Rourke Baby Record 2014

Evidence-based tool for the health of infants and children from birth to age 5

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Abstract

Objective To update the 2011 edition of the Rourke Baby Record (RBR) by reviewing current best evidence on health supervision of infants and children from birth to 5 years of age.

Quality of evidence The quality of evidence was rated with the former (until 2006) Canadian Task Force on Preventive Health Care classification system and GRADE (grading of recommendations, assessment, development, and evaluation) approach.

Main message New evidence has been incorporated into the 2014 RBR recommendations related to growth monitoring, nutrition, education and advice, development, physical examination, and immunization. Growth is monitored with the World Health Organization growth charts that were revised in 2014. Infants’ introduction to solid foods should be based on infant readiness and include iron-containing food products. Delaying introduction to common food allergens is not currently recommended to prevent food allergies. At 12 months of age, use of an open cup instead of a sippy cup should be promoted. The education and advice section counsels on injuries from unstable furniture and on the use of rear-facing car seats until age 2, and also includes information on healthy sleep habits, prevention of child maltreatment, family healthy active living and sedentary behaviour, and oral health. The education and advice section has also added a new environmental health category to account for the effects of environmental hazards on child health. The RBR uses broad developmental surveillance to recognize children who might be at risk of developmental delays.

Conclusion The 2014 RBR is the most recent update of a long-standing evidence-based, practical knowledge translation tool with related Web-based resources to be used by both health care professionals and parents for preventive health care during early childhood. The 2014 RBR is endorsed by the Canadian Paediatric Society, the College of Family Physicians of Canada, and the Dietitians of Canada. National and Ontario versions of the RBR are available in English and French.

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EDITOR’S KEY POINTS

• The 2014 Rourke Baby Record (RBR) is an update of the 2011 edition and incorporates the most recent evidence for the health supervision of infants and children from birth to age 5. Tools to aid in knowledge translation and clinical decision making are available on the RBR website (www.rourkebabyrecord.ca).

• The “Interactive RBR” section of the website provides checklist forms for preventive care visits (Guides 1 to 5) and resources (Resources 1 to 3) that present summaries of and live links to the current best evidence. The “Indepth Information” section includes a literature review table that lists the critically appraised references supporting the items included in the 2014 RBR.

• The most substantial revisions in the 2014 RBR are related to nutrition. Infants should be introduced to solid food when they show signs of readiness (timing might range from a few weeks before to just after 6 months of age). Also, delaying the introduction of allergenic foods to prevent food allergies is no longer recommended, even for infants at risk of atopy.

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The first few years of life are crucial in shaping the physical, mental, and emotional health of one’s lifetime. Adverse experiences that occur during early childhood can potentially result in lifelong consequences by changing the stress response system and modifying gene expression. The complex interactions...
between biologic, behavioural, and environmental factors might have positive or negative effects on the child’s health, which might persist into adulthood and to subsequent generations. Preventive care and health supervision for infants and children in the first few years of life assume an important role to monitor and promote child growth and development for an optimal health trajectory. Recommendations for preventive care in children, including screening maneuvers, anticipatory guidance, and specific interventions, should be based on the current best evidence.

The Rourke Baby Record (RBR) was first published in 1985 as a structured and evidence-based tool for preventive care of children up to 5 years of age. The RBR has undergone validation testing, is periodically updated to keep abreast of new evidence, and is endorsed by the Canadian Paediatric Society (CPS), the College of Family Physicians of Canada, and the Dietitians of Canada. Tools to aid in knowledge translation and clinical decision making are available on the RBR website (www.rourkebabyrecord.ca), which includes interactive links to resources for both health care providers and parents. This article provides a synthesis of the current best evidence incorporated in the 2014 RBR on health supervision of and anticipatory guidance for infants and preschool children. We also highlight new developments on the RBR website and related initiatives.

Quality of evidence

**Literature search.** We used a systematic approach to retrieve relevant articles, reports, and statements to support updates for all specific topics and general categories featured in the 2014 RBR. First, we developed a search strategy linking relevant terms for each topic. Second, we conducted broad searches using the terms related to the key RBR domains (growth, nutrition, injury prevention, behaviour and family, environmental health, developmental surveillance, physical examination, and immunization) in combination with search terms related to anticipatory guidance and children. We searched MEDLINE and the Cochrane Library since the last RBR update (April 2011) and up to June 2013 for new scientific evidence to support the recommendations in the 2014 RBR. Manual searches were also conducted using relevant resources (eg, Cochrane’s Evidence-based Child Health) and websites (eg, CPS, American Academy of Pediatrics [AAP]). To view the scientific and practice-based articles selected for this update and for previous iterations of the RBR, visit the “Indepth Information” section on the RBR website and scroll down to “Literature Review,” where you will find what we refer to as the literature review table.

**Appraisal of the evidence.** In previous years, we used the former classification system (until 2006) from the Canadian Task Force on Preventive Health Care (CTFPHC) to critically appraise the evidence. To keep abreast of new advances in knowledge synthesis methodologies, references that contributed evidence in support of or against an existing or emerging recommendation for the 2014 RBR update were assessed using both the GRADE (grading of recommendations, assessment, development, and evaluation) framework and the CTFPHC’s former classification system. The GRADE system was developed by an international group of guideline developers and methodologists (the GRADE group). Organizations, including the CPS and CTFPHC, are now using it. For this edition of the RBR, we deemed it unfeasible to apply the GRADE system to both existing and new entries in our literature review table. Further, for each RBR recommendation or guideline, we did not modify the format in which the strength of recommendation was displayed in the RBR guides and the literature review table. We have retained the previous scheme using good, fair, and consensus.

The literature up to June 1, 2013, was used as the basis for the 2014 edition of the RBR. Articles subsequent to this date might be included in the literature review table if we believed they were important, but they did not influence the content of the 2014 RBR because of the timeline needed for finalization.

**Main message**

Each new edition of the RBR, as well as the accompanying website (www.rourkebabyrecord.ca), provides an evidence update in health surveillance of Canada’s youngest members, and also includes improvements to knowledge translation tools designed to assist parents and primary providers in decision making. Guides 1 to 5 are checklist forms (available in either 3-visits-per-page or 1-visit-per-page formats) to be used during preventive care visits; they can be found in the “Downloads” section of the website. The 1-visit-per-page format has larger print and more space but results in repetition of anticipatory guidance items, which in the 3-visits-per-page version are spread over 3 visits. Resources 1 to 3 provide summaries of the current best evidence with links to relevant published guidelines and resources. The literature review table is a more comprehensive list of the critically appraised references supporting the topics included in the 2014 RBR. Increasingly, location-specific adaptations to the national version of the RBR are being adopted or considered in various Canadian jurisdictions, including Ontario, Nunavut, Alberta First Nations Health Region, the Northwest Territories, and Nova Scotia. Visitors to the RBR website can also find news items for a current list of official location-specific modifications. National and Ontario versions of the 2014 RBR are available in both English and French.

We have made considerable improvements to the RBR guides, resources, and website in an effort to
make them user-friendly and readily available to parents and health professionals. The RBR website, which contains a set of practical and comprehensive knowledge translation tools relevant to the field of preventive pediatric health care, has been completely redesigned. The “Interactive RBR” section of the health care professional Web portal brings the RBR guides to life. Live links to current evidence, reliable Web-based and printable parent resources, and literature reviews make the supporting resources, including those listed in this article, easily accessible. New, age-specific information sheets for parents are available to reinforce and supplement discussion during health visits.

To identify the changes in the 2014 RBR compared with the previous 2011 edition, a version of the RBR with the revisions shown in aqua-coloured print is available in the Updates/Changes category within the “Indepth Information” section (click on the National Version 2014 RBR link). In the following discussion, we present an overview of recent updates. These updates are justified based on critical appraisal of emerging evidence; readers can visit the literature review table on the website to view existing and emerging evidence from primary studies and syntheses supporting current RBR recommendations and recent changes.

**Growth monitoring.** We continue to recommend growth monitoring using growth charts based on the 2006 World Health Organization Child Growth Standards (birth to 5 years), available at [www.whogrowthcharts.ca](http://www.whogrowthcharts.ca) or on the RBR website. The format of the WHO Growth Charts for Canada was revised in March 2014 to address several concerns, including the choice of percentile range lines and the omission of weight-for-age curves for those older than age 10. These growth charts are now recommended by the Canadian Pediatric Endocrine Group, the CPS, the College of Family Physicians of Canada, the Community Health Nurses of Canada, and the Dietitians of Canada.

The wording of the 2014 RBR now clearly specifies that using the corrected age (ie, subtracting the number of weeks of prematurity from the infant’s actual age) is recommended for growth monitoring until 24 to 36 months in infants born at less than 37 weeks’ gestation.

**Nutrition.** The most substantial revisions in the 2014 RBR are related to nutrition. Health Canada’s *Nutrition for Healthy Term Infants* has been revised and released as 2 documents: recommendations for birth to 6 months of age were released in 2012 and those for 6 to 24 months of age were released in April 2014. The nutrition items in the 2014 RBR are consistent with these national guidelines.

**Box 1. New nutrition resources on the 2014 Rourke Baby Record**

- **General nutrition:** [www.dietitians.ca](http://www.dietitians.ca) and [www.nutristep.ca](http://www.nutristep.ca)
- **Baby-friendly initiative:** [http://breastfeedingcanada.ca/BFI.aspx](http://breastfeedingcanada.ca/BFI.aspx)

**Introduction to solid food:** Evidence is accumulating that infants should be introduced to solid food when they show signs of readiness, and the timing might range from a few weeks before to just after 6 months of age. Thus an item has been added to the 4-month visit guide to discuss future introduction to solid food, and the word initial has been deleted from the statement “introduction of solids” on the 6-month visit guide.

Introduction to solid food should begin with iron-containing food, such as iron-fortified cereals, meat, tofu, legumes, poultry, fish, and whole eggs, to avoid iron deficiency. Fruits, vegetables, and milk products (eg, yogurt, cheese) can follow. Delaying introduction to common food allergens such as egg whites and nut products is not currently recommended to prevent food allergies, including for infants at risk of atopy. In fact, most foods can be introduced at around 6 months of age, but the following items should be avoided:

- honey until age 1 to prevent botulism;
- cow’s milk as the primary milk source until 9 to 12 months to prevent iron-deficiency anemia;
- sweetened liquids or juices, which can lead to dental caries and excess weight gain, and can take the place of nutritious solids; and
- hard, small and round, or smooth and sticky solids until age 3 to prevent choking.

It is also recommended to introduce a new food every 3 to 4 days to facilitate recognition of intolerances to any new food.

**Vitamin D supplementation:** Changes related to the recommendations on vitamin D supplementation include the following.

- On the RBR guides, a bullet symbol has been added in front of vitamin D, indented under breastfeeding, as an additional prompt to confirm vitamin D supplementation in breastfed infants.
- Consistent with the Health Canada guidelines, a daily supplement should be given to breastfed infants until...
2 years of age, or until the child’s diet provides sufficient sources of vitamin D. 18
• A higher dose of vitamin D supplement (800 IU rather than 400 IU daily) should be considered for high-risk infants. 28
• As there is no evidence that supplementing formula-fed infants with vitamin D is required or improves outcomes, the following statement from the 2011 RBR has been removed: "Formula may only supply a portion of the recommended daily vitamin D intake if less than 1000 mL (33 oz) is consumed daily."

Protective effects of breastfeeding: We expanded the statement on the protective effects of breastfeeding to include the prevention of sudden infant death syndrome (SIDS) in addition to gastrointestinal and respiratory infections. 29,30

Sippy cup versus open cup: When discussing the transition from bottle to cup at the visits at 12 to 15 months, we clarified that providers should promote the use of an open cup rather than a sippy cup. As an infant gets liquids from a sippy cup by sucking (similar to suckling with a bottle), the sippy cup delays the acquisition of the motor skills for drinking. 18,31 Also, children using a sippy cup tend to consume excessive quantities of milk or juice. 18,32

Nutrition for children 2 to 5 years old: There are fewer changes in the nutrition section for children 2 to 5 years of age. We added a statement that restriction in dietary fat during the first 2 years is not recommended because it might compromise the intake of energy and essential fatty acids required for growth and development. We added breastfeeding in regular font for those aged 2 to 3 years (the evidence is not as strong as for younger ages) to be consistent with the Nutrition for Healthy Term Infants document. 19 We added skim milk to 1% and 2% milk as appropriate for children starting at 2 years of age. This is consistent with the literature and with Canada’s Food Guide. 18 For those aged 2 to 5 years, avoiding sweetened juices and liquids is still recommended.

Education and advice

Injury prevention: Safe Kids Canada, Safe Communities Canada, SMARTRISK, and ThinkFirst Canada have joined to create Parachute, a national organization for injury prevention. The new Parachute website (www.parachutecanada.org) includes information and resources relevant to injury prevention for families, communities, the health sector, researchers, governments, and businesses.

Transportation in motor vehicles has been updated to recommend rear-facing seats for infants and children until the age of 2, as per recent recommendations. 33 The outdated CPS position statement (currently under revision) has been replaced with a more up-to-date statement by the AAP. 33

Bicycle safety has been expanded to include advocating for helmet legislation for all ages, consistent with a new CPS position statement. 34 Firearm safety has been expanded to include safe storage. Under the falls category, we advise ensuring the stability of furniture to reflect the large number of reported pediatric injuries and fatalities due to instability and tipping over of appliances, furniture, and televisions. 36

Pacifier use might have a protective effect against SIDS; 36 for this reason, the reminder to counsel on pacifier use now appears in the injury prevention section on the RBR guides.

Behaviour and family issues: The Resources 2 page provides a summary of current evidence for behaviour and family issues. We added a reminder to assess healthy sleep habits, as evidence is emerging that normal sleep (quality and quantity for age) is associated with normal development and leads to better health outcomes. 37,41

Similarly, the discussion on family healthy active living and avoiding sedentary behaviour has been expanded. Primary care providers are encouraged to recommend increasing physical activity, with parents as role models, through interactive floor-based play for infants and a variety of activities for young children, as well as decreasing sedentary pastimes. Further, physicians might also counsel parents on appropriate screen time (avoid in those younger than age 2; less than 1 hour a day for children aged 2 to 4) for infants and children. 42 The Resources 2 page presents this information, as well as information on other family issues, and includes a web link to the Canadian Society for Exercise Physiology guidelines for physical activity and sedentary behaviour. 43

The following are other updates to anticipatory guidance information.
• Newly adopted children have been added as a high-risk population with special needs for health supervision.
• The recommendation for swaddling has been changed from in the first 6 months of life to in the first 2 months to reflect safety concerns regarding SIDS (although there is no conclusive evidence in the literature) (Resources 2).
• The term shaken baby syndrome has been changed to abusive head trauma, and expanded recommendations for prevention of child maltreatment are included. 44

Environmental health: An environmental health category was added to the RBR guides, as well as to the Resources 1 page, to account for the growing body of evidence supporting the effects of environmental hazards on child health. The items relevant to environmental health in past RBR editions were generally scattered throughout the education and advice section. To find evidence-based statements and non–evidence-based practice-relevant resources from the Canadian Partnership for Children’s Health and Environment and from the AAP, go to the Resources 1 page.
Other issues: Oral health items now include information on fluoride varnish and a caries risk assessment tool.

Developmental surveillance. Currently the RBR uses broad developmental surveillance as opposed to screening. Developmental surveillance is the process of recognizing children who might be at risk of developmental delays. It involves asking the parents for any concerns about their child’s development, observing the child, identifying risk and protective factors (including social determinants of health), and documenting attainment of milestones. In contrast, developmental screening involves the use of standardized tools to identify and refine a recognized risk.45

The developmental surveillance in the RBR uses a list of predefined items that were developed based on the oldest age by which a skill (or developmental milestone) should be achieved. These items were selected from various developmental surveillance tools present in the literature.46-49 This approach, which is typically referred to as the red flag approach, is designed to prevent unnecessary referrals while maximizing the positive identification of developmental delays. Failure to achieve these developmental milestones suggests the need for further evaluation of development such as the use of validated development screening tools or more specialized referral.50,51

With the understanding of the importance of early childhood experience and development, several organizations are advocating for increased attention and resources. Enhanced surveillance is recommended by the CPS and the province of Ontario at the 18-month visit, and is now being considered in several other Canadian provinces and territories.52 The CTFPHC is currently evaluating the evidence to support standardized developmental screening in healthy children and subsequent interventions and outcomes for identified cases of developmental delay. Standardized developmental screening tools are recommended by the AAP at the 9-, 18-, and 24- or 30-month visits. This approach is more resource intensive.53

As recommendations are currently evolving, there has been no change in the choice of developmental milestones chosen for the 2014 RBR.

It should be noted that a revised and validated Modified Checklist for Autism in Toddlers, including a follow-up document, is now available for specific screening of toddlers aged 16 to 30 months for autism spectrum disorder.46 It should be performed on all children who have failed items on the inquiry about social, emotional, and communication skills; on all children who have siblings with autism; or when there is a development concern identified by a parent, caregiver, or physician.

Physical examination. An appropriate age-specific physical examination is recommended at each visit. Evidence-based screening for specific conditions is highlighted.

Checking visual acuity at 3 to 5 years of age to detect the presence of amblyopia or its risk factors has been added to Resources 1.53

The term obstructive sleep apnea has been updated to sleep-disordered breathing.

“Tongue mobility” has been added to Guide 1 (at the 1-week, 2-week, and 1-month visits), and “Inspect tongue for ankyloglossia” has been added to Resources 1.54

“Patency of anus” has been added to the 1-week visit physical examination (Guide 1) because a child with an imperforate anus might not be identified at birth, based on a case reviewed by the Office of the Chief Coroner in Ontario.55

Immunization and infectious diseases. The immunization chart (Guide 5) has been improved with the addition of a new column to separate the date of vaccine administration from the name of the vaccine. The immunization chart and supplementary information (Resources 3) continue to be based on the recommendations of the National Advisory Committee on Immunization,56 and a direct link to the Canadian Immunization Guide has been added so current recommendations are accessible. As always, funded immunizations are in flux and vary between provinces and territories.

Changes to Guide 5 and Resources 3 include the following:

- The meningococcal vaccine terminology has been updated to MCV-C (conjugate meningococcal C vaccine) and MCV-4 (quadrivalent meningococcal vaccine).
- The human papillomavirus vaccine is now recommended for both boys and girls.
- Timing of the administration of the second dose of the measles-mumps-rubella vaccine has been clarified: For convenience and high uptake rates, it should be given with the 18-month or preschool dose of the diphtheria, tetanus, pertussis, and polio vaccine (with or without a shot of Haemophilus influenzae type b), or at any intervening age that is practical (and note that timing might depend on provincial or territorial policy).
- The live attenuated influenza vaccine can be used in those 2 years of age and older if there are no contraindications.
- Web links to the Canadian Tuberculosis Standards are now included, and the wording of tuberculosis recommendations has been simplified.

Conclusion

The RBR is an evidence-based and practice-relevant tool to support clinical decision making for health supervision of children from birth to 5 years of age. The 2014
RBR builds on the large knowledge base of its predecessors and continues the tradition of incorporating new advances to its core health supervision topics in the RBR guides and resources pages. Further development of the RBR website as a knowledge translation tool, as well as increasing electronic availability and supporting resources, will enhance its accessibility and outreach.

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Contributors

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Competing interests

None declared.

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