anemia Screening and Iron Supplementation References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Angulo-Barroso RM, Li M, Santos DCC, Bian Y, Sturza J, Jiang Y, Kaciroti N, Richards B and Lozoff B. Iron supplementation in pregnancy or infancy and motor development: a randomized controlled trial. Pediatrics 2016, peds.2015-3547; DOI: https://doi.org/10.1542/peds.2015-3547		Abstract: **BACKGROUND AND OBJECTIVE:** Insufficient iron levels for optimal fetal and infant development is a concern during pregnancy and infancy. The goal of this study was to assess the effects of iron supplementation in pregnancy and/or infancy on motor development at 9 months. **METHODS:** The study was a randomized controlled trial (RCT) of infancy iron supplementation linked to an RCT of pregnancy iron supplementation, conducted in Hebei, China. A total of 1482 infants were randomly assigned to receive placebo (*n* = 730) or supplemental iron (*n* = 752) from 6 weeks to 9 months. Gross motor development (assessed by using the Peabody Developmental Motor Scale, Second Edition, instrument) was the primary outcome. Neurologic integrity and motor quality were secondary outcomes. **RESULTS:** Motor outcome was available for 1196 infants, divided into 4 supplementation period groups: (1) placebo in pregnancy/placebo in infancy (*n* = 288); (2) placebo in pregnancy/iron in infancy (*n* = 305); (3) iron in pregnancy/placebo in infancy (*n* = 298); and (4) iron in pregnancy/iron in infancy (*n* = 305). Using the Peabody Developmental Motor Scale, instrument, iron supplementation in infancy but not pregnancy improved gross motor scores: overall, *P* < .001; reflexes, *P* = .03; stationary, *P* < .001; and locomotion, *P* < .001. Iron supplementation in infancy improved motor scores by 0.3 SD compared with no supplementation or supplementation during pregnancy alone. Effects of iron supplementation in infancy alone were similar to effects with iron in both pregnancy and infancy. **CONCLUSIONS:** The RCT design supports the causal inference that iron supplementation in infancy, with or without iron supplementation in pregnancy, improved gross motor test scores at 9 months.		

Siu, A. L., & Force, U. S. P. S. T. **Screening for Iron Deficiency Anemia in Young Children: USPSTF Recommendation Statement.** Pediatrics. 2015; 136(4): 46-752.	**Subjects:** Children 6 – 24 months **Design:** USPSTF Recommendation Statement **Methods:** This is an update of the USPSTF 2006 recommendation on screening for iron deficiency anemia. The USPSTF has reviewed the evidence on an association between change in iron status as a result of intervention and improvement in child health outcomes, as well as screening for and treatment of iron deficiency anemia with oral iron formulations, in children ages 6 - 24 months.	The USPSTF concludes that the current evidence is insufficient to determine the balance of benefits and harms of screening for iron deficiency anemia in asymptomatic children ages 6 - 24 months, and thus cannot make a recommendation in favor of or against screening (I statement). This conclusion applies to children aged 6 - 24 months living in the United States who are asymptomatic for iron deficiency anemia. It does not apply to children <6 months or >24 months, children who are severely malnourished, children who were born prematurely or with low birth weight, or children who have symptoms of iron deficiency anemia. No studies directly evaluated the effectiveness of screening for iron deficiency anemia in asymptomatic children ages 6 - 24 months and reported on health outcomes. In addition, no new studies of oral iron treatment of iron deficiency anemia in this age group were found. The USPSTF also found inadequate evidence on the harms of routine screening for iron deficiency anemia in asymptomatic children ages 6 - 24 months. In addition, no new studies that reported on the harms of iron treatment in children ages 6 – 24 months were found.		See outcomes

McDonagh, M. S., Blazina, I., Dana, T., Cantor, A., & Bougatsos, C. **Screening and routine supplementation for iron deficiency anemia: a systematic review.** Pediatrics. 2015; 135(4): 723-733.	**Subjects:** Children 6 – 24 months **Design:** Review **Methods:** This study reviewed the evidence regarding the benefits and harms of screening and routine supplementation for iron deficiency anemia for the USPSTF recommendation statement. The Medline and Cochrane databases (1996–August 2014) were searched, as well as reference lists of relevant systematic reviews. Trials and controlled observational studies regarding the effectiveness and harms of routine iron supplementation and screening in children ages 6 - 24 months conducted in developed countries were included. Dual quality assessment was performed.	This review found no evidence regarding the effects of routine iron supplementation in young children on diagnosis of psychomotor or neurodevelopmental delay or quality of life. Furthermore, developmental test scores after 3- to 12-month follow-up periods were not significantly different in 2 trials. 5 of 6 trials sparsely reporting various growth outcomes found no clear benefit of supplementation. Ten trials assessing iron supplementation in children reported inconsistent findings for hematologic measures. Harms of routine iron supplementation in children were rarely reported, and supplementation did not result in higher rates in studies reporting harms. No studies assessed the benefits or harms of screening asymptomatic children aged 6 - 24 months for iron deficiency anemia. This review found only very limited evidence regarding the benefits and harms of iron deficiency treatment. This comprised 1 study on short term benefits, which indicated no differences between children receiving iron supplementation and placebo in the incidence of overall or specific adverse events, including gastrointestinal events. The evidence does not support a clear association between change in iron status and potential long term benefits, such as normal growth or neurodevelopment. It must be noted that a limited number of studies were available for analysis with significant clinical and methodologic heterogeneity (differences among studies in design, population, and outcomes). This review concludes that the limited evidence indicates no benefits in growth and neurodevelopmental test scores with supplementation, and hematologic outcomes are variably affected. The benefits and harms of treatment are largely unclear, as is the association between improvement in IDA or iron deficiency and clinical outcomes.		

Janus J, Moerschel SK. **Evaluation of anemia in children.** Am Fam Physician. 2010 Jun 15;81(12):1462-71. Available from: PubMed	**Subjects:** Children **Design**: Overview of the recommendations **Methods:** not reported.	Anemia is defined as a hemoglobin level of less than the 5th percentile for age. Causes vary by age. Most children with anemia are asymptomatic, and the condition is detected on screening laboratory evaluation. Screening is recommended only for high-risk children. Anemia is classified as microcytic, normocytic, or macrocytic, based on the mean corpuscular volume. Mild microcytic anemia may be treated presumptively with oral iron therapy in children six to 36 months of age who have risk factors for iron deficiency anemia. If the anemia is severe or is unresponsive to iron therapy, the patient should be evaluated for gastrointestinal blood loss. Other tests used in the evaluation of microcytic anemia include serum iron studies, lead levels, and hemoglobin electrophoresis. Normocytic anemia may be caused by chronic disease, hemolysis, or bone marrow disorders. Workup of normocytic anemia is based on bone marrow function as determined by the reticulocyte count. If the reticulocyte count is elevated, the patient should be evaluated for blood loss or hemolysis. A low reticulocyte count suggests aplasia or a bone marrow disorder. Common tests used in the evaluation of macrocytic anemias include vitamin B12 and folate levels, and thyroid function testing. A peripheral smear can provide additional information in patients with anemia of anymorphology.		
Baker, RD, Greer, FR., Committee on Nutrition American Academy of Pediatrics. **Diagnosis and prevention of iron deficiency and iron-deficiency anemia in infants and young children (0-3 years of age**). Pediatrics. 2010. 126(5): 1040-1050 Retrieved From:	**Subjects:** Infants and Young Children (0–3 Years of Age) **Design:** Clinical Report **Methods:**	**Abstract** This clinical report covers diagnosis and prevention of iron deficiency andiron-deficiency anemia in infants (both breast fed and formula fed) and toddlers from birth through 3 years of age. Results of recent basic research support the concerns that iron-deficiency anemia and iron deficiencywithoutanemiaduringinfancyandchildhoodcanhavelongl asting detrimental effects on neurodevelopment. Therefore, pediatricians and other health care providers should strive to eliminate iron deficiency and iron-deficiency anemia. Appropriate iron intakes for infants and toddlers as well as methods for screening for iron deficiency and iron-deficiency anemia are presented.		

https://www.ncbi.nlm.nih.gov/pubmed/20923825				
World Health Organization. **Guideline: Daily Iron Supplementation in Infants and Children.** Geneva. 2016 Available From: https://www.ncbi.nlm.nih.gov/books/NBK362032/	**Subjects:** Infants and Children **Design:** Guideline	**Excerpt** This guideline provides global, evidence-informed recommendations on daily iron supplementation in infants and children, as a public-health intervention for the prevention of anaemia and iron deficiency. It includes recommendations for iron supplementation in countries where malaria is prevalent. The guideline aims to help Member States and their partners in their efforts to make informed decisions on the appropriate nutrition actions to achieve the Sustainable Development Goals, in particular, Goal 2: End hunger, achieve food security and improved nutrition and promote sustainable agriculture. It will also support Member States in their efforts to achieve the global targets set in the *Comprehensive implementation plan on maternal, infant and young child nutrition*, as endorsed by the Sixty-fifth World Health Assembly in 2012, in resolution WHA65.6, and the *Global strategy For women's, children's, and adolescents' health (2016–2030)*. The recommendations in this guideline are intended for a wide audience, including policy-makers, their expert advisers, and technical and programme staff at organizations involved in the design, implementation and scaling-up of programmes for anaemia prevention and control, and in nutrition actions for public health. This document presents the key recommendations and a summary of the supporting evidence.		
Wang, M. **Iron Deficiency and Other Types of Anemia in Infants and Children.** American Family Physician. 2016. 93(4). Retrieved from:	**Subjects:** Infants and Children	**Abstract** Anemia, defined as a hemoglobin level two standard deviations below the mean for age, is prevalent in infants and children worldwide. The evaluation of a child with anemia should begin with a thorough history and risk assessment. Characterizing the anemia as microcytic, normocytic, or macrocytic based on the mean corpuscular volume will aid in the workup and management. Microcytic anemia due to iron deficiency is the most common type of anemia in children. The American Academy of Pediatrics and the World Health Organization recommend routine screening for anemia at 12 months of age; the U.S. Preventive		

https://www.ncbi.nlm.nih.gov/pubmed/26926814		Services Task Force found insufficient evidence to assess the benefits vs. harms of screening. Iron deficiency anemia, which can be associated with cognitive issues, is prevented and treated with iron supplements or increased intake of dietary iron. The U.S. Preventive Services Task Force found insufficient evidence to recommend screening or treating pregnant women for iron deficiency anemia to improve maternal or neonatal outcomes. Delayed cord clamping can improve iron status in infancy, especially for at-risk populations, such as those who are preterm or small for gestational age. Normocytic anemia may be caused by congenital membranopathies, hemoglobinopathies, enzymopathies, metabolic defects, and immune-mediated destruction. An initial reticulocyte count is needed to determine bone marrow function. Macrocytic anemia, which is uncommon in children, warrants subsequent evaluation for vitamin B12 and folate deficiencies, hypothyroidism, hepatic disease, and bone marrow disorders.		
Szymlek-Gay E. A., Ferguson, E.L., Heath, A-L., Gray, A.R., Gibson, R.S., **Food-based strategies improve iron status in toddlers: a randomized controlled trial.** Am J Clin Nutr 2009;90:1541–51 Available from: https://www.ncbi.nlm.nih.gov/pubmed/19828711	**Subjects:** 12–20-mo-old children **Design:** randomized placebo-controlled trial **Methods:** In the 20-wk randomized placebo-controlled trial, 225 healthy non-anemic 12-20 mo old children were assigned to 1 of 3 groups: red meat(toddlers encourage to consume ~2.6 mg iron from red meat dishes daily), fortified milk[toddler's regular milk replaced with iron-fortified(1.5 mg iron/100 g prepared	See paper for full outcomes. "In summary, we found no evidence that the red meat intervention had an effect on the prevalence of suboptimal iron status in this group of toddlers. The fortified milk group was not powered sufficiently to detect this. However, our results show that in healthy non-anemic toddlers, both the iron-fortified milk strategy and the increased red meat strategy are likely to prevent the decline in iron stores that can occur during the second year of life. The improvements in biochemical iron status achieved through an increase in red meat consumption are, however, considerable smaller than those possible with iron fortified milk. Only the iron-fortified milk strategy is likely to ensure an increase in toddlers' iron stores."		

	milk) cow milk], or control [toddlers' regular milk replaced with nonfortified (0.01 mg iron/100 g prepared milk) cow milk]. Blood samples were collected at baseline and at 20 wk for hemoglobin, serum ferritin, serum transferrin receptor, and C-reactive protein. The prevalence of suboptimal iron status (ie, depleted iron stores, iron-deficient erythropoiesis, and iron deficiency anemia) was determined, and body iron was calculated.			
Abdullah, K., Kendzerska T., Shah, P., Uleryk E., Parkin, P.C. **Efficacy of oral iron therapy in improving the developmental outcome of pre-school children with non-anaemic iron deficiency: a systematic review.** Public Health Nutrition. 2012. 16(8):1497-1506. Retrieved from:	**Subjects:** pre-school children (1–5 years) **Design:** Systematic Review **Methods:** A comprehensive search strategy was performed to identify all relevant studies, including searching the electronic literature and hand searching. We searched the following electronic databases and updated results as of 13 January	**Conclusions** Our findings suggest that data regarding developmental outcomes of children with NAID following treatment with oral Fe abstracted from trials specifically aimed at understanding the relationship between Fe and development in children with IDA are few and inconclusive. NAID as a cause of poor development and the efficacy of oral Fe therapy to reverse or prevent Fe-related developmental impact in this population can only be achieved by randomized trials specifically targeting children with NAID. It is imperative that these trials have adequate sample size to detect significant differences in the NAID population. Current evidence indicating the irreversible nature of IDA further strengthens the need to identify and treat children with ID while they are still in the non-anaemic stage		

https://www.ncbi.nlm.nih.gov/pubmed/22894941	2011: MEDLINE (1950 **to the present),** EMBASE (1980–2011 Week 1) and the Cochrane Controlled Trials Register (CCTR; Cochrane Library issue 4, 2010). We scanned reference lists of identified trials and important			
Pasricha, S.R., Hayes, E. Kalumba, K., Biggs, B-A. **Effect of daily iron supplementation on health in children aged 4–23 months: a systematic review and meta-analysis of randomised controlled trials.** Lancet Global Health, 2013. 1(2): e77-e86. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/25104162	**Subjects: children aged 4-23 months** **Design: systematic review and meta-analysis** **Methods:** We searched Scopus and Medline, from inception to Feb 5, 2013, WHO databases, theses repositories, grey literature, and references. Randomised controlled trials that assigned children 4-23 months of age to daily oral iron supplementation versus control were eligible. We calculated mean difference (MD) or standard MD (SMD) for continuous variables, risk ratios for dichotomous	**Discussion** Our study shows that daily iron supplementation improves haemoglobin and iron indices and substantially reduces the risk of anaemia, iron deficiency, and especially IDA in children aged 4–23 months. However, benefits to development and growth from daily iron supplementation in this age group are unclear. Participants of included studies were at high risk of anaemia (ie, 44% prevalence of anaemia at endpoint in the control group of the meta-analysis), iron deficiency (32% prevalence at endpoint in control group), and IDA (20% prevalence in control group). Most studies were done in low-income or middle-income settings. Our findings are thus relevant to anaemia control programmes in developing countries. IDA is an important medical problem in young children (panel 3 43 44 45 46 47 48 49), associated with symptoms including lethargy, irritability, pica, and poor oral intake. We identified a clear improvement in haemoglobin (MD 7·22 g/L, 26 studies) and reduction in the prevalence of anaemia (risk ratio 0·61, 17 studies; table) in children receiving daily iron supplementation. Gera and colleagues 43 identified a similar effect of iron on haemoglobin (MD 7·4 g/L) but did not do meta-analysis for anaemia, instead estimating that between 37·9% and 62·3% of baseline anaemia is amenable to control by iron, less so in malaria-endemic areas. Likewise, we noted a smaller effect from iron on anaemia in malaria-endemic areas (risk ratio 0·70) than non-endemic areas (0·40;		

	data, and rate ratios for rates. We quantified heterogeneity with the I(2) test and synthesised all data with a random-effects model. This review is registered with the International Prospective Register of Systematic Reviews, number CRD42011001208.	appendix p 28). De-Regil and colleagues 44 showed that multiple-micronutrient fortification reduced anaemia by 31% and iron deficiency by 51% in children younger than 2 years (six studies), whereas intermittent iron in children younger than 12 years reduced anaemia by 49% and iron deficiency by 76% (ten studies). 12 We conclude that iron supplementation can be expected to halve the prevalence of anaemia in young children (with greater reductions in the prevalence of iron deficiency [risk ratio 0·30] and IDA [0·14]; table). These estimates should guide realistic targets for anaemia control programmes.		
Thompson, J., Biggs, B-A., Pasricha, S-R., **Effects of Daily Iron Supplementation in 2- to 5-Year-Old Children: Systematic Review and Meta-analysis.** Pediatrics. 2013, 131 (4) 739-753 Retrived form: https://pediatrics.aappublications.org/content/131/4/739	**Subjects:** 2- to 5-Year Old Children **Design:** Systematic Review and Meta-analysis **Methods:** Electronic databases, regional databases, thesis repositories, gray literature, and references of studies and previous reviews were searched. We included randomized controlled trials that compared daily oral iron supplementation with control in 2 to 5 year olds. A random-effects meta-analysis was used to synthesize predefined outcomes reported by at least 2	**CONCLUSIONS** This systematic review and meta analysis confirm the benefit of daily iron supplementation on Hb and iron stores in 2- to 5-year-old children. A small benefit from iron on cognitive parameters is suggested, although the number of studies is small, and the combination of the different scales limits the validity of meta-analysis. Our study highlights a concerning lack of data on the effect of iron supplementation on the clinically important outcomes of anemia, ID, IDA, and cognitive development in the important preschool age group. Additional research is needed to address the operational challenges associated with delivering iron supplementation programs in the field. There remains a need for well conducted and clearly reported interventional studies in this age group that evaluate important clinical and functional outcomes, side effects, and adherence.		

	studies.			
De-Regil, L.M., Jefferds, MED., Sylvetsky, Ac>c, Dowswell, T. **Intermittent iron supplementation for improving nutrition and development in children under 12 years of age. Cochrane Systematic Reviews.** **2011.** Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4547491/	**Subjects:** children under 12 years of age **Design:** Systematic Review **Methods:** We searched the following databases on 24 May 2011: CENTRAL (2011, Issue 2), MEDLINE (1948 to May week 2, 2011), EMBASE (1980 to 2011 Week 20), CINAHL (1937 to current), POPLINE (all available years) and WHO International Clinical Trials Registry Platform (ICTRP). On 29 June 2011 we searched all available years in the following databases: SCIELO, LILACS, IBECS and IMBIOMED. We also contacted relevant organisations (on 3 July 2011) to identify ongoing and unpublished studies.	**MAIN RESULTS:** We included 33 trials, involving 13,114 children (˜49% females) from 20 countries in Latin America, Africa and Asia. The methodological quality of the trials was mixed. Nineteen trials evaluated intermittent iron supplementation versus no intervention or a placebo and 21 studies evaluated intermittent versus daily iron supplementation. Some of these trials contributed data to both comparisons. Iron alone was provided in most of the trials. Fifteen studies included children younger than 60 months; 11 trials included children 60 months and older, and seven studies included children in both age categories. One trial included exclusively females. Seven trials included only anaemic children; three studies assessed only non-anaemic children, and in the rest the baseline prevalence of anaemia ranged from 15% to 90%.In comparison with receiving no intervention or a placebo, children receiving iron supplements intermittently have a lower risk of anaemia (average risk ratio (RR) 0.51, 95% confidence interval (CI) 0.37 to 0.72, ten studies) and iron deficiency (RR 0.24, 95% CI 0.06 to 0.91, three studies) and have higher haemoglobin (mean difference (MD) 5.20 g/L, 95% CI 2.51 to 7.88, 19 studies) and ferritin concentrations (MD 14.17 µg/L, 95% CI 3.53 to 24.81, five studies).Intermittent supplementation was as effective as daily supplementation in improving haemoglobin (MD -0.60 g/L, 95% CI -1.54 to 0.35, 19 studies) and ferritin concentrations (MD -4.19 µg/L, 95% CI -9.42 to 1.05, 10 studies), but increased the risk of anaemia in comparison with daily iron supplementation (RR 1.23, 95% CI 1.04 to1.47, six studies). Data on adherence were scarce and it tended to be higher among those children receiving intermittent supplementation, although this result was not statistically significant. We did not identify any differential effect of the type of intermittent supplementation regimen (one, two or three times a week), the total weekly dose of elemental iron, the nutrient composition, whether recipients were male or female or the length of the intervention.		

Abdullah, K., Birken, C.S., Maguire, J.L., Fehlings, D., Hanley, A.J., Thorpe, K.E., Parkin, P.C., **Re-Evaluation of Serum Ferritin Cut-OffValues for the Diagnosis of Iron Deficiency in ChildrenAged 12-36 Months.** The Journal of Pediatrics. 2017, 188: 287-290. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0022347617303773?via%3Dihub	**Subjects**: Children aged 12-36 months **Design:** Cross Sectional Study **Methods:** Data on children's health, nutrition, and sociodemographicchara cteristicswerecollected prospectivelywithastan dardized parent-completed survey instrument. A sample of blood also was collected and analyzed to determine children's iron status by the use of iron specific indicators—Hb, serum ferritin, and CRP. Serum ferritin was measured with a Roche Modular platform (Roche Diagnostics Limited, Rotkreuz, Switzerland), and Hb was measured using Sysmex platform (Sysmex Canada, Mississuaga, ON, Canada).20,21 All diagnostic assessments were performed at the Mount Sinai Services Laboratory (www.mountsinaiservic	**Results** Blood samples of 1257 children (12-36 months of age) were analyzed for Hb and serum ferritin. The mean (±SD) age of thechildrenwas18.9(5.9) months,and53.5%weremale.Mean (±SD) serum ferritin and Hb were 27.7 (19.7)g/L and 119.3 (8.8) g/L, respectively. Children's health, nutrition, and sociodemographic characteristics have been reported previously in the cohort profile.28 Compared with nested univariate models of linear predictors, the model with RCS showed a likelihood ratio c2 value of 91.07(P<.001), indicating that a non linear relationship (between serum ferritin and Hb) had a better fit to the data. Using RCS regression analysis, we found serum ferritin to be significantly associated with Hb (P ≤ .001), age (P ≤ .001), and sex(P=.004)inthe4-knotsmodelandwithHb(P≤.001) and age (P=.003) in the 5-knots model. From the model with 4 knots, we identified a serum ferritin value of 23.7 g/L corresponding to the "Hb plateau point" of 121.2g/L(see Methods for definition). Figure 1 shows the plot of the RCS regression model with 4 knots, which depicts a 2-phase association between serum ferritin and Hb with a strong increase up to the "Hb plateau point," followed by a much milder increase afterwards. The serum ferritin value of 2.4 g/L corresponded to the Hb value of 110 g/L (mean age 18.9 months and sex=male).Similarly,themodelwith5knots(Figure 2)identified a serum ferritin value of 17.9 g/L corresponding to the "Hb plateau point" of 121.0 g/L; and a serum ferritin value of 4.6 g/L corresponded to the Hb value of 110 g/L (mean age 18.9 months and sex = male).		C

	es.com).Approval for data collection was received from the Hospital for Sick Children and St Michael's Hospital research ethics boards, and informed consent was received from parents of participating children			
Maguire, J.L., Lebovic, G., Kandasamy, S., Khovratovich, M., Mamdani, M., Birken, C.S., Parkin, P.C., on behalf of the TARGet Kids! And Collaboration, **The Relationship Between Cow's Milk and Stores of Vitamin D and Iron in Early Childhood.** Pediatrics. 2013. 131(1):e144-151 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/23248224	**Subjects:** children 2 to 5 years of age **Design:** **Method:** Healthy children 2 to 5 years of age were recruited from December 2008 through December 2010 through the TARGet Kids! practice-based research network. Cow's milk intake was measured by parental report. Vitamin D and iron stores were measured by using serum 25-hydroxyvitamin D and ferritin. Bivariate multivariable linear regression was used to examine the effect of cow's milk intake simultaneously on 25-hydroxyvitamin D and	**RESULTS:** Among 1311 children, increasing cow's milk consumption was associated with decreasing serum ferritin ($P < .0001$) and increasing 25-hydroxyvitamin D ($P \leq .0001$). Two cups (500 mL) of cow's milk per day maintained 25-hydroxyvitamin D >75 nmol/L with minimal negative effect on serum ferritin for most children. Children with darker skin pigmentation not receiving vitamin D supplementation during the winter required 3 to 4 cups of cow's milk per day to maintain 25-hydroxyvitamin D >75 nmol/L. Cow's milk intake among children using a bottle did not increase 25-hydroxyvitamin D and resulted in more dramatic decreases in serum ferritin.		C

	serum ferritin. Analyses were stratified by important clinical variables including skin pigmentation, bottle feeding, vitamin D supplementation, and season.			
Cox, K.A., Parkin, P.C., Anderson, L.N., Chen, Y., Birken, C.S., Maguire, J.L., Macarthur, C., Borkhoff, C.M. **Association Between Meat and Meat-Alternative Consumption and Iron Stores in Early Childhood.** Academic Pediatrics. 2016. 16(8):783-791 Retrieved from: https://www.sciencedirect.com/science/article/pii/S187628591600019X	**Subjects:** Infants from 6 to 24 months **Design:** Cross Sectional Study **Methods**: Healthy children aged 12-36 months were recruited. A cross-sectional study was conducted. Meat and meat-alternative consumption was measured using the Nutri-STEP questionnaire. Adjusted multivariate regression analyses were used to evaluate an association between meat consumption and serum ferritin, and iron deficiency(serum ferritin <14µg/L)	**Conclusions:** Daily cow's milk intake of >2 cups, longer breast-feeding duration, and a higher body mass index z score were modifiable risk factors associated with iron deficiency. Eating meat according to recommendations may be a promising additional target for the prevention of iron deficiency in early childhood.		C

7.2 HEMOGLOBINOPATHY SCREENING

Hemoglobinopathy Screening Recommendation	Strength of Recommendation
1. Screen all neonates from high-risk groups: Asian, African and Mediterranean.	**Good**

Hemoglobinopathy Screening References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Lin K, Barton M. **Screening for Hemoglobinopathies in Newborns: Reaffirmation Update for the U.S. Preventive Services Task Force.** Evidence Synthesis No. 52. Rockville, MD: Agency for Healthcare Research and Quality, August 2007. AHRQ Publication No. 07-05104-EF-1.UPDATE in progress. Available from: http://www.uspreventiveservicestaskforce.org/uspstf07/sicklecell/sicklers.htm	**Subjects:** Newborns **Design**: Systematic review **Methods:** The goal of this targeted review was to find new, high-quality evidence regarding the benefits and potential harms of screening for hemoglobinopathies in newborns.	Sixty-nine studies were initially identified. One systematic review of benefits of screening, one systematic review of benefits of penicillin prophylaxis, and three articles about potential harms met inclusion criteria and are discussed in this review. Authors found no substantial new evidence since 1996 on the benefits or harms of screening for hemoglobinopathies in newborns.	I	

7.3 UNIVERSAL NEWBORN HEARING SCREENING (UNHS)

Universal Newborn Hearing Screening (UNHS) Recommendation	Strength of Recommendation
1. Universal newborn hearing screening (UNHS) effectively identifies infants with congenital hearing loss and allows for early intervention & improved outcomes.	**Good**

"				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Levit, Y., Himmelfarb, M., & Dollberg, S. **Sensitivity of the Automated Auditory Brainstem Response in Neonatal Hearing Screening**. Pediatrics. 2015; 136(3): e641-647.	**Subjects:** Newborns **Design:** Prospective cohort study **Methods:** Data from 17 078 infants born at Lis Maternity Hospital, Israel between Jan 2013 - June 2014 were reviewed to estimate the rate of hearing loss detected by first-stage otoacoustic emissions test but missed by second-stage automated ABR testing. Infants who failed screening with a transient evoked otoacoustic emissions (TEOAE) test and infants with risk indicators for neural hearing loss (admitted to NICU for >5 days) underwent screening with an automated ABR test at 45 decibel hearing level	In a 2-stage neonatal hearing screening protocol, if an infant fails the first-stage screening with an otoacoustic emissions test, an automated auditory brainstem response (ABR) test is performed. Including the automated ABR test has shown to reduce the false positive rate and to minimize unnecessary referrals to the hearing clinic. The purpose of this study was to further investigate the rate of hearing loss detected by first-stage otoacoustic emissions but missed by automated ABR hearing screening tests. Of the 17 078 infants in the cohort, 16 965 (99.34%) were screened for hearing loss before hospital discharge. 22 infants were diagnosed with hearing loss after a "failed TEOAE/passed automated ABR" screening result which comprised 52% of all infants diagnosed with hearing loss (22/42). This group included 13 infants without any known risk indicators for hearing loss (13/22; 59%). After urine tests, congenital CMV was diagnosed in 2 of the infants in this group (2/22; 9%). Hearing loss greater than 45 dB HL in 1 or both ears, as measured by the diagnostic ABR, was diagnosed in 19 infants in the cohort. Although hearing loss in this range is considered to be of a moderate to profound severity, 8 of these infants passed the hearing screening with automated ABR to a click stimulus presented at 45 dB HL (8/19; 42%). They comprised 36% of the infants with a failed TEOAE/passed automated ABR screening result (8/22).		B

	(dB HL). All infants who failed screening with TEOAE were referred to a follow-up evaluation at the hearing clinic.	**Recommendations**: In well infants, if a 2-stage protocol is being used, it is recommended to refer infants with a failed TEOAE/passed automated ABR screening result to an audiology clinic for a follow-up. Furthermore, a repeated TEOAE test at the age of 10 - 30 days may serve as a good alternative for the second-stage screening.		
Pimperton H, Kennedy CR. **The impact of early identification of permanent childhood hearing impairment on speech and language outcomes**. Arch Dis Child. 2012 Jul;97(7):648-53. Abstract available from: PubMed	**Subjects:** Newborn **Design:** Review **Methods:** Review of the literature using PubMed to explore the effects of UNHS on later language outcomes.	Results from this review suggest that exposure to UNHS and early identification of PCHI are associated with benefits to language development in deaf children, with more consistent evidence provided for links between early identification and positive language outcomes. The relationship between early identification and superior language outcomes is likely to be mediated by intervention: early identification must be coupled with comprehensive early intervention programmes to improve the quality of the language input for children with PCHI (e.g., advice for parents on how best to support their child's communication in either the oral or manual modality, amplification using hearing aids, fitting of cochlear implants) during the first few months of life—a sensitive period for language development. The two studies reviewed in this paper that found benefits of 'early' identification on language outcomes used cut-off points for early identification of 6 months and 9 months, suggesting a time window for the ability to maximally benefit from intervention following early identification that ends before the age of 1year. **Conclusion:** UNHS and early identification of permanent childhood hearing impairment are associated with benefits to language development in deaf children.	II-3, II-2, II-1 B	C
Patel, H, Feldman, M. Canadian Paediatric Society, Community Paediatrics Committee. **Universal newborn hearing**	**Subjects:** Newborn **Design:** Position Statement **Methods:** Systematic review of the literature: using search dates from	This is an excellent CPS statement on hearing loss, screening, effective of earlier intervention, as well as limitations and cost-effective of universal newborn hearing screening. The statement reviewed three systematic reviews, one controlled nonrandomized trial and multiple cohort studies. The Canadian Paediatric Society	II-1 II-2 A	

screening. Paediatrics & Child Health. 2011; 16: 301-5. Reaffirmed February 1 2016. Available from: Canadian Paediatric Society	1996 to the third week of August 2009, Medline and Cochrane Central Register.	recommends hearing screening for all newborns. The authors state that "screening should be provided universally to all Canadian newborns via a comprehensive and linked system of screening, diagnosis and intervention".		
Nelson HD, Bougatsos C, Nygren P. **Universal newborn hearing screening: Systematic review to update the 2001 US Preventive Services Task Force recommendation.** Pediatrics. 2008;122:e266-e276. Abstract available from: PubMed	**Subjects**: Newborn infants **Design:** Systematic review **Methods:** Searched key databases (MEDLINE and Cochrane) for articles published since the 2001 recommendation.	Twenty studies were found. Overall, children who were universally screened as newborns were diagnosed and received hearing aids at younger ages than those not screened. Children with hearing loss who had universal hearing screening at birth had better language outcomes at school-age than those not screened. This was due to earlier referral, diagnosis and treatment.	II-1, II-2, II-3 B	

7.4 Tuberculosis

Tuberculosis Resources
Canadian TB Standards 2014

8.0 IMMUNIZATION

8.1 IMMUNIZATION GENERAL: recommendations and resources

General Immunization Recommendations
Influenza vaccine: Recommended for all children between 6 and 59 months of age, and for older high-risk children. - Previously unvaccinated children up to 9 years of age require 2 doses with an interval of at least 4 weeks. The second dose is not required if the child has received one or more doses of influenza vaccine during the previous immunization season. A quadrivalent vaccine should be used if available. - For children between 6 and 23 months, the quadrivalent inactivated influenza vaccine (QIV) should be used, and if not available, either unadjuvanted or adjuvanted trivalent inactivated vaccine (TIV). - Children 2-18 years of age should be given QIV, or quadrivalent live attenuated influenza vaccine (LAIV) if not contraindicated. Egg allergy is not a contraindication to vaccination with QIV, TIV, or LAIV. - Immunization with TIV or QIV in the second or third trimester to provide protection for the pregnant woman and infant < 6 months of age. **Diphtheria, Tetanus, acellular Pertussis, inactivated Polio virus vaccine and Haemophilus influenzae B (DTaP-IPV-Hib):** DTaP-IPV-Hib vaccine may be used for all doses in the vaccination series in children < 2 years of age, and for completion of the series in children < 5 years old who have received ≥ 1 dose of DPT (whole cell) vaccine (e.g., recent immigrants). **Diphtheria, Tetanus, acellular Pertussis, inactivated Polio virus vaccine, Haemophilus influenzae B and Hepatitis B (Hep B) (DTaP-IPV-Hib-Hep B)** is used for 3 of the 4 initial doses in some jurisdictions with routine infant Hep B vaccination programs. **Diphtheria, Tetanus, acellular Pertussis, inactivated Polio virus vaccine (DTaP-IPV)** may be used up to age 7 years and for completion of the series in incompletely immunized children 5-7 years old (healthy children ≥5 years of age do not require Hib vaccine). **Tetanus, Diphtheria, Pertussis, Polio (Tdap-IPV) Vaccine**, a quadrivalent vaccine containing less pertussis and diphtheria antigen than the preparations given to younger children and less likely to cause local reactions, is used for the preschool booster at 4-6 years of age in some jurisdictions and should be used in all individuals > 7 years of age receiving or completing their primary series. **Diphtheria, Tetanus, acellular Pertussis vaccine – (dTap)**: is used for booster doses in people ≥ 7 years of age. All adults should receive at least one dose of pertussis containing vaccine (excluding the adolescent booster). Immunization with dTap should be offered to pregnant women (≥26 weeks of gestation) who have not received an adult dose of pertussis vaccine, to provide immediate protection to infants less than 6 months of age. In an outbreak situation it may be offered regardless of immunization history. **Haemophilus influenzae type b conjugate vaccine (Hib)**: Hib is usually given as a combined vaccine (DTaP-IPV-Hib above). If required and not given in combination, Hib is available as Haemophilus b capsular polysaccharide – PRP conjugated to tetanus toxoid (Act-HIBTM or HiberixTM). The number of doses required depends on the age at vaccination and underlying health status.

Measles, Mumps and Rubella vaccine (MMR) and MMR-varicella (MMRV): The first dose is given at 12-15 months and a second dose should be given with the 18 month or preschool dose of DTaP-IPV (±Hib) (depending on the provincial/territorial policy), or at any intervening age that is practical but at least 4 weeks after the first if MMR, or 3 months after the first if MMRV. If MMRV is not used, MMR and varicella vaccines should be administered concurrently, at different sites, or separated by at least 4 weeks.

Pneumococcal vaccine - conjugate (Pneu-C-13) and polysaccharide (Pneu-P-23): Recommended schedule, number of doses and product depend on the age of the child, risk for pneumococcal disease, and when vaccination is begun. Consult NACI guidelines. Routine infant immunization: administer three doses of Pneu-C-13 vaccine at minimum 8-week intervals beginning at 2 months of age, followed by a fourth dose at 12 to 15 months of age. For healthy infants, a three-dose schedule may be used, with doses at 2 months, 4 months, and 12 months of age. Children 2 years and above who are at highest risk of invasive pneumococcal disease should receive Pneu-P-23. Consult NACI guidelines for eligibility and dosing schedule.

Respiratory syncytial virus: Palivizumab (Synagis) prophylaxis during RSV season for children with chronic lung disease, congenital heart disease or born preterm. Preventing hospitalizations for respiratory syncytial virus infection (CPS)

Other resources for information on immunization

Routine immunizations:

- See the Canadian Immunization Guide for recommended immunization schedules for infants, children, youth, and pregnant women, from the National Advisory Committee on Immunization (NACI)
- **Provincial/territorial immunization schedules** may differ based on funding differences. Provincial/territorial immunization schedules are available at the Public Health Agency of Canada.
- **Immunization pain reduction strategies:** During vaccination, pain reduction strategies with good evidence include breastfeeding or use of sweet-tasting solutions, use of the least painful vaccine brand, and consideration of topical anaesthetics.Reducing vaccine pain (CMAJ)
- Acetaminophen or ibuprofen should not be given prior to, but after vaccination as required. Prophylactic Antipyretic Administration (PLOS ONE)
- Information for physicians on vaccine safety: Canada's vaccine safety program (CPS) Autism spectrum disorder: No causal relationship with vaccines (CPS)
- Information for parents on vaccinations can be accessed through:
    - ImmunizeCA
    - Caring for Kids website (CPS) including Your Child's Best Shot
    - A Parent's Guide to Vaccination (PHAC)
    - Working with vaccine-hesitant parents (CPS)

Other resources:

- Canadian Tuberculosis Guidelines and Standards, 7th Edition 2014 - www.phac-aspc.gc.ca/publicat/ccdr-rmtc/14vol40/dr-rm40-06/dr-rm40-06-tub-eng.php
- Center for Disease Control and Prevention : http://www.cdc.gov/mmwr/pdf/wk/mm62e0128.pdf
- See CPS position statements of the Infectious Diseases and Immunization Committee: http://www.cps.ca/documents/authors-auteurs/infectious-diseases-and-immunization-committee
- Committee to Advise on Tropical Medicine and Travel (CATMAT) - http://www.cps.ca/en/documents/position/CATMAT

Immunization References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Shen, S., Dubey, V. **Addressing vaccine hesitancy Clinical guidance for primary care physicians working with parents.** Canadian Family Physician. 2019, 65(3):175-181. Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/30867173	**Design:** Clinical Review **Methods:** The PubMed database was searched for Englishlanguage articles published in the 10 years before January 1, 2018. Search terms included vaccine hesitancy or confidence or acceptance, parents or children, and communication, counseling, or clinical practice. References of identified articles were assessed for additional relevant articles. A separate gray literature search was conducted using Google to find best-practice guidelines from public health and health care organizations, knowledge translation materials for health care providers, and resources that could be used in discussions with parents about vaccines.	**Conclusion** Parental vaccine hesitancy is an important issue in Canada. Decision making around vaccination is complex. As the most trusted source of information on vaccination, physicians are uniquely positioned to sway parents from vaccine hesitancy to acceptance. Facts are not enough to change the views of vaccine-hesitant parents. Present vaccination as the default approach early on; be honest about side effects; maintain trust; focus on protection; and address pain. Be prepared to answer commonly asked questions and know where to find answers to unfamiliar questions. Provide credible resources to parents, especially if they ask.		

MacDonald, N., Desai, S., Gerstein, B., Canadian Paediatric Society**. Working with vaccine-hesitant parents: An update.** 2018 Available at: https://cps.ca/en/documents/position/working-with-vaccine-hesitant-parents	**Subjects:** Parents **Design:** Practice Point	**Abstract** Most Canadian parents make sure their children are immunized on time, but health care providers often encounter parents who are hesitant about vaccination or refuse recommended vaccines. This practice point offers evidence-based guidance to clinicians on how to work with vaccine-hesitant parents. Steps include: 1) Understanding the health care provider's key role in parental decision-making and not dismissing vaccine refusers from practice; 2) Using presumptive and motivational interviewing techniques to identify specific vaccine concerns; 3) Using effective, clear language to present evidence for disease risks and vaccine benefits fairly and accurately; 4) Managing pain on immunization; and 5) Reinforcing the importance of and parental responsibility for community protection. Immunization is one of the most important preventive health measures in existence and responsible for saving millions of lives. Addressing the concerns of vaccine-hesitant parents is a priority for health care providers.		
Glanz JM, Newcomer SR, Daley MF, et al. Association between estimated cumulative vaccine antigen exposure through the first 23 months of life and non-vaccine-targeted infections from 24 through 47 months of age. JAMA 2018;319(9):906-913. Available at: JAMA		Abstract **Importance** Some parents are concerned that multiple vaccines in early childhood could weaken their child's immune system. Biological data suggest that increased vaccine antigen exposure could increase the risk for infections not targeted by vaccines. **Objective** To examine estimated cumulative vaccine antigen exposure through the first 23 months of life in children with and without non–vaccine-targeted infections from 24 through 47 months of age. **Design, Setting, and Participants** A nested case-control study was conducted in 6 US health care organizations participating in the Vaccine Safety Datalink. Cases were identified by *International Classification of Diseases* codes for infectious diseases in the emergency department and inpatient medical settings and then validated by medical record review. Cases of non–vaccine-targeted infection were matched to controls by age, sex, health care organization site, and chronic disease status. Participants were		

		children ages 24 through 47 months, born between January 1, 2003, and September 31, 2013, followed up until December 31, 2015. **Exposures** Cumulative vaccine antigen exposure, estimated by summing the number of antigens in each vaccine dose received from birth through age 23 months. **Main Outcomes and Measures** Non–vaccine-targeted infections, including upper and lower respiratory infections and gastrointestinal infections, from 24 through 47 months of age, and the association between these infections and estimated cumulative vaccine exposure from birth through 23 months. Conditional logistic regression was used to estimate matched odds ratios representing the odds of non–vaccine-targeted infections for every 30-unit increase in estimated cumulative number of antigens received. **Results** Among the 944 patients (193 cases and 751 controls), the mean (SD) age was 32.5 (6.3) months, 422 (45%) were female, and 61 (7%) had a complex chronic condition. Through the first 23 months, the estimated mean (SD) cumulative vaccine antigen exposure was 240.6 (48.3) for cases and 242.9 (51.1) for controls. The between-group difference for estimated cumulative antigen exposure was −2.3 (95% CI, −10.1 to 5.4; *P* = .55). Among children with vs without non–vaccine-targeted infections from 24 through 47 months of age, the matched odds ratio for estimated cumulative antigen exposure through age 23 months was not significant (matched odds ratio, 0.94; 95% CI, 0.84 to 1.07). **Conclusions and Relevance** Among children from 24 through 47 months of age with emergency department and inpatient visits for infectious diseases not targeted by vaccines, compared with children without such visits, there was no significant difference in estimated cumulative vaccine antigen exposure through the first 23 months of life.		

Wysocki, J. et al. **A randomized study of fever prophylaxis and the immunogenicity of routine pediatric vaccinations.** Vaccine. 2017. 15(4):1926-1935. Retrieved from: https://www.sciencedirect.com/science/article/pii/S0264410X17302293	**Subjects:** Infants at beginning of study **Design:** Randomized Control Trial **Methods:** This research protocol(ClinicalTrials.gov identifier NCT01392378) sponsored by Pfizer Inc was reviewed and approved by institutional review boards and/or independent ethics committees for each participating center. This study was conducted according to principles derived from the declaration of Helsinki and the International Conference on Harmonisation Guidelines for Good Clinical Practice. Both parents of all participants gave written, informed consent before enrollment and before performance of study related procedures. Data analysis was performed by the sponsor.	**Conclusions** The prophylactic use of antipyretics, especially when administered concomitantly with vaccination, may interfere with immune responses to routine vaccines in infants. The effects vary by vaccine, antipyretic agent, and timing of administration. The clinical significance of these findings is unclear, as the immune responses elicited are likely to be sufficient to prevent disease in populations with high immunization rates. Despite the relative reduction in immune responses associated with antipyretic use, priming by the infant series is adequate for a robust response after toddler vaccination. Nonetheless, the data suggest that prophylactic use of over the counter antipyretics, especially during the primary infant series of vaccinations should be considered with caution.		A

Robinson, J. L., Le Saux, N., Canadian Paediatric Society, I. D., & Immunization, C. **Preventing hospitalizations for respiratory syncytial virus infection**. Paediatr Child Health. 2015; 20(6): 321-333. Updated: May 12 2016.	**Subjects:** Children **Design:** CPS Position statement **Methods:** This position statement reviews the published literature and provides updated recommendations regarding palivizumab use in children in Canada. The present statement replaces four previous position statements from the Canadian Paediatric Society on this topic.	Respiratory syncytial virus (RSV) is the most common cause of lower respiratory tract infections (LRTIs) in young children worldwide, with almost all experiencing their first RSV infection by 2 years of age. In Canada, the RSV season typically begins in November or December and persists for 4-5 months. Palivizumab use in Canada is directed by provincial or territorial programs. If practitioners have questions about eligibility, they should contact their local program. Contact information is available through neonatal care units. The CPS provides the following **recommendations** for the use of palivizumab in different risk groups: • Healthcare providers should instruct parents that good hand hygiene in the home and avoiding contact of high-risk children with people with RTIs is essential for RSV prevention. Breastfeeding and avoidance of exposure to cigarette smoke should also be encouraged. • Children with hemodynamically significant chronic lung disease (CLD) or congenital heart disease (CHD) (defined as a need for oxygen at 36 weeks' GA) who require ongoing diuretics, bronchodilators, steroids or supplemental oxygen, should receive palivizumab if they are <12 months of age at the start of RSV season. Palivizumab is not indicated during the second RSV season for infants with CHD or for the vast majority of children with CLD (with the exception of those still on or weaned off of supplemental oxygen in the past 3 months).		

		• In preterm infants without CLD born before 30 + 0 weeks' GA who are <6 months of age at the start of RSV season, it is reasonable (but not essential) to offer palivizumab. • Infants in remote communities who would require air transportation for hospitalization born before 36 + 0 weeks' GA and <6 months of age at the start of RSV season should be offered palivizumab. It is not clear whether this recommendation should apply only to Inuit infants, to all Aboriginal infants or to all infants in remote communities. The incidence of RSV hospitalization in a remote community in previous years should be taken into account when making this decision. A practical issue is that the onset and duration of RSV season is unpredictable in the Far North. A logical option is to delay administering palivizumab until RSV is detected in the Far North. The attendant risk is that significant spread may have already occurred. Consideration may be given to administering palivizumab during RSV season to term Inuit infants until they reach 6 months of age only if they live in communities with documented persistent high rates of RSV hospitalization. However, the first priority should be to provide palivizumab to infants with prematurity, CLD or CHD. • Children with immunodeficiencies, Down syndrome, cystic fibrosis, upper airway obstruction or a chronic pulmonary disease other than CLD should not routinely be offered palivizumab. However, prophylaxis may be considered for children <24 months of age who are on home oxygen, have had a prolonged hospitalization for severe pulmonary disease or are severely immunocompromised. • Continuation of monthly palivizumab is not recommended for children hospitalized with breakthrough RSV infection. Repeat RSV infections in one season are not common. Although recommended on the product monograph, the number needed to treat is no doubt very high if one continues palivizumab following RSV infection.		

		Addtionally, the CPS provides the following recommendations for optimizing palivizumab use: • Each jurisdiction should optimize processes to implement recommendations in the most cost-effective manner, ensuring that healthcare providers who administer palivizumab are prepared to monitor for and treat anaphylaxis. Well-organized palivizumab clinics decrease drug wastage. • For eligible infants being discharged home for the first time during RSV season, palivizumab should be started just before discharge. Use before discharge to prevent nosocomial RSV is an expensive strategy that is not recommended. • Programs should administer a maximum of 3-5, with 4 doses probably being sufficient in all risk groups if palivizumab is started only when there is RSV activity in the community, especially if doses 2, 3, and 4 are given 38 days apart. • There is no evidence to support giving >5 doses in one RSV season, administration to any child >24 months of age at the start of RSV season, or using palivizumab as RSV therapy.		
Robinson, J.L., Le Saux, N, Canadian Paediatric Society**, Preventing hospitalizations for respiratory syncytial virus infection.** Paediatr Child Health 2015;20(6):321-26 **Available at** https://www.cps.ca/en/documents/position/preventing-hospitalizations-for-rsv-infections	**Subjects:** Young Children **Design:** Position Statement	**Abstract** Respiratory syncytial virus infection is the leading cause of lower respiratory tract infections in young children. Palivizumab has minimal impact on RSV hospitilization rates as it is only practical to offer it to the highest risk groups. The present statement reviews the published literature and provides updated recommendations regarding palivizumab use in children in Canada.		

Maglione, M. A., Das, L., Raaen, L., Smith, A., Chari, R., Newberry, S., . . . Gidengil, C. **Safety of vaccines used for routine immunization of U.S. children: a systematic review**. 2014; Pediatrics, 134(2): 325-337.	**Subjects:** Children ≤6 years old **Design:** Systematic review **Methods:** This review expands on the 2011 Institute of Medicine consensus report on vaccine safety. Data sources included databases (DARE, Cochrane Database of Systematic Reviews, CENTRAL, PubMed, Embase, CINAHL, TOXLINE, TOXFILE), Advisory Committee on Immunization Practices statements, vaccine package inserts, and other review articles. Adverse events and patient and vaccine characteristics were abstracted, and evaluated using the McHarm scale. GRADE was used to evaluate the quality of studies with regard to their assessment of adverse events (AEs) and overall strength of evidence.	Parental refusal of recommended vaccinations due to safety doubts is still persistent, leading to the resurgence of some diseases. This review looked at the safety of vaccines recommended for routine use in US children aged ≤6 years, including DTaP, hepatitis A, hepatitis B, Hib, influenza (live attenuated and inactivated), meningococcal (conjugate or polysaccharide), MMR, pneumococcal (conjugate or polysaccharide), rotavirus, and varicella. 67 studies (in addition to those included in the 2011 IOM consensus report) were included, and the authors described the statistical associations between these vaccines and AEs. The following findings support IOM results: hepatitis B vaccine was not associated with long- or short-term AEs; the MMR vaccine was associated with febrile seizures (high quality evidence), but not autism; both LAIV and TIV forms of the influenza vaccines were linked with mild gastrointestinal events (moderate); TIV was associated with febrile seizures (moderate); the MMR vaccine was associated with thrombocytopenic purpura (moderate); the varicella vaccine was associated with thrombocytopenic purpura in children aged 11-17 years (moderate); and the Hib vaccine was associated with local discomfort (redness, swelling), but not any serious AEs or hospitalization (moderate). In addition, the strength of evidence is moderate for the following associations: hepatitis A vaccine and purpura in children aged 7-17 years, PCV13 and febrile seizures with an escalation of risk when co-administered with TIV, and rotavirus vaccine and intussusception. It is important to note that though the evidence suggests that some vaccines are associated with serious AEs, these events are extremely rare and should be weighed against the protective benefits that vaccines provide.		

Diekema DS and the Committee on Bioethics. **Responding to parental refusals of immunization of children.** Pediatrics. 2005;115(5):1428-1431. Abstract available from: PubMed	**Subjects:** Children **Design:** Clinical report **Methods:** The objective of this report is to help paediatricians understand the various reasons why parents might refuse a vaccine. As well, it gives them appropriate guidelines on how to deal with parents who refuse immunizations for their children.	Three issues are discussed in this report: 1) if the parents are withholding medical care this constitutes medical neglect and child services have to be called; 2) if not immunizing poses harm to the community, this becomes a public health issue; and 3) how the physician should respond to a refusing parent. Due to the high rates of immunization in most communities and low prevalence of vaccine-preventable disease, the authors report that many unimmunized children can be covered by herd immunity. The report highlights that physicians should counsel parents on the benefits of vaccines and address their concerns.	III	

8.2 IMMUNIZATION PAIN REDUCTION STRATEGIES/ANTIPYRETIC USE

Immunization Pain Reduction/Antipyretic Use Recommendations	Strength of Recommendation
1. During vaccination, pain reduction strategies with good evidence include breastfeeding or use of sweet-tasting solutions, giving the most painful vaccine last, and consideration of topical anaesthetics.	**Good**
2. Acetaminophen or ibuprofen should not be given prior to, but after vaccination as required.	Fair

Immunization Pain Reduction/Antipyretic Use References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Das, R. R., Panigrahi, I., & Naik, S. S. **The effect of prophylactic antipyretic administration on post-vaccination adverse reactions and antibody response in children: a systematic review.** PLoS One. 2014 ; 9(9): e106629. doi:10.1371/journal.pone.0106629	**Subjects:** Children ≤6 years old **Design:** Systematic review **Methods:** A systematic search of major databases (CENTRAL, Medline/Ovid, Pubmed, Embase) and the NIH clinical trial register was carried out till March 2014. Randomized controlled trials (RCTs) comparing prophylactic antipyretic treatment versus placebo post-vaccination in children ≤6 years of age were included. All formulation, dose and schedule of administration of antipyretics were considered. Two reviewers independently applied eligibility criteria, assessed	This systematic review aims to provide a recommendation on the use of prophylactic antipyretics post-vaccination in children. 13 RCTs including 5 077 children were included. One trial used ibuprofen, two used both paracetamol and ibuprofen, and others used only paracetamol. Prophylactic antipyretic administration significantly reduced febrile reactions ≥38.0°C after both primary and booster vaccinations. Antibody responses were significantly lower following prophylactic paracetamol (PCM) administration compared to no prophylaxis. However, the prophylactic PCM group had what would be considered protective levels of antibodies (GMCs) to all antigens given after the primary and booster vaccinations. Additionally, no significant difference in nasopharyngeal carriage rates (short-term and long-term) of *H. influenzae* or *S. pneumoniae* serotypes was found between the prophylactic and no prophylactic PCM groups. There was a significant reduction in local and systemic symptoms after primary, but not booster vaccinations. Future research is needed to assess the effectiveness of programs administering prophylactic PCM. The authors conclude that the administration of antipyretics, and its timing, should be discussed with parents after explaining the benefits and risks.		

	the studies for methodological quality using the criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions, and extracted data. Primary outcome measures included (1) Febrile reactions ≥38.0°C in the first 24-48 hrs of primary and booster vaccinations, and (2) Antibody response rate (measured by geometric mean concentration (GMC)) after primary (2, 3, and 4 or 3, 4, and 5 months) and booster vaccinations (12–15 months, and 40–48 months).			
Taddio, A., McMurtry, C. M., Shah, V., Riddell, R. P., Chambers, C. T., Noel, M., . . . Adults. **Reducing pain during vaccine injections: clinical practice guideline**. CMAJ. 2015; 187(13): 975-982. doi:10.1503/cmaj.150391.	**Subjects:** Children and adults **Design:** Clinical practice guideline **Methods:** The current guideline expands on and updates those published in 2010 by the Help Eliminate Pain in Kids (HELPinKIDS) team on reducing pain during childhood vaccination. The AGREE II (Appraisal of Guidelines for Research and Evaluation II) tool was used as the	**Recommendations:** 1. Procedural interventions (injection techniques): - No aspiration during intramuscular vaccine injections in individuals of all ages (strong recommendation; very low confidence in estimates of effect). - Injection of the most painful vaccine last (rather than first) during vaccine injections in individuals of all ages (strong recommendation; moderate confidence in estimates of effect). 2. Physical interventions (body position and activity): - Breastfeeding during vaccine injections in children ≤2 years old (strong recommendation; very low confidence in estimates of effect).		See outcomes

	overarching methodology for guideline development. The GRADE system provided the general framework for the formulation of recommendations and the synthesis of the research evidence. Members of the renamed HELPinKids&Adults team provided clinical questions which were rated for inclusion in the guideline. A systematic review was performed for all included questions and the quality of evidence assessed. Recommendations were characterized as strong or weak on the basis of four factors: balance between benefits and harms, strength of evidence for critical outcomes, variability in patient values and preferences, and resource implications.	- Hold infant (rather than the child lying supine) during vaccine injections in children ≤3 years old (strong recommendation; very low confidence in estimates of effect). - Sit upright (rather than the individual lying supine) during vaccine injections in children ≥3 years old and adults (strong recommendation; low confidence in estimates of effect). 3. Pharmacologic interventions (pain medicine): - Topical anesthetics can be applied before vaccine injections in children ≤12 years old (strong recommendation; very low confidence in estimates of effect). - Give sucrose solution before vaccine injections in children ≤2 years old (strong recommendation; moderate confidence in estimates of effect). 4. Process interventions (education and implementation): - Educate clinicians administering vaccine injections about pain management (strong recommendation; low confidence in estimates of effect). - Parents should be present during vaccine injections in children ≤10 old (strong recommendation; very low confidence in estimates of effect). - Educate parents about pain management before the day of vaccination (strong recommendation; low confidence in estimates of effect). - Educate parents about pain management on the day of vaccination (strong recommendation; very low confidence in estimates of effect). - Educate children ≥3 years old and adults about pain management on the day of vaccination (strong recommendation; very low confidence in estimates of effect).		
Reducing pain at the time of vaccination: WHO position paper - September 2015. Wkly	**Subjects:** Children and adults **Design:** Position paper	General measures: (i) Healthcare personnel carrying out vaccination should be calm, collaborative and well-informed; they should use neutral words		

Epidemiol Rec. 2015; 90(39): 505-510.	**Methods:** This position paper provides age-specific evidence-based strategies to mitigate pain at the time of vaccination, taken from a systematic review of 55 interventions. Interventions were selected for potential global implementation, taking into consideration the following criteria: benefits and harms; patients' values and preferences; resource utilization; cost of interventions; impact on equity; acceptability; and feasibility from a global perspective (relevance and cultural acceptability within different geographic regions and cultural settings)	and avoid language that increases anxiety, promotes distrust and/or is falsely reassuring or dishonest. (ii) Proper positioning of the vaccine recipient should be ensured, according to age. Lying down may be preferred for those with a history of fainting. (iii) No aspiration should be done during intramuscular injections, as this may increase pain due to longer contact time and lateral movement of the needle. (iv) When multiple vaccines are injected sequentially in the same session, they should be administered in order of increasing painfulness. Specific measures for infants and young children: (i) The caregiver should be present throughout and after the vaccination procedure. (ii) Infants and children aged <3 years should be held by caregivers throughout the procedure, and those aged ≥3 years should be seated to alleviate fear and distress, preferably on the caregiver's lap. (iii) If culturally acceptable, breastfeeding of infants should be done during or shortly before the vaccination session. Where oral vaccines are being co-administered with injectable vaccines, it would be best to proceed with the administration of oral rotavirus vaccine, then oral polio vaccine (if OPV is used), then breastfeeding with simultaneous administration of the injectable vaccines. (iv) For children <6 years of age, distractions to divert attention away from pain to something more pleasant (e.g. with toys, video, music, or conversation with an adult) are recommended. Measures not recommended: Topical anesthetics, although effective, are not recommended for systematic use by national programs due to high costs, lack of availability, and the additional time required for application.		

		Several of the interventions that were considered are not currently recommended due to lack of evidence of pain-mitigation effectiveness and/or the potential for altering vaccine effectiveness. These include: (i) warming the vaccine (e.g. by rubbing it between the hands) (ii) manual stimulation of the injection site (e.g. by rubbing or pinching) (iii) administration of oral analgesics (e.g. acetaminophen, ibuprofen) before or at the time of vaccination		
Taddio A, Shah V, Leung E, Wang J, Parikh C, Smart S, Hetherington R, Ipp M, Riddell RP, Sgro M, Jovicic A, Franck L. **Knowledge translation of the HELPinKIDS clinical practice guideline for managing childhood vaccination pain: usability and knowledge uptake of educational materials directed to new parents.** BMC Pediatr. 2013 Feb 8;13:23. Abstract available from: http://www.ncbi.nlm.nih.gov/pubmed/23394070	**Subjects:** **Design:** KT Tool validation using mixed-methods design **Methods:** An evidence-based clinical practice guideline for managing vaccination pain was recently developed in order to address this knowledge-to-care gap. Educational tools (pamphlet and video) for parents were included to facilitate knowledge transfer at the point of care. The objectives of this study were to evaluate usability and effectiveness in terms of knowledge acquisition from the pamphlet and video in parents of newly born infants. the video.	An illustration of the pamphlet is available from http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3585914/figure/F1/. Three overarching themes were identified from the interviews regarding usability of these educational tools: receptivity to learning, accessibility to information, and validity of information. Parents' performance on the knowledge test improved ($p \leq 0.001$) from the baseline phase to after review of the pamphlet, and again from the pamphlet review phase to after review of the video. **Conclusion:** Authors demonstrated the usability and conceptual knowledge acquisition from a parent-directed educational pamphlet and video about management of vaccination pain.	II-2	C

Taddio, A, Appleton M, Bortolussi R, Chambers C, Dubey V, Halperin S, Hanrahan A, Ipp M, Lockett D, MacDonald N, Midmer D, Mousmanis P, Palda V, Pielak K, Riddell RP, Rieder M, Scott J, Shah V. **Reducing the pain of childhood vaccination: an evidence-based clinical practice guideline.** *CMAJ* 2010; 182: E843-55. Abstract available from: PubMed	**Subjects:** Children **Design:** Review of the literature **Methods:** Expert panel for development and consensus on guideline recommendations; guideline was externally reviewed by experts not involved in guideline development.	This clinical practice guideline was based on review of the evidence of clinical questions related to pain and immunization. 14 of 18 questions had sufficient evidence for the authors and expert panel to make practice recommendations to reduce pain with immunization. Recommendations were based on a "3-P" (pharmacologic, physical and psychological) approach and were categorized into five clusters: infants, injection procedure, parent-led strategies, pharmacotherapy and psychological strategies. **Recommendations by cluster:** Infants: breastfeeding and sweet-tasting solution during injection (I, A); Injection procedure: when possible, the least painful brand of vaccine should be given (one study showed Priorix brand least painful) (I, A); children should not be placed in the supine position (I, E); for intramuscular injections, rapid injection technique without aspiration (I, B); if multiple injections, the most painful should be given last (I, B); tactile stimulation (rub/stroke) near the injection site before and during the vaccination; Parent-led interventions: "although there is insufficient evidence for or against the use of parent-led distraction or parent coaching during vaccination of children as a way to reduce pain at the time of injection, clinicians may offer this intervention to parents to reduce pain-related distress."(I, B) Pharmacotherapy: topical anesthetics (I,A); Psychological interventions: clinician-led distraction (I, B); child-led distraction (I, B); breathing techniques/exercises (I, B); combined psychological interventions (I, B); recommended not to use suggestion therapy that "it won't hurt" (I, D). There was insufficient evidence for the following: skin-cooling techniques, simultaneous vs sequential injections, route of administration (IM vs SC), and oral analgesics.	I A,B	

8.3 EVIDENCE AGAINST RELATIONSHIP BETWEEN ASD AND VACCINES

Evidence Against Relationship Between Autism Spectrum Disorder (ASD) and Vaccines	Strength of Recommendation
1. No causal relationship with vaccines.	**Good**

Evidence Against Relationship Between ASD and Vaccines				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Jain, A., Marshall, J., Buikema, A., Bancroft, T., Kelly, J. P., & Newschaffer, C. J. **Autism occurrence by MMR vaccine status among US children with older siblings with and without autism**. JAMA. 2015; 313(15): 1534-1540. doi:10.1001/jama.2015.3077.	**Subjects:** Children ≤ 5 years old **Design:** Retrospective cohort study **Methods:** Using an administrative claims database associated with a large US health plan, this study reports on autism spectrum disorders (ASD) occurrence by MMR vaccine status in children having older siblings with ASD. Findngs were then compared with children who have older siblings without ASD. ASD status was defined as 2 claims with a diagnosis code in any position for autistic disorder or other specified pervasive developmental disorder (PDD) or unspecified PDD. Various covariates were	Families with a child affected by ASD may be particularly concerned about reports linking MMR and ASD. This study is the first of its kind to examine MMR immunization and ASD outcomes among the younger siblings of children with ASD. Of 95 727 children with older siblings, 994 (1.04%) were diagnosed with ASD and 1 929 (2.02%) had an older sibling with ASD. Of those with older siblings with ASD, 134 (6.9%) had ASD vs 860 (0.9%) children with unaffected siblings (P < .001). MMR vaccination rates (≥1 dose) were 84% (n = 78 549) at 2 years of age and 92% (n = 86 063) at 5 years of age for children with unaffected older siblings vs 73% (n = 1 409) and 86% (n = 1 660) for children with affected siblings. MMR vaccine receipt was not associated with an increased risk of ASD at any age. For children with older siblings with ASD, at age 2, the adjusted RR of ASD for 1 dose of MMR vaccine vs no vaccine was 0.76 (95% CI, 0.48-1.22; P = 0.25), and at age 5, the RR of ASD for 2 doses compared with no vaccine was 0.56 (95%CI, 0.30-1.04; P = 0.07). For children whose older siblings did not have ASD, at age 2, the adjusted RR of ASD for 1 dose was 0.91 (95%CI, 0.68-1.20; P = 0.50) and at age 5, the RR of ASD for 2 doses was 1.09 (95%CI, 0.76-1.54; P = 0.65). As such, no association between MMR vaccination and increased ASD risk was observed among study participants. The authors conclude that there is no evidence that receipt of either 1 or 2 doses of MMR vaccination is associated with an increased risk of ASD among children who have older siblings with ASD.		B

	included in adjusted models to control for potential confounding. Adjusted relative risk (RRs or hazard rate ratios) of ASD were estimated from Cox proportional hazards models, and statistical significance testing was conducted using Wald $\chi 2$ statistics.			
Destefano F, Price CS, Weintraub ES. **Increasing Exposure to Antibody-Stimulating Proteins and Polysaccharides in Vaccines Is Not Associated with Risk of Autism.** J Pediatr. 2013;163(2): 561-567. PubMed	**Subjects:** Children < 2 years old **Design:** Case-control study **Methods:** Data obtained in 3 managed care organizations (MCOs) of 256 children with autism spectrum disorder (ASD) and 752 control children matched on birth year, sex, and MCO. Conditional logistic regression was used to assess associations between ASD outcomes and exposure to antigens in selected time periods.	The adjusted odds ratio (95% CI) of ASD associated with each 25-unit increase in total antigen exposure was 0.999 (0.994-1.003) for cumulative exposure to age 3 months, 0.999 (0.997-1.001) for cumulative exposure to age 7 months, and 0.999 (0.998-1.001) for cumulative exposure to age 2 years. Similarly, no increased risk was found for autistic disorder or ASD with regression. **Conclusion:** Increasing exposure to antibody-stimulating proteins and polysaccharides in vaccines during the first 2 years of life was not related to the risk of developing an ASD.	II-2	C
NE MacDonald, LPickering; Canadian Paediatric Society, Infectious Diseases and Immunization Committee. **Autism spectrum disorder: no causal relationship with**	**Subjects:** Children **Design:** Review **Methods:** This review conducted by the Infectious Diseases and Immunization Committee of the CPS examines recent	The authors cite recent studies refuting any causality between autism and vaccines. Specifically, in assessing the criteria for causality, there is no consistency in the finding, no strength of association nor any biological plausibility. The article also highlights reviews and studies showing that there was no link between thimerosal-containing vaccines and autism spectrum disorders.	II	

vaccines. Paediatr Child Health 2007;12(5):393-5**.** Reaffirmed: February 1 2016. Available from: http://www.cps.ca/en/documents/position/autistic-spectrum-disorder-no-causal-relationship-with-vaccines	controversies on the relationship between autism and vaccines.			
Price CS, Thompson WW, Goodson B, et al. **Prenatal and infant exposure to thimerosal from vaccines and immunoglobulin and risk of autism**. Pediatrics. 2010;125(4):656-664. Abstract available from: http://pediatrics.aappublications.org/content/early/2010/09/13/peds.2010-0309.abstract	**Subjects:** Children (with data from birth to two years old) **Design:** Case-control study in 3 managed care organizations **Methods:** The objective was to examine the relationship between prenatal and infant ethylmercury exposure from thimerosal-containing injections (vaccines and/or immunoglobulin preparations) and autism spectrum disorder (ASD) or ASD subtype. A total of 256 children with ASD and 752 matched controls were compared using computerized data files, medical chart abstractions, and interviews with biological mothers.	Receipt of thimerosal-containing vaccines (from birth to 20 months old) and prenatal exposure were not associated with an increased risk of ASD or ASD subtypes (including autistic disorder and autism spectrum disorder with regression) at 6 to 13 years old.	II-2	

8.4 MENINGOCOCCAL VACCINE

Meningococcal Vaccine Recommendations	Strength of Recommendation
1. Canadian children should be immunized with a MCV-C at 12 months of age, or earlier depending on provincial/territorial vaccine programs; suggested one dose at 12 months of age.	**Good**
2. MCV-4 (A, C, Y, W) should be given to children two months of age and older who are at increased risk for meningococcal disease or who have been in close contact with a case of invasive meningococcal A,C,Y or W disease. MCV-4-CRM (MenveoTM) should be used for those less than 2 years old; any MCV-4 may be used for older children.	**Good**
3. A routine booster dose with MCV-4 or MCV-C is recommended at approximately 12 years of age. High risk children require boosters at 5 year intervals.	**Good**
4. MCV-4 should be given to children two months of age and older travelling to areas where meningococcal vaccine is recommended. MCV-4 CRM is recommended for immunization of children 2 months to less than 2 years of age. Any MCV-4 may be used for older children.	**Good**
5. Multi-component meningococcal serogroup B (4CMenB) vaccine should be considered for active immunization of children ≥ 2 months of age who are at high risk of meningococcal disease or who have been in close contact with a case of invasive meningococcal B disease or travelling to an area where risk of transmission of meningococcus B is high. Two to 3 doses are required at 4 or 8 wk intervals depending on age. Routine prophylactic administration of acetaminophen after immunization and/or separating 4CMenB vaccination from routine vaccination schedule may be considered for preventing fever in infants and children up to 3 years of age..	Consensus

Meningococcal Vaccine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
National Advisory Committee on Immunization (NACI). **Advice for the use of the Multicomponent Meningococcal Serogroup B (4CMenB) Vaccine**. Public Health Agency of Canada. April 2014.	**Subjects:** Children and adults **Design:** Advisory Committee Statement (ACS) **Methods:** This statement updates the epidemiology of invasive meningococcal disease (IMD) in Canada, provides available vaccine	The multicomponent meningococcal serogroup B (4CMenB) vaccine is the first available vaccine against serogroup B IMD in Canada. In 2011, 62% of reported Canadian cases of IMD were due to serogroup B; 18.5% of cases were infants, the majority ≤6 months of age. The rates of IMD from other serogroups have decreased since the introduction of routine vaccination programs. The 4CMenB vaccine is an immunogenic vaccine, though further research, evaluation and surveillance is required to determine its		

	efficacy, effectiveness, immunogenicity and safety information on 4CMenB vaccine through a comprehensive literature search and review. It also provides recommendations for the use of the 4CMenB vaccine in Canada.	effectiveness, the risk of adverse events, the duration of protection, etc. This NACI statement provides the following **recommendations** for use of the 4CMenB vaccine in Canada: *1.* Multi-component meningococcal serogroup B (4CMenB) vaccine may be considered on an individual basis, for persons ≥2months of age, to protect against invasive meningococcal disease caused by relevant strains of serogroup B *Neisseria meningitidis.* 2. There is insufficient evidence for the use of multi-component meningococcal serogroup B (4CMenB) vaccine in routine immunization programs for Canadian infants, children, adolescents and adults 3. Multi-component meningococcal serogroup B (4CMenB) vaccine should be considered for active immunization of individuals ≥2 months of age who are at high risk of meningococcal disease to prevent invasive meningococcal disease caused by serogroup B *N. meningitidis.* 4. Multi-component meningococcal serogroup B (4CMenB) vaccine should be considered, in addition to chemoprophylaxis, for protection of individuals ≥2 months of age having close contact with a case of invasive meningococcal disease caused by serogroup B *N. meningitidis*. 5. During invasive meningococcal disease outbreaks caused by serogroup B *N. meningitidis* or the emergence of hyperendemic and/or hypervirulent *N. meningitidis* strains that are predicted to be susceptible to the vaccine based on MATS testing, immunization with the multi-component meningococcal serogroup B (4CMenB) vaccine is recommended for individuals ≥2 months of age. 6. Routine prophylactic administration of acetaminophen and/or separating 4CMenB vaccination from routine vaccination schedule may be considered for preventing fever in infants and children up to 3 years of age. 7. It is recommended that a comprehensive surveillance and vaccine evaluation program be implemented to monitor and		B I I I I I A I

		evaluate the effects of immunization with 4CMenB vaccine, whether for routine use, outbreaks or for high risk groups/settings. 8. Travellers do not need to receive 4CMenB vaccine unless they are travelling to an area with a hyperendemic strain or an outbreak that is known to be caused by a *N. meningitidis* serotype B that can be prevented by the vaccine.		
Robinson, J. L., Canadian Paediatric Society, I. D., & Immunization, C. **Immunization for meningococcal serogroup B: What does the practitioner need to know?** Paediatr Child Health. 2014; 19(2): 91-98.	**Subjects**: Children and adults **Design:** Practice point **Methods:** Pending the NACI decision on routine use of 4CMenB, this practice point provides information for clinicians when faced with questions from parents.	Serogroup B (MenB) is now the most prevalent serogroup in Canada, accounting for >50% of cases between 2002 and 2011, the majority of which occurred in preschool-age children. A four-component vaccine for MenB (4CMenB or Bexsero, Novartis, Canada) was licensed in Canada in December 2013. Uncertainties exist regarding the vaccine, including its effectiveness. There is also no data regarding the persistence of vaccine-induced immunity. Invasive meningococcal disease (IMD) progresses so rapidly that an anamnestic response may not always occur. It is, therefore, likely that boosters would be required to protect throughout childhood. A high incidence of fever from the vaccine has also been recorded, and there exists the burden of introducing more injections into the current immunization schedule. However, these uncertainties need to be considered against the potentially preventable mortality and morbidity that result from IMD. The highest risk for IMD occurs in patients with asplenia or hyposplenism, congenital complement, properdin, factor D or primary antibody deficiencies, in individuals prescribed the terminal complement inhibitor eculizumab or who have had more than one episode of IMD. These high-risk individuals should be offered 4CMenB when it is available.		
National Advisory Committee on Immunization (NACI). **Update on Quadrivalent Meningococcal Vaccines available in Canada.** Public	**Subjects**: Children and adults **Design:** Advisory Committee Statement (ACS) **Methods:** This statement reviews and updates information on quadrivalent	Nimenrix is a newly licensed quadrivalent conjugate (serogroups A, C, Y and W135) meningococcal vaccine authorized for use in individuals 12 months -55 years of age. Nimenrix™ may be administered alone or concomitantly with other routinely administered vaccines in Canada. NACI **recommends** periodic boosters for individuals at high risk for meningococcal disease or who have ongoing increased risk of exposure.		

Health Agency of Canada. April 2015.	conjugate meningococcal vaccines and vaccination schedules used in Canada following the approval of a new quadrivalent conjugate meningococcal vaccine Nimenrix™ (GlaxoSmithKline [GSK]) and the expanded age indication for Menactra® (Sanofi Pasteur).	In addition, the following are updated **recommendations** on the use of conjugate meningococcal vaccines following the approval of Nimenrix and the new age indication for Menactra: 1. For routine immunization of adolescents, any of the quadrivalent or monovalent C conjugate meningococcal vaccines registered in Canada may be used. The choice between quadrivalent and monovalent C conjugate vaccines is dependent on local epidemiology and other programmatic considerations. 2. For the immunization of high risk individuals ≥2 years of age, any of the quadrivalent conjugate meningococcal vaccines registered in Canada may be used. 3. For the immunization of high risk individuals between 2 months - 2 years of age, Men-C-ACYW-CRM (Menveo™) is the recommended product. 4. For immunization of individuals ≥2 years of age travelling to areas where meningococcal vaccine is recommended, any of the quadrivalent conjugate meningococcal vaccines may be used. Men-C-ACYW-CRM (MenveoTM) is recommended for immunization of individuals 2 months - 2 years of age who are travelling to areas where meningococcal vaccine is recommended.		B B B B

Robinson, J.L., Update on invasive meningococcal vaccination for Canadian children and youth. Paediatrics & Child Health. 2018. 23(1):e1-e4 Retrieved from: https://academic.oup.com/pch/article/23/1/e1/4860341	**Subjects:** Children **Design:** Postion Statement	See Position Statement for specific recommendations.		
Flacco, M.E., et al. **Immunogenicity and safety of the multicomponent meningococcal B vaccine (4CMenB) in children and adolescents: a systematic review and meta-analysis.** The Lancet Infectious Diseases. 2018. 18. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/29371070	**Subjects:** Children and Adolescents **Design:** Systematic Review **Methods:** Methods For this systematic review and meta-analyses (proportion, head to head, and network), we searched MEDLINE, Scopus, Embase, and ClinicalTrials.gov from database inception to June 30, 2017, for randomised trials that compared the immunogenicity or safety of the 4CMenB vaccine with its originator meningococcal B recombinant vaccine or routine vaccines in children or adolescents. For proportion meta-analyses, we also included single arm trials and follow-up studies of randomised controlled trials. Trials that assessed	**Conclusion:** 4CMenB has an acceptable short-term safety profile. The primary course is sufficient to achieve a satisfactory immune response within 30 days of vaccination among both adolescents and children. However, a booster dose is required for children to prolong the protection against strain M10713, and the long-term immunogenicity against strain NZ98/254 remains suboptimal. Among adolescents, immunogenicity persists after 6 months from vaccination, but data are limited to one trial. Additional studies, preferably non-industry sponsored, are needed to support the longterm safety and efficacy of 4CMenB. Close population-level surveillance of MenB strains is required to ascertain whether sustained immunogenicity is maintained.		

	immunogenicity against at least one of four Neisseria meningitidis serogroup B reference strains (44-76/SL, 5/99, NZ98/254, and M10713) and included participants younger than 18 years who had received two or more doses of the 4CMenB vaccine were eligible for inclusion. We requested individual patient-level data from study authors and extracted data from published reports and online trial registries. We did meta-analyses to assess 4CMenB safety and immunogenicity against the four reference strains 30 days after a primary immunisation course (three doses for children, two doses for adolescents), 30 days after the primary course plus one booster dose (children only), 6 months or more after primary course, and 6 months or more after the booster dose			

8.5 ROTAVIRUS VACCINE

Rotavirus Vaccine Recommendation	Strength of Recommendation
1. Universal rotavirus vaccine is recommended by NACI and CPS. Two oral vaccines are currently authorized for use in Canada: Rotarix (2 doses) and RotaTeq (3 doses). Dose #1 is given between 6 wks and 14 wks/6 days with a minimum interval of 4 weeks between doses. Maximum age for the last dose is 8 mos/0 days.	**Good**

Rotavirus Vaccine Resources
1. Centers for Disease Control and Prevention – Vaccine Safety: Rotavirus 2. Recommendations for the use of rotavirus vaccines in infants (CPS)

Rotavirus Vaccine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

National Advisory Committee on Immunization (NACI). **Updated Statement on the Use of Rotavirus Vaccines.** Canada Communicable Disease Report (CCDR). July 2010; 36:ACS-4. Available from: http://www.phac-aspc.gc.ca/publicat/ccdr-	**Subjects:** Infants **Design:** Review article **Methods**: A literature review of relevant studies was conducted for this statement using the Medline database from 1966-2007. MeSH headings: Rotavirus infection, Rotavirus disease, and rotavirus vaccine. A subsequent literature review was done for 2007-2009 using the same headings. Critical appraisals of individual studies, summary tables rating quality of evidence were prepared to develop these recommendations.	**NACI recommendations** for the rotavirus vaccine: 1. Rotavirus vaccines are recommended for healthy infants starting at 6 weeks and up to 15 weeks. The vaccination series should be completed by 8 months. (This is a Grade A recommendation – good evidence to support this recommendation). 2. Preterm infants can receive the vaccine using same timeline as healthy infants if they are healthy. 3. The vaccine is not recommended for immunocompromised infants or for infants with a history of intussusception. (Grade E – good evidence to not recommend) Phase III trials showed 98.2% efficacy for 3 doses of RotaTeq® against severe rotavirus gastroenteritis caused by the G serotypes contained in the vaccine (G1, G2, G3, and G4). Effectiveness against rotavirus of any severity was 73.8% during the first full season after completion of vaccination.	A, E	

Le Saux, Nicole. **Recommendations for the use of rotavirus vaccines in infants. Canadian Paediatric Society. 2017. Updated Oct 2018** Available at: https://www.cps.ca/en/documents/position/rotavirus-vaccines	**Subjects**: Infants **Design**: Position statement	RECOMMENDATIONS Rotavirus vaccine prevents severe disease and significantly decreases the risk of dehydration and hospitalization associated with rotavirus. Rotavirus vaccination is recommended for all infants except those who are immunocompromised or have a history of or a known condition that predisposes them to intussusception. Both licensed rotavirus vaccines are efficacious, and there are no interchangeability data. Whenever practical, the rotavirus vaccination series should be completed using the same product. However, if any dose in the series was the RV5 vaccine, a total of three doses of vaccine should be administered. Rotavirus vaccines are given orally and can be started at 6 weeks of age. Doses are usually administered as part of the routine infant vaccine schedule at 2 and 4 months of age if using RV1, with a third dose at 6 months if using RV5. Parents and caregivers of infants should be informed of the slightly higher temporal risk for intussusception, especially in the week after receiving rotavirus vaccine. All cases of intussusception should be reported to local public health authorities: www.phac-aspc.gc.ca/im/aefi-essi-form-eng.php Physicians should continue to advocate for the universal funding and integration of rotavirus vaccines into provincial/territorial programs in Canada—and into global immunization schedules—to ensure equitable access for all children. The impact of decreasing morbidity and mortality due to rotavirus diarrheal illness through universal rotavirus vaccination will be especially critical in resource-poor settings worldwide.		

Soares-Weiser, K., **Vaccines for preventing rotavirus diarrhoea: vaccines in use.** Cochrane Database Systematic Review. 2012. 14:11 Available at: https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD008521.pub2/full	**Subjects:** Children 5 and under **Design:** Systematic Review **Methods:** For this update, we searched MEDLINE (via PubMed) in October 2011, and in June 2011 we searched the Cochrane Infectious Diseases Group Specialized Register, CENTRAL (published in The Cochrane Library 2011, Issue 2), , EMBASE, LILACS, and BIOSIS. We also searched the ICTRP (28 June 2011) and checked reference lists of identified studies.	**Authors' conclusions** RV1 and RV5 vaccines are effective in preventing rotavirus diarrhoea. These data support the WHO's global vaccine recommendation. The potential for reduced vaccine efficacy in low-income countries needs to be investigated. No increased risk of intussusception was detected, but surveillance monitoring studies are probably advisable in countries introducing the vaccine nationally.		

8.6 VARICELLA VACCINE SCHEDULE

Varicella Vaccine schedule (two-dose recommendations)	Strength of Recommendation
1. Children aged 12 months to 12 years who have not had varicella should receive 2 doses of varicella vaccine (univalent varicella or MMRV). Unvaccinated individuals ≥ 13 years who have not had varicella should receive two doses at least 28 days apart (univalent varicella only). Consult NACI guidelines for recommended options for catch-up varicella vaccination. Varicella and MMR vaccines should be administered concurrently (at different sites if the MMRV [combined MMR/varicella] vaccine is not available) or separated by at least 4 weeks. **Preventing varicella (PCH)**	**Good**

Varicella Vaccine Schedule References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
MI Salvadori, Canadian Paediatric Society, Infectious Diseases and Immunization Committee. **Preventing varicella: Recommendations for routine two-dose varicella immunization in children.** Paediatr Child Health. 2011 Aug-Sep; 16(7): 415. Reaffirmed: February 1 2016. Canadian Paediatric Society	**Subjects:** Children **Design:** Position statement **Methods:** In September 2010, NACI recommended a two-dose schedule for varicella immunization. The present CPS position statement, which replaces the statement published in 2005, outlines the epidemiology of varicella in Canada and the rationale for a two-dose varicella immunization strategy for all children nationwide	The recommendations made for children 0 to 5 years of age are presented below. The quality of the evidence as well as the strength of the recommendation was assessed using the CTFPHC system. **Recommendations:** 1) Healthy children aged 12 months to 12 years of age should receive two doses of varicella-containing vaccine for primary immunization (A-III). The second dose of varicella vaccine may be given three months or longer after the first varicella immunization. The second dose should be given at four to six years of age in order to minimize risk of infection resulting from waning immunity, or until all provinces and territories have universal programs in place, or until more data are available on the best scheduling option. 2) The first dose of a varicella-containing vaccine should be given between 12 and 18 months of age.		A

		3) Children who have received one dose of varicella vaccine should be immunized with a second dose if they have not developed breakthrough disease. 4) Canadian physicians should advocate for universal funding and integration of this two-dose regimen into provincial and territorial programs to ensure equitable access for all Canadian children. 5) Prenatal assessment of women for evidence of varicella immunity (criteria in text) is recommended. Women who do not have evidence of varicella immunity should be vaccinated once they are no longer pregnant.		
National Advisory Committee on Immunization (NACI). **Varicella Vaccination Two-Dose Recommendations.** September 2010. Available from: http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/10vol36/acs-8/index-eng.php	**Subjects:** Children **Design:** Position statement/guidelines (NACI)	The main message of this NACI guideline is that health children should receive two doses of the varicella vaccine, either the univalent varicella vaccine or the combined MMRV vaccine. The first varicella-containing vaccine is recommended to be administered at 12 to 15 months. The guideline describes the recommendations for the second dose, as well as guidelines for susceptible adolescents and adults. The report also describes vaccine administration guidelines for special populations.		A

8.7 HEPATITIS B, A or A/B Combined

Hepatitis Vaccine Recommendation	Strength of Recommendation
Hepatitis B vaccine (Hep B): - Hepatitis B vaccine can be routinely given to infants or preadolescents, depending on the provincial/territorial policy. The first dose can be given at 1 month, or at 2 months of age to fit more conveniently with other routine infant immunization visits. The second dose should be administered at least 1 month after the first dose, and the third at least 2 months after the second dose, but again may fit more conveniently into the 4- and 6-month immunization visits. Alternatively, Hep B can be administered as DTaP-IPV-HibHepB vaccine in infants, with the first dose at 2 months of age. A two- dose schedule for adolescents is an option. - For high-risk children, 3 or 4 doses of higher dose of monovalent hepatitis B vaccine is recommended (immunocompromising conditions, chronic renal failure, dialysis). - For infants born to a mother with acute or chronic hepatitis B (HBsAg-positive), the first dose of Hep B vaccine should be given at birth (with Hepatitis B immune globulin, below) and repeat doses of vaccine at 1 and 6 months of age. Premature infants of birthweight less than 2,000 grams, born to HB- infected mothers, require four doses of HB vaccine at 0, 1, 2 and 6 months. The last dose should not be given before 6 months of age. Infants of HBsAg- positive mothers also require Hepatitis B immune globulin at birth and followup immune status at 9–12 months for HBV antibodies and HBsAg. - Infants with HBsAg-positive fathers, siblings or other household contacts require Hepatitis B vaccine at birth, and at 1 month, and 6 months of age. - Hepatitis B vaccine should also be given to all infants from high-risk groups, such as: i) infants where at least one parent has emigrated from a country where Hepatitis B is endemic; ii) infants of mothers positive for Hepatitis C virus; iii) infants of substance-abusing mothers. - For children in medically high risk groups (e.g. immunocompromising conditions, chronic renal failure, dialysis). See Hepatitis B chapter in the Canadian Immunization Guide for schedules re:timing and number of Hep B vaccine doses and monitoring of HB antibody levels. **Hepatitis A or A/B combined (HAHB - when Hepatitis B vaccine has not been previously given):** - Children 6 months and older in high-risk groups should receive 2 doses of the hepatitis A vaccine given 6-36 months apart (depending on product used). HAHB is the preferred vaccine for individuals with indications for immunization against both hepatitis A and hepatitis B, who are ≥12 months unless medical condition indicates high dose Hep B vaccine required. - These vaccines should also be considered when traveling to countries where Hepatitis A or B are endemic.	

- Possible HAHB schedules include 12 months to 18 years: 2 doses at months 0 and 6-12; OR 3 doses at months 0, 1, and 6 depending on age and product used.	

Hepatitis Vaccine Recommendation				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Henry, B., Baclic, O., Nationalal Advisory Committee on Immunization **Summary of the National Advisory Committee on Immunization (NACI) Statement Update on the Recommended Use of Hepatitis A Vaccine.** Can Commun Dis Rep. 2016. 42((): 193-194 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/29770031	**Design:** Advisory Committee Statement **Methods**: The NACI Hepatitis Working Group (HWG) performed literature reviews and reviewed vaccine manufacturer provided data on the topic of HA post-exposure prophylaxis. All evidence was rated and reported in evidence tables. A knowledge synthesis was performed and NACI approved specific evidence-based recommendations, elucidating the rationale and relevant considerations.	**Results**: No studies on the efficacy or effectiveness of HA-containing vaccines in children six to less than 12 months of age were identified through the literature search. Receipt of two doses of HA-containing vaccines was found to be safe and immunogenic in infants six to 12 months of age. Limited data were available regarding HA-containing vaccine immunogenicity in adults over the age of 40 years. **Conclusion**: There are now new NACI recommendations on HA vaccine and post-exposure use of Ig.		

Henry, B., Baclic, O., Nationalal Advisory Committee on Immunization **Summary of the National Advisory Committee on Immunization (NACI) Statement Update on the Recommended Use of Hepatitis A Vaccine.** Can Commun Dis Rep. 2017. 43(5):104-106 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/29770073	**Design:** Advisory Committee Statement **Methods:** The National Advisory Committee on Immunization (NACI) Hepatitis Working Group reviewed key questions and performed an evidence review and synthesis. In consideration of the burden of illness to be prevented, the target population and issues related to safety, immunogenicity, efficacy and effectiveness of the vaccine, the group proposed recommendations for vaccine use to NACI. All evidence was rated and summarized in tables. NACI approved specific evidence-based recommendations and elucidated the rationale and relevant considerations in the Statement update.	**Results:** In addition to the epidemiological data assessment, NACI reviewed evidence from efficacy and effectiveness studies with up to 30 years of follow-up data as well as data from 39 publications on immune response following the administration of a HB booster dose in individuals who were immunized as infants. Based on the conducted review, NACI did not find evidence that would support a change to its current recommendation that there is no need for routine booster immunization of individuals immunized in infancy and that there is no evidence to support preferential immunization schedules or routine immunization of individuals with diabetes. **Conclusion:** NACI now recommends that following immunization of immunocompromised individuals, initial annual monitoring of HB antibody levels may be considered.		

8.8 PNEUMOCOCCAL VACCINE

Pneumococcal Vaccine Recommendation	Strength of Recommendation
Pneumococcal vaccine: conjugate (Pneu-C-13) and polysaccharide (Pneu-P-23): Recommended schedule, number of doses, and product depend on the age of the child, risk for pneumococcal disease, and when vaccination is begun. Consult NACI guidelines. Routine infant immunization: administer three doses of Pneu-C-13 vaccine at minimum 8-week intervals beginning at 2 months of age, followed by a fourth dose at 12 to 15 months of age. For healthy infants, a three-dose schedule may be used, with doses at 2 months, 4 months, and 12 months of age. Children 2 years and above who are at highest risk of invasive pneumococcal disease should receive Pneu-P-23. Consult NACI guidelines for eligibility and dosing schedule.	

Pneumococcal Vaccine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

National Advisory Committee on Immunization (NACI). **Re-Immunization with Polysaccharide 23-Valent Pneumococcal Vaccine (Pneu-P-23).** Public Health Agency of Canada. April 2015.	**Subjects:** Children and adults **Design:** Advisory Committee Statement (ACS) **Methods:** This statement provides evidence for the optimal time between initial vaccination with polysaccharide 23-valent pneumococcal vaccine (Pneu-P-23) and subsequent booster doses to protect against invasive pneumococcal disease (IPD) in those at highest risk for IPD.	Immunity following Pneu-P-23 declines rapidly and re-vaccination of those at highest risk of IPD provides a boost in immune response, suggesting an improved ability to prevent IPD related illnesses. **Recommendation**: For all individuals aged ≥2 years who are at highest risk of IPD (functional or anatomic asplenia or sickle cell disease; hepatic cirrhosis; chronic renal failure or nephrotic syndrome; HIV infection; and immunosuppression related to disease or therapy) and who have received age-appropriate doses of 13-valent conjugate pneumococcal vaccine followed 8 weeks later by Pneu-P-23, revaccination with a second dose of Pneu-P-23 should be provided 5 years after the initial dose of Pneu-P-23. This is a change from the previous recommendation that recommended that children aged ≤10 years at their first dose of Pneu-P-23 should receive the second dose 3 years later. This change is based on the absence of evidence to support the 3-year timing of the booster dose in children and on the universal use of Pneu-C-13 in children that has contributed to the marked decrease in the incidence of IPD. The single re-vaccination at 5 years after the initial vaccination harmonizes the pediatric and adult schedules for those at highest risk of IPD.		B
National Advisory Committee on Immunization (NACI). **Update on the Use of Pneumococcal Vaccines: Addition of Asthma as a High-Risk Condition.** Public Health Agency of Canada. February 2014.	**Subjects:** Children and adults **Design:** Advisory Committee Statement (ACS) **Methods:** This statement provides evidence for the addition of asthma as a high-risk condition which increases an individual's risk for invasive pneumococcal disease (IPD).	Based on a review of the literature, NACI concludes that there is good evidence to recommend the addition of asthma – with or without prolonged use of systemic corticosteroid or associated with chronic obstructive pulmonary disease (COPD) – as a high-risk condition warranting vaccination to prevent IPD. Patients who required a medical attention for asthma in the past 12 months should be vaccinated using the appropriate pneumococcal vaccine (conjugate and polysaccharide), as recommended for their age group. Asthma is not considered an immunocompromising condition in and of itself but rather a medical condition with a higher risk of IPD. **Recommendations**: Children 2-18 years of age with asthma should receive PNEU-C-13 as appropriate for their age group and an		A

		additional dose of PNEU-P-23 at least 8 weeks after the last dose of PNEU-C-13. At present, further booster doses of PNEU-C-13 or PNEU-P-23 are not recommended.		

8.9 MEASLES, MUMPS AND RUBELLA AND MMR-VARICELLA (MMRV) VACCINES

Measles, Mumps and Rubella, and MMR-Varicella Vaccine Recommendation	Strength of Recommendation
The first dose is given at 12-15 months and a second dose should be given with the 18 month or preschool dose of DTaP-IPV (±Hib) (depending on the provincial/territorial policy), or at any intervening age that is practical but at least 4 weeks after the first if MMR, or 3 months after the first if MMRV. If MMRV is not used, MMR and varicella vaccines should be administered concurrently, at different sites, or separated by at least 4 weeks.	

Measles, Mumps and Rubella, and MMR-Varicella Vaccine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**
Hviid, A., Hansen, J.V., Frisch, M., Melbye, M. **Measles, Mumps, Rubella Vaccination and Autism,** Annals of Internal Medicine. 2019. 170(8):513-520 Retrieved from: https://www.ncbi.nlm.nih.gov/pubmed/30831578/	**Subjects:** Children **Design:** Nationwide cohort study **Methods:** We conducted a nationwide cohort study of all children born in Denmark of Danish-born mothers from 1 January 1999 through 31 December 2010. We sourced the study cohort from the Danish Civil Registration System, which assigns a unique personal identification number to all people living in Denmark and keeps track of basic demographic information for each individual (8). This unique identifier is used in all other national registries	**Conclusion:** The study strongly supports that MMR vaccination does not increase the risk for autism, does not trigger autism in susceptible children, and is not associated with clustering of autism cases after vaccination. It adds to previous studies through significant additional statistical power and by addressing hypotheses of susceptible subgroups and clustering of cases.		

	and allows for individual-level linkage of health-related information, including vaccinations and autism diagnoses.			
Salvadori, MI., Canadian Paediatric Society, Infectious Disease and Immunization Committee, **Preventing varicella: Recommendations for routine two-dose varicella immunization in children.** Paediatric Child Health. 2011. 16(7): 415-416. Retrieved From: https://www.ncbi.nlm.nih.gov/pubmed/22851897	**Design:** Position Statement **Methods:** This statement presents the rationale for a two-dose immunization strategy in Canada, as well as recommendations for a routine two-dose varicella vaccine schedule for all Canadian children. Children who have received one dose of varicella vaccine and have not had breakthrough infection should receive another dose of varicella vaccine	**RECOMMENDATIONS** The levels of evidence reported in these recommendations have been described using the evaluation of evidence criteria outlined by the Canadian Task Force on Preventive Health Care. The Canadian Paediatric Society recommends the following: • Healthy children 12 months to 12 years of age should receive two doses of varicella-containing vaccine for primary immunization (A-III). The second dose of varicella vaccine may be given three months or longer after the first varicella immunization. The second dose should be given at four to six years of age to minimize risk of infection resulting from waning immunity, or until all provinces and territories have universal programs in place, or until more data on the best scheduling option are available. • The first dose of a varicella-containing vaccine should be given between 12 and 18 months of age. • Susceptible adolescents 13 years of age and older should continue to receive two doses of varicella vaccine four weeks apart. • Children who have received one dose of varicella vaccine should be immunized with a second dose if they have not developed breakthrough disease. • Canadian physicians should advocate for universalfundingand integration of this two-dose regimen into provincial and territorial programs to ensure equitable access for all Canadian children. • Prenatal assessment of women forevidence of varicella immunity is recommended. Women who do not have evidence ofvaricella immunity should be vaccinated once they are no longer pregnant.		

		• Further research should beconducted in Canada to determine: Duration of vaccine-induced varicella immunity, and requirements for future boosters Relative contributions of primary and secondary vaccine failure Optimal spacing of the two doses Varicella surveillance and vaccine coverage rates in Canada.		

8.10 INFLUENZA VACCINE

Influenza Vaccine Recomenndations	**Strength of Recommendation**
Recommended for all children, particularly those aged 6-59 months and other children at high risk. - Previously unvaccinated children up to 9 years of age require 2 doses with an interval of at least 4 weeks. The second dose is not required if the child has received one or more doses of influenza vaccine during the previous immunization season. A quadrivalent vaccine should be used if available. - For children between 6 and 23 months, the quadrivalent inactivated influenza vaccine (QIV) should be used, and if not available, either unadjuvanted or adjuvanted trivalent inactivated vaccine (TIV). - Children 2-18 years of age should be given QIV, or quadrivalent live attenuated influenza vaccine (LAIV) if not contraindicated. If a quadrivalent vaccine is not available, TIV should be used. Egg allergy is not a contraindication to vaccination with QIV, TIV, or LAIV. - Immunize with TIV or QIV in the second or third trimester to provide protection for the pregnant woman and infant <6 months of age. - LAIV is contraindicated for children i) with immune compromising conditions, ii) with severe asthma (defined as current active wheezing or currently on oral or high-dose inhaled glucocorticosteroids, or medically attended wheezing within the previous 7 days), or iii) on aspirin.	

Influenza Vaccine References				
Reference	**Methods**	**Outcomes**	**CTFPHC**	**GRADE**

MacDonald, N. E., McDonald, J. C., Canadian Paediatric Society, I. D., & Immunization, C. **The benefits of influenza vaccine in pregnancy for the fetus and the infant younger than six months of age**. 2014; Paediatr Child Health, 19(10): e121-122. Updated July 2018	**Subjects:** Pregnant women **Design:** Practice point **Methods:** This practice point offers new evidence-based guidance for clinicians on prevention of influenza in infants <6 months of age via immunization during pregnancy.	Influenza vaccines are not licensed or recommended for infants <6 months of age. However, influenza is a serious problem in this age group, and hospitalization rates for influenza and associated illness are comparable with rates in the elderly. To prevent influenza in infants <6 months of age, the best evidence-based strategy is to administer influenza vaccines during pregnancy. Immunization with the trivalent inactivated influenza vaccine (TIV) in the second and third trimester is well studied, safe and has protective effects for both mother and child before birth, including potentially providing protection for the fetus by decreasing the risk for low birth weight. Furthermore, the infant is born with influenza antibodies, which offer some protection until the first dose of influenza vaccine can be given at 6 months of age. Influenza immunization in early pregnancy may be of even greater value as studies suggest that first-trimester influenza immunization could avert some congenital anomalies. NACI recommends immunization with TIV for women in any stage of pregnancy.		
Jefferson T, Rivetti A, Di Pietrantonj C, Demicheli V. Vaccines for preventing influenza in healthy children. Cochrane Database of Systematic Reviews 2018, Issue 2. Art. No.: CD004879. Retrieved From: https://www.cochrane.org/CD004879/ARI_vaccines-preventing-influenza-healthy-children	**Subjects:** children under 16 years **Design:** Systematic Review **Methods:** We searched the Cochrane Central Register of Controlled Trials (CENTRAL) (the Cochrane Library 2016, Issue 12), which includes the Cochrane Acute Respiratory Infections Group Specialised Register, MEDLINE (1966 to 31 December 2016), Embase (1974 to 31 December 2016), WHO International Clinical Trials Registry Platform (ICTRP; 1 July 2017), and ClinicalTrials.gov (1 July 2017).	**Main results** We found 41 randomised studies. Most studies included children older than two years of age and were conducted in the USA, Western Europe, Russia, and Bangladesh. Compared with placebo or do nothing, live attenuated vaccines probably reduced the proportion of children who had confirmed influenza from 18% to 4% (moderate-certainty evidence), and may reduce ILI from 17% to 12% (low-certainty evidence). Seven children would need to be vaccinated for one child to avoid influenza, and 20 children would need to prevent one child from experiencing an ILI. We found data from one study that showed similar risk of ear infection in the two groups. There was insufficient information available to assess school absence and parents needing to take time off work. We found no data on hospitalisation, and harms were not consistently reported. Compared with placebo or no vaccination, inactivated vaccines reduce the risk of influenza from 30% to 11% (high-certainty evidence), and they probably reduce ILI from 28% to 20% (moderate-certainty evidence). Five children would need to be vaccinated for one child to avoid influenza, and 12 children would need to be vaccinated to prevent one case of ILI. The risk of otitis		

		media is probably similar between vaccinated children and unvaccinated children (31% versus 27%, moderate-certainty evidence). There was insufficient information available to assess school absenteeism due to very low-certainty evidence from one study. We identified no data on parental working time lost, hospitalisation, fever, or nausea. One brand of monovalent pandemic vaccine was associated with a sudden loss of muscle tone triggered by the experience of an intense emotion (cataplexy) and a sleep disorder (narcolepsy) in children. Only a few studies were well designed and conducted, and the impact of studies at high risk of bias varied across the outcomes evaluated. Influenza and otitis media were the only outcomes where our confidence in the results was not affected by bias.		
Hui, C. P., Canadian Paediatric Society, I. D., & Immunization, C. **Increasing the use of influenza vaccines in children with egg allergy**. Paediatr Child Health. 2014; 19(10): 553-554. Reaffirmed: Feb 1 2016.	**Subjects**: Children and adults **Design:** Practice point **Methods:** This practice point offers new evidence-based guidance for clinicians on administration of inactivated trivalent or quadrivalent influenza vaccines (TIV or QIV) for individuals with egg allergy.	Based on new evidence, the CPS recommends that all egg-allergic patients be vaccinated with a full dose of trivalent or quadrivalent inactivated influenza vaccine. The CPS specifically endorses the recommendations from NACI for the 2014/2015 influenza season, including the following specific guidance: 1. All clinics that administer vaccines need to have the expertise and equipment to be able to deal with anaphylaxis, as per PHAC's Canadian Immunization Guide. 2. All egg-allergic patients should be vaccinated with a full dose of TIV or QIV unless they have previously had anaphylaxis from influenza vaccine. There is no need for split doses or pre-vaccination skin testing. Post-vaccination monitoring should be the same as after any other vaccine. 3. Live attenuated influenza vaccine (LAIV) should not be used in egg-allergic patients because there are insufficient data to support a recommendation. 4. The use and safety of LAIV should be studied in egg-allergic patients.		

9.0 LEVELS AND GRADES OF EVIDENCE

For our critical appraisal of the literature, prior to the 2014 RBR we used the former system of the Canadian Task Force on Preventive Health Care (CTFPHC) to determine the quality of the evidence in each publication reviewed (Table 1). We continued to use this system for the 2014 RBR, but also began transitioning to the new GRADE system, now endorsed by the CTFPHC (Table 2). For the 2017and 2020 RBR, only the GRADE system was used. Both former CTFPHC and GRADE systems are described below.

Based on this grading guide, we then used the quality of the evidence to determine the strength of each RBR item recommendation, using the longstanding and clinician-friendly scheme of **Good**, *Fair*, and Inconclusive evidence/Consensus.

Table 1: Former system of the Canadian Task Force on Preventive Health Care (CTFPHC)

Levels and grades of evidence

Level	Description
I	Evidence obtained from at least one properly randomized trial.
II-1	Evidence obtained from a well-designed, controlled trial without randomization.
II-2	Evidence obtained from a well-designed cohort or case-controlled analytic studies, preferably from more than one centre or research group.
II-3	Evidence obtained from comparisons between times and places, with or without the intervention; dramatic results in uncontrolled experiments could also be included in this category.
III	Opinions of respected authorities, based on clinical experience, descriptive studies or reports of expert committees.
Grade	
A	There is good evidence to recommend the clinical preventive action.
B	There is fair evidence to recommend the clinical preventive action.
C	The existing evidence is conflicting and does not allow to make a recommendation for or against use of the clinical preventive action; however, other factors may influence decision making.
D	There is fair evidence to recommend against the clinical preventive action.
E	There is good evidence to recommend against the clinical preventive action.
I	There is insufficient evidence (in quantity or quality) to make a recommendation; however, other factors may influence decision making.

The task force recognizes that, in many cases, patient-specific factors must be considered and discussed, such as the value the patient places on the clinical preventive action, its possible positive and negative outcomes, and the context or personal circumstances of the patient (medical and other). In certain circumstances in which the evidence is complex, conflicting or insufficient, a more detailed discussion may be required.

Canadian Task Force on Preventive Health Care. New grades for recommendations from the Canadian Task Force on Preventive Health Care. *CMAJ* 2003;169:207-8.

Table 2: Grades of Recommendation, Assessment, Development and Evaluation

(GRADE) Grading Guide (http://www.uptodate.com/home/grading-guide)

Grade of Recommendation	**Clarity of risk/benefit**	**Quality of supporting evidence**	**Implications**
1A. Strong recommendation, high quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Strong recommendations, can apply to most patients in most circumstances without reservation. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1B. Strong recommendation, moderate quality evidence	Benefits clearly outweigh risk and burdens, or vice versa.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Strong recommendation and applies to most patients. Clinicians should follow a strong recommendation unless a clear and compelling rationale for an alternative approach is present.
1C. Strong recommendation, low quality evidence	Benefits appear to outweigh risk and burdens, or vice versa.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Strong recommendation, and applies to most patients. Some of the evidence base supporting the recommendation is, however, of low quality.

2A. Weak recommendation, high quality evidence	Benefits closely balanced with risks and burdens.	Consistent evidence from well performed randomized, controlled trials or overwhelming evidence of some other form. Further research is unlikely to change our confidence in the estimate of benefit and risk.	Weak recommendation, best action may differ depending on circumstances or patients or societal values.
2B. Weak recommendation, moderate quality evidence	Benefits closely balanced with risks and burdens, some uncertainly in the estimates of benefits, risks and burdens.	Evidence from randomized, controlled trials with important limitations (inconsistent results, methodologic flaws, indirect or imprecise), or very strong evidence of some other research design. Further research (if performed) is likely to have an impact on our confidence in the estimate of benefit and risk and may change the estimate.	Weak recommendation, alternative approaches likely to be better for some patients under some circumstances.
2C. Weak recommendation, low quality evidence	Uncertainty in the estimates of benefits, risks, and burdens; benefits may be closely balanced with risks and burdens.	Evidence from observational studies, unsystematic clinical experience, or from randomized, controlled trials with serious flaws. Any estimate of effect is uncertain.	Very weak recommendation; other alternatives may be equally reasonable.

*Numbers represent strength of recommendation (strong, weak) and letters represent quality (low, moderate, high)

GRADE

Grades of Recommendation, Assessment, Development, and Evaluation

Target Audience	Strong Recommendation	Weak Recommendation
For patients/public	We believe most people in this situation would want the recommended course of action and only a small number would not.	We believe that most people in this situation would want the recommended course of action, but many would not. Different choices are acceptable for each person, and clinicians should support patients and discuss their values and preferences to reach a decision. Decision aids may support people in reaching these decisions.
For clinicians	The recommendation would apply to most individuals. Formal discussion aids are not likely to be needed to help individuals make decisions consistent with their values and preferences.	We recognize that different choices may be appropriate for individual patients. Clinicians should support each patient in reaching a management decision consistent with his or her values and preferences. Decision aids may support individuals in reaching such decisions.
For policy makers and developers of quality measures	The recommendation can be adapted as policy in most situations. Adherence to this recommendation according to the guideline could be used as a quality criterion or performance indicator.	Policy-making will require substantial debate and involvement of various stakeholders. An appropriately documented decision making process could be used as quality indicator.

Quality of Evidence

Recommendations in the guidelines prepared by the Canadian Task Force on Preventive Health Care (CTFPHC) www.canadiantaskforce.ca are graded as either strong or weak according to the Grading of Recommendations Assessment, Development and Evaluation system (GRADE). The CTFPHC's judgments about the **quality of evidence** are summarized by the degree of confidence that available evidence correctly reflects the theoretical true effect of the intervention or service.

We judge evidence as **high quality** when we are highly confident that the true effect lies close to that of the estimate of the effect. For example, evidence is judged as high quality if all of the following apply: there is a wide range of studies included in the analyses with no major limitations, there is little variation between studies, and the summary estimate has a narrow confidence interval.

We judge evidence as **moderate quality** when we consider that the true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different. For example, evidence might be judged as moderate quality if any of the following applies: there are only a few studies and some have limitations but not major flaws, there is some variation between studies, or the confidence interval of the summary estimate is wide.

We judge evidence to be **low or very low quality** when the true effect may be substantially different from the estimate of the effect. For example, evidence might be judged as low quality if any of the following applies: the studies have major flaws, there is important variation between studies, or the confidence interval of the summary estimate is very wide.

Strength of Recommendations

In addition to the quality of supporting evidence, **the strength of our recommendations** is influenced by,

- the balance between desirable and undesirable effects;
- the variability or uncertainty in values and preferences of citizens; and
- whether or not the intervention represents a wise use of resources.

Strong recommendations are those for which **we are confident** that the desirable effects of an intervention outweigh its undesirable effects (strong recommendation for an intervention) **or** that the undesirable effects of an intervention outweigh its desirable effects (strong recommendation against an intervention). A strong recommendation implies that most individuals will be best served by the recommended course of action.

Weak recommendations are those for which the desirable effects **probably** outweigh the undesirable effects (weak recommendation for an intervention) **or** undesirable effects probably outweigh the desirable effects (weak recommendation against an intervention) but uncertainty exists. Weak recommendations result when the balance between desirable and undesirable effects is small, the quality of evidence is lower, and there is more variability in the values and preferences of individuals. A weak recommendation implies that we believe most people would want the recommended course of action but that many would not. Clinicians must recognize that different choices will be appropriate for different individuals, and they must support each person in reaching a management decision consistent with his/her values and preferences. Policy-making will require substantial debate and involvement of various stakeholders.

SOURCE: Grades of Recommendation, Assessment, Development, and Evaluation (GRADE) Working Group, 2011.