Appendix F: Newborn Screening

Newborn Screening Ontario (NSO) screens for 29 conditions:

- 20 inborn errors of metabolism
- 3 hemoglobinopathies
- 2 endocrine disorders
    - Congenital hypothyroidism
    - Congenital adrenal hyperplasia
- 3 other disorders
    - Cystic fibrosis
    - Galactosemia
    - Biotinidase deficiency
- Hearing loss (This summary does not include newborn screening for hearing loss.)

Sample Collection and Timing

- Samples are collected through heel prick onto the newborn screening card.
- Newborn screening (NBS) samples should be collected between 24 hours and 7 days after birth.
- The best time for sample collection is between 48-72 hours after birth.
- If a baby is tested before 24 hours of age, the sample should be repeated within 5 days.
- If the baby is beyond 5 days old, screening is still available. Contact NSO for details.

Special Considerations

- Prematurity
    - If <37 weeks – collect specimen at 5-7 days old.
    - Indicate this on NBS card.
    - May have false positive test results.
- Total Parenteral Nutrition (TPN)
    - Certain amino acids and organic acids will be elevated.
    - Indicate this on NBS card.
- Transfusion
    - Disorders may be missed.
    - Ideally complete card and obtain sample before transfusion.
- Early discharge
    - If prior to 24 hours, parents should be informed that a repeat sample must be done.

How likely is a positive test?

The disorders being screened are very rare. The overall prevalence of a metabolic disorder is about 1/2400. The overall specificity of NBS is about 99.7% and overall sensitivity is close to 100% for classic forms of these disorders and about 92.6% for variants. The false positive rate is about 0.33%. It is estimated that about 1/4100 newborns will benefit from screening and treatment.[1]

What are the benefits and risks of NBS?
Babies born with these disorders may appear healthy at birth. The benefit of screening is that early identification may allow early treatment, decreasing or preventing consequences such as recurrent illness, developmental disability or death. Parents can be informed of the diagnosis and be counseled about the risk for future children. In the case of inborn errors of metabolism, treatment may include special formulas and diets, vitamin supplements, and avoiding fasting. Prophylactic penicillin and vaccination have been shown to be effective in reducing infections and morbidity in sickle cell disease. Frequent monitoring and increased use of appropriate medications in the management of cystic fibrosis have resulted in improved outcomes.

The risks of NBS include parental anxiety, especially in the case of false positive tests, and potentially in those healthy individuals identified as carriers or diagnosed with benign conditions. There is also the risk of unanticipated outcomes such as misattributed paternity.

It is the responsibility of primary care providers to discuss:

- NBS with expectant parents (NBS brochures are available on NSO website)
- benefits and risks of screening
- how testing is done
- timing of testing
- need for repeat sample in some situations
- difference between a screening and diagnostic test (A screening test determines if there is a high or low risk that the infant has a condition. A further diagnostic test is needed to determine with certainty if the infant has the condition.)
- possible results of screening
    - Screen negative: Results will go to the submitting health care professional/hospital. More than 99% will be negative. If you suspect that an infant or child has symptoms of a screened condition and their NBS results are negative, please refer to the appropriate specialist for evaluation as NBS does not screen for every metabolic condition.
    - Screen positive: This does not mean that the infant has the disorder. Further testing is required to confirm the diagnosis. NSO will immediately notify the regional treatment centre, which will notify the infant's healthcare provider and/or parents and arrange confirmatory testing. If the diagnosis is confirmed, the regional treatment centre will provide management and follow up.

[1] Schulze A, Lindner M, Kohlmuller D, Olgemoller K, Mayatepek E, Hoffmann GF. Expanded newborn screening for inborn errors of metabolism by eletrospray ionization-tandem mass spectrometry: results outcome and implications. Pediatrics 2003;111:1399-1406.

Disorders Screened by Newborn Screening Ontario

Category	Disorder
Organic Acid Disorders	• Isovaleric acidemia (IVA) • Glutaric acidemia type 1 (GA1) • HMG-CoA lyase deficiency (HMG) • Multiple carboxylase deficiency (MCD) • Methylmalonic acidemia (MMA) • Methylmalonic acidemia (MUT, Cbl) • 3-methylcrotonyl-CoA carboxylase(3MCC) deficiency • Propionic acidemia (PA) • B-ketothiolase deficiency (BKT)
Fatty Acid Oxidation Disorders	• Medium-chain acyl-CoA dehydrogenase (MCAD) deficiency • Very long-chain acyl-CoA dehydrogenase deficiency (VLCAD) • Long-chain L-3-OH acyl-CoA dehydrogenase deficiency (LCHAD) • Trifunctional protein deficiency (TFP) • Carnitine uptake defect (CUD)
Amino Acid Disorders	• Phenylketonuria (PKU) • Maple syrup urine disease (MSUD) • Tyrosinemia type 1 (TYR 1) • Homocystinuria • Citrullinemia (CIT) • Argininosuccinic acidemia (ASA)
Hemoglobinopathies	• Sickle Cell Disease and variants • Other Hemoglobinopathies
Endocrine Disorders	• Congenital hypothyroidism (CH) • Congenital adrenal hyperplasia (CAH)
Other Disorders	• Cystic fibrosis (CF) • Galactosemia (GALT) • Biotinidase deficiency
Hearing Loss	• Hearing loss

Additional Resources:

- **Newborn Screening Ontario:** www.newbornscreening.on.ca
- **Ontario Ministry of Health:** http://www.health.gov.on.ca/english/providers/program/child/screening/screen_sum.html
- **March of Dimes:** www.marchofdimes.com
- **Genetests:** www.genetests.org
- **National Newborn Screening & Genetics Resource Centre:** http://genes-r-us.uthscsa.edu/

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Appendix G: Neurological Examination of the Newborn

Neurological Signs	Description	Significance	Developmental change
Posture	All limbs flexed	Asymmetry or extension -hypotonia suspected	Hyperflexion past 2 months suspect spasticity
Motor Activity	Vigorous, constant motor activity alternating limb flexion and extension	Asymmetry or minimal-CNS or PNS problem	
Passive Tone *	Resistance to passive stretch	Best indicator of CNS maturation Earliest sign of neurologic dysfunction	
	Upper limb: Extend both upper limbs by pressing on forearms. Hold – release a brisk symmetrical flexion not forceful nor clonus	Absent or poor: Hypotonia or muscle weakness Exaggerated: spasticity	
	Lower limb: Hold feet and flex over abdomen then pull to extension. Hold then release. A symmetrical flexion should occur	As for upper limbs	
	Scarf sign: Hold baby's hand and bring to opposite shoulder: elbow should be in line with sternum	Wraps around neck may be hypotonia Resists before midline -may be spasticity	
	Adductor's angle – Hold knee in extension and abduct until resistance -note asymmetry – measure angle with pubis and midline 40-80 degrees	A wider angle – hypotonia. Less-spasticity	Gradually increases to 100-140 degrees by 6-9 months
	Popliteal Angle – Flexing of the thighs over abdomen, then gently extending the leg until resistance – measure angle between the thigh and leg and compare sides – 80-100 degrees	Early sign of spasticity -hemiplegia or diplegia	By six months – 120-140 degrees -baby can put feet in his mouth
	Active neck muscle tone – 1. Hold baby in sitting position allow head to extend backwards by moving his trunk back. Infant should move head to vertical axis and hold briefly. 2. Ventral extension: hold baby in prone position hold under trunk and abd. – should straighten back and redress head. Limbs in flexion	1. Headlag may indicate CNS depression or hypotonia 2. In hypotonia the infant hangs limp exaggerated spinal curve-limbs more extended, no extensor neck activity. Spacticity may show exaggerated response	***Landau response:*** By 3 months more sustained straightening of head and trunk. Increasing from head downwards -response complete by 4-6 months. Now forced flexion of the head causes flexion of all the limbs. By 12 months the infant can inhibit the Landau response.

	Deep tendon reflexes: Biceps, knee and ankle jerks present in newborn. Up to **two months** knee jerk causes crossed adduction response and the ankle jerk has a few clonic beats	Responses should be brisk and symmetrical to be normal	Triceps; present after a few weeks
Developmental Primitive Reflexes		The response to a single reflex not very significant but a poor response to 2 or 3 may be important neurologically. Absence of habituation is also important.	The persistence beyond appropriate time may signify pathology They should be checked until one year
	Moro Reflex: Lift baby by hands to raise shoulders off the bed about 3 cm – release-extension and abduction of arms with opening of hands then smooth adduction and flexion and a cry	An asymmetrical response possible focal defect eg brachial plexus palsy. Prolongation of phases – may indicate brain damage	After three months a positive Moro response is abnormal
	Palmar Grasp: Slight stimulation to palm leads to strong grasp		Between three and four months, this response lessens. After this period a positive response is abnormal.
	Foot Grasp: Light pressure on sole of foot -flexion and grasp response in the toes		This reflex disappears after 9 months
	Rooting Reflex: Light stroke on corner of mouth – leads to rotation of head in the direction plus sucking movements		Response disappears after 3-4 months when awake and 7-8 months when drowsy.
	Sucking Reflex: Placing a finger in infant's mouth produces sustained sucking. Weaker if fed.	Absence or weak response in presence of feeding problem – may mean brain involvement	Same as rooting *Poor sucking and latch can be associated with future speech and language problems
	Crossed Extension Reflex: Stroke the sole of infants foot – flexion and abduction then extension and adduction and other leg crossing over the extended one.	Full response in full term infant – a test of maturity of the nervous system	Disappears after 1st month
	Tonic Neck Reflex: Lying on back rotate baby's head to one side – arm on same side extends and other arm flexes- rotate the other opposite way to obtain similar response.	This reflex appears at 1-2 months – important if sustained	Disappears by 7-8 months
	Placing reaction: Hold baby by trunk in upright – one leg touching table. Baby steps on the table then takes step with other		Response should disappear by 5-6 weeks

From: Larbrisseau, A. Neurologic Examination of the newborn,. Diagnosis, June: 69 – 79, 1986

Appendix H: **Rourke Baby Record**

Revised August 2009
www.rourkebabyrecord.ca

Canadian Paediatric Society / Société canadienne de pédiatrie
The College of Family Physicians of Canada / Le Collège des médecins de famille du Canada

Pregnancy/Birth remarks/Apgar:	Risk factors/Family history:

Rourke Baby Record: Evidence-Based Infant/Child Health Maintenance **GUIDE I**

NAME: _____ Birth Day (d/m/yr): _____ M [ ] F [ ]

Birth Length: _____ cm Head Circ:_____ cm Birth Wt.: _____ g Discharge Wt.:_____ g

DATE OF VISIT	**within 1 week**			**2 weeks** (optional)			**1 month** (optional)		
GROWTH* Correct percentiles until 24-36 months if < 37 weeks gestation	*Height*	*Weight*	*HC (avg 35 cm)*	*Height*	*Weight*	*Head Circ.*	*Height*	*Weight*	*Head Circ.*
PARENTAL CONCERNS									
NUTRITION*	❍ **Breastfeeding (exclusive)*** **Vitamin D 400 IU/day*** ❍ *Formula Feeding* (iron-fortified) [150 mL(5 oz)/kg/day*] ❍ Stool pattern and urine output			❍ **Breastfeeding (exclusive)*** **Vitamin D 400 IU/day*** ❍ *Formula Feeding* (iron-fortified) [150 mL(5 oz) /kg/day*] ❍ Stool pattern and urine output			❍ **Breastfeeding (exclusive)*** **Vitamin D 400 IU/day*** ❍ *Formula Feeding* (iron-fortified) [450-750 mL(15-25 oz) /day*] ❍ Stool pattern and urine output		
EDUCATION AND ADVICE ✓ discussed and no concerns X if concerns	Injury Prevention ❍ **Car seat (infant)*** ❍ Carbon monoxide/*Smoke detectors** ❍ **Sleep position/bed sharing/room sharing*** ❍ *Hot water <49°C** ❍ **Crib safety*** ❍ Choking/safe toys* ❍ **Firearm safety/removal*** Behaviour and family issues ❍ Sleeping/crying** ❍ Parenting/bonding ❍ Soothability/responsiveness ❍ Parental fatigue/postpartum depression** ❍ **High risk infants/assess home visit need**** ❍ Family conflict/stress ❍ Siblings Other Issues ❍ **Second hand smoke*** ❍ *Counsel on pacifier use** ❍ Fever advice/thermometers* ❍ **No OTC cough/cold medn*** ❍ *Temperature control and overdressing* ❍ *Inquiry on complementary/alternative medicine** ❍ Sun exposure/sunscreens/insect repellent*								
DEVELOPMENT** (Inquiry and observation of milestones) Tasks are set **after** the time of normal milestone acquisition. **Absence of any item suggests consideration for further assessment of development.** NB-Correct for age if < 37 weeks gestation ✓ if attained X if not attained				❍ Sucks well on nipple ❍ *No parent/caregiver concerns*			❍ *Focuses gaze* ❍ *Startles to loud noise* ❍ *Calms when comforted* ❍ Sucks well on nipple ❍ *No parent/caregiver concerns*		
PHYSICAL EXAMINATION Evidence-based screening for specific conditions is highlighted, but an appropriate age-specific focused physical examination is recommended at each visit. ✓ if normal X if abnormal	❍ *Skin (jaundice, dry)* ❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ *Ears (TMs) Hearing inquiry/screening** ❍ Heart/Lungs ❍ Umbilicus ❍ Femoral pulses ❍ Hips* ❍ Muscle tone* ❍ Testicles ❍ Male urinary stream/foreskin care			❍ *Skin (jaundice, dry)* ❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ *Ears (TMs) Hearing inquiry/screening** ❍ Heart/Lungs ❍ Umbilicus ❍ Femoral pulses ❍ Hips* ❍ Muscle tone* ❍ Testicles ❍ Male urinary stream/foreskin care			❍ *Skin (jaundice)* ❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex*** ❍ *Hearing inquiry/screening** ❍ Heart ❍ Hips* ❍ Muscle tone*		
PROBLEMS AND PLANS	❍ **PKU, Thyroid** ❍ **Hemoglobinopathy screen (if at risk)***								
IMMUNIZATION Provincial guidelines vary	**Record on Guide V: Immunization Record** If HBsAg-positive parent or sibling: ❍ **Hepatitis B vaccine**			**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record** If HBsAg-positive parent or sibling: ❍ **Hepatitis B vaccine**		
	Signature			**Signature**			**Signature**		

Strength of recommendation based on literature review using the classification of the Canadian Task Force on Preventive Health Care: **Good (bold type)**; *Fair (italic type)*; Consensus (plain type).
(*) see Infant/Child Health Maintenance Selected Guidelines on reverse of Guide I (**) see Healthy Child Development Selected Guidelines on reverse of Guide IV

Disclaimer: Given the constantly evolving nature of evidence and changing recommendations, the Rourke Baby Record is meant to be used as a guide only.

Financial support has been provided by the Government of Ontario, with funds administered by the Ontario College of Family Physicians.

GROWTH

- **Important:** Corrected age should be used at least until 24 to 36 months of age for premature infants born at <37 wks gestation.
- *Measuring growth* - The growth of all full term infants, both breastfed and non breastfed, and preschoolers should be evaluated using growth charts from the 2006 World Health Organization Child Growth Standards (birth to 5 years) with measurement of recumbent length (birth to 2-3 years) or standing height (≥ 2 years), weight, and head circumference (birth to 2 years). www.who.int/childgrowth/standards/en/

NUTRITION

- Pediatric nutrition guidelines – Nutrition for Healthy Term Infants
  - www.hc-sc.gc.ca/fn-an/pubs/infant-nourrisson/nut_infant_nourrisson_term_e.html
  - http://www.osnpph.on.ca/pdfs/ImprovingOddsJune-08.pdf
- **Breastfeeding: Exclusive breastfeeding** is recommended for the first six months of life for healthy term infants. Breast milk is the optimal food for infants, and breastfeeding (with complementary foods) may continue for up to two years and beyond unless contraindicated. Breastfeeding reduces gastrointestinal and respiratory infections. 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.
- Routine **Vitamin D supplementation** of 400 IU/day (800 IU/day in northern communities) is recommended for all breastfed full term infants until the diet provides a sufficient source of Vitamin D (~ 1 year of age). Formula may only supply a portion of the recommended daily vitamin D intake if less than 1000 mL (33 oz) is consumed daily.
  - Breastfeeding - www.cps.ca/english/statements/N/BreastfeedingMar05.htm
  - Weaning - www.cps.ca/english/statements/CP/cp04-01.htm
  - Vitamin D - www.cps.ca/english/statements/fi/fnim07-01.htm
  - Colic - www.cps.ca/english/statements/N/NutritionNoteSept03.htm
  - Ankyloglossia and breastfeeding - www.cps.ca/english/statements/CP/cp02-02.htm
  - Maternal medications when breastfeeding - Medications and Mothers' Milk, T. Hale (2008)
  - Motherisk - www.motherisk.org
- Milk consumption range is consensus only & is provided as an approximate guide.
- Soy-based formula is not recommended for routine use in term infants as an equivalent alternative to cow's milk formula, or for cow milk protein allergy, and is contraindicated for preterm infants. www.cps.ca/english/statements/N/InfantSoyConcern.htm
- *Transition to lower fat diet*: A gradual transition from the high-fat infant diet to a lower-fat diet begins after age 2 years as per Canada's Food Guide.
- Encourage a healthy diet as per Canada's Food Guide
  - www.hc-sc.gc.ca/fn-an/food-guide-aliment/index_e.html

INJURY PREVENTION

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, drowning, choking, burns, poisoning, and falls.

- **Transportation in motor vehicles:** www.cps.ca/english/statements/IP/IP08-01.htm
  http://www.safekidscanada.ca/SKCPublicPolicyAdvocacy/custom/BoosterSeatLegislationChart.pdf
  Children < 13 years should sit in the rear seat. Keep children away from all airbags.
  Install and follow size recommendations as per specific car seat model and keep child in each stage as long as possible.
  Use rear-facing infant seat until at least 1 year of age AND 10 kg (22 lb).
  Use forward-facing child seat from at least 1 year of age AND 10 - 22 kg (22 - 48 lb) and up to 122 cm (48"). Maximum ht/wt may vary with car seat model.
  Use booster seat from at least 18 - 36 kg (40 - 80 lb) and up to 145 cm (4'9").
  Use lap and shoulder belt in the rear seat for older children over 8 yrs who are at least 36 kg (80 lb) and 145 cm (4'9") and fit vehicle restraint system.
- **Bicycle:** wear **bike helmets**. Replace if heavy impact or sign of damage.
- Drowning: www.cps.ca/english/statements/IP/IP03-01.htm
  - *Bath safety*: Never leave a young child alone in the bath. Do not use infant bath rings or bath seats.
  - *Water safety*: Recommend adult supervision, training for adults, 4-sided pool fencing, lifejackets, swimming lessons, and boating safety to decrease the risk of drowning.
- Choking: Avoid hard, small and round, smooth and sticky solid foods until age 3 years. Use safe toys, follow minimum age recommendations, and remove loose parts and broken toys.
- Burns: *Install smoke detectors in the home on every level.*
  Keep hot water at a temperature < 49°C.
- **Poisons:** Keep medicines and cleaners locked up and out of child's reach. Have Poison Control Centre number handy. *Use of ipecac is contraindicated in children.*
- Falls: Assess home for hazards- never leave baby alone on change table or other high surface; use window guards and stair gates. Baby walkers are banned in Canada and should never be used. Advise against trampoline use at home. www.cps.ca/english/statements/IP/IP07-01.htm
- **Safe sleeping environment:** www.cps.ca/english/statements/CP/cp04-02.htm
  - **Sleep position and SIDS/Positional plagiocephaly:** Healthy infants should be positioned on their backs for sleep. Their heads should be placed in different positions on alternate days. 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.
  - **Bed sharing:** Advise against bed sharing.
  - **Room sharing:** Encourage putting infant in a crib that meets current Canadian safety regulations in parents' room for the first 6 months of life. Room sharing is protective against SIDS.
- **Firearm safety/removal:** There is evidence-based association between a firearm in the home and increased risk of unintentional firearm injury, suicide, or homicide.

For more safety information:
www.safekidscanada.ca www.cps.ca/english/publications/InjuryPrevention.htm

PROBLEMS AND PLANS (SCREENING)

Anemia screening: All infants from high-risk groups for iron deficiency anemia require screening between 6 and 12 months of age, e.g. Lower SES; Asian; First Nations children; low-birth-weight infants, and infants fed whole cow's milk during their first year of life.
Hemoglobinopathy screening: Screen all neonates from high-risk groups, e.g. Asian, African, and Mediterranean.

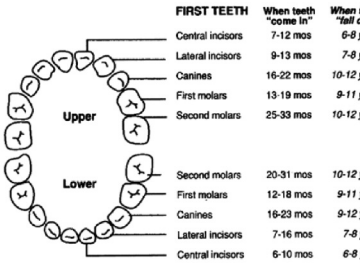
OTHER

- **Second-hand smoke exposure:** contributes to childhood illnesses such as URTI, middle ear effusion, persistent cough, pneumonia, asthma, and SIDS.
- Advise parents against using **OTC cough/cold medications**.
  - http://www.hc-sc.gc.ca/ahc-asc/media/advisories-avis/_2008/2008_184-eng.php
- *Complementary and alternative medicine (CAM)*: Questions should be routinely asked on the use of homeopathy and other complementary and alternative medicine therapy or products, especially for children with chronic conditions.
  - www.cps.ca/english/statements/DT/DT05-01.htm
  - Homeopathy - www.cps.ca/english/statements/CP/cp05-01.htm
- *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. - www.cps.ca/english/statements/CP/cp03-01.htm
- Fever advice/thermometers: Fever ≥ 38°C in an infant < 3 months needs urgent evaluation. 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.
  - Temperature measurement - www.cps.ca/english/statements/CP/cp00-01.htm
- Footwear: Shoes are for protection, not correction. Walking barefoot develops good toe gripping and muscular strength - http://www.cps.ca/english/statements/CP/FootwearChildren.htm
- Healthy Active Living: Encourage increased physical activity and decreased sedentary pastimes with parents as role models.
  - www.cps.ca/english/statements/HAL/HAL02-01.htm
  - Media use - www.cps.ca/english/statements/PP/pp03-01.htm
- Sun exposure/sunscreens/insect repellents: Minimize sun exposure. Wear protective clothing, hats, properly applied sunscreen with SPF ≥ 30 for those > 6 months of age. No DEET in < 6 months; 6-24 months 10% DEET apply max once daily; 2 - 12 yrs 10% DEET apply max TID.
- *Pesticides*: Avoid pesticide exposure. Encourage pesticide-free foods.
  - http://www.ocfp.on.ca/local/files/Communications/Current%20Issues/Pesticides/Final%20Paper%2023APR2004.pdf
- *Lead Screening* is recommended for children who:
  - in the last 6 months lived in a house or apartment built before 1950;
  - 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;
  - have been seen eating paint chips.

  Even for blood levels less than 10ug/dL, evidence suggests an association, and perhaps partial causal relationship with lower cognitive function in children.
  http://www.pulsus.com/journals/toc.jsp?sCurrPg=journal&jnlKy=5&isuKy=444
- Websites about environmental issues:
  - CPCHE - www.healthyenvironmentforkids.ca/
  - Health and housing - www.cmhc-schl.gc.ca/en/inpr/bude/heho/index.cfm
  - Environmental health section of CDC - www.cdc.gov/node.do/id/0900f3ec8000e044
  - Commission for Environmental Cooperation – www.cec.org/children

Dental Care:

- **Dental Cleaning: Fluoridated toothpaste** should be used twice per day with a minimum amount of water used to rinse the mouth after brushing. As excessive swallowing of toothpaste by young children may result in dental fluorosis, children under 6 years of age should be supervised during brushing and only use a small amount (e.g. pea-sized portion) of toothpaste. Children under 3 years of age should have their teeth brushed by an adult using only a smear of toothpaste.



  - Fluoride supplements are not recommended under 6 yrs of age unless the child is considered at high risk for dental caries. www.cda-adc.ca/_files/position_statements/fluorides.pdf
  - *To prevent early childhood caries*: avoid sweetened liquids and constant sipping of milk or natural juices in both bottle and cup.

PHYSICAL EXAMINATION

- Vision screening: www.cps.ca/english/statements/cp/cp09-02.htm
  - Check **Red Reflex** for serious ocular diseases such as retinoblastoma and cataracts.
  - **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.
- *Hearing screening/inquiry* – Universal newborn hearing screening (UNHS) effectively identifies infants with congenital hearing loss & allows for early intervention. Any parental concerns about hearing acuity or language delay should prompt a rapid referral for hearing assessment. Formal audiology testing should be performed in all high-risk infants, including those with normal UNHS. Older children should be screened if clinically indicated.
  http://pediatrics.aappublications.org/cgi/reprint/122/1/e266
- Muscle tone – Physical assessment for spasticity, rigidity, and hypotonia should be performed.
- Hips – There is insufficient evidence to recommend routine screening for developmental dysplasia of the hips, but examination of the hips should be included in the periodic health exam. http://pediatrics.aappublications.org/cgi/reprint/117/3/898
- Adenotonsillar hypertrophy and presence of sleep-disordered breathing warrant assessment re. obstructive sleep apnea. http://aappolicy.aappublications.org/cgi/reprint/pediatrics;109/4/704.pdf

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www.rourkebabyrecord.ca

Canadian Paediatric Society / Société canadienne de pédiatrie
The College of Family Physicians of Canada / Le Collège des médecins de famille du Canada

Past problems/Risk factors:	Family history:

Rourke Baby Record: Evidence-Based Infant/Child Health Maintenance — GUIDE II

NAME: _____ Birth Day (d/m/yr): _____ M [ ] F [ ]

DATE OF VISIT	2 months			4 months			6 months		
GROWTH* Correct percentiles until 24-36 months if < 37 weeks gestation	*Height*	*Weight*	*Head circ.*	*Height*	*Weight*	*Head Circ.*	*Height*	*Weight* (x2 BW)	*Head Circ.*
PARENTAL CONCERNS									
NUTRITION*	❍ **Breastfeeding (exclusive)*** **Vitamin D 400 IU/day*** ❍ *Formula Feeding* (iron-fortified) [600-900 mL(20-30 oz) /day*]			❍ **Breastfeeding (exclusive)*** **Vitamin D 400 IU/day*** ❍ *Formula Feeding* (iron-fortified) [750-1080 mL(25-36 oz) /day*]			❍ **Breastfeeding*– initial introduction of solids** **Vitamin D 400 IU/day*** ❍ *Formula Feeding – iron-fortified* [750-1080 mL(25-36 oz) /day*] ❍ No bottles in bed ❍ Avoid sweetened liquids ❍ Iron containing foods (cereals, meat, egg yolk, tofu) ❍ Fruits and vegetables to follow ❍ No egg white, nut products, or honey ❍ Choking/safe food*		
EDUCATION AND ADVICE ✓ discussed and no concerns X if concerns	Injury Prevention ❍ **Car seat (infant)*** ❍ **Sleep position/bed sharing/room-sharing/crib safety** ❍ **Poisons*; PCC#*** ❍ **Firearm safety/removal*** ❍ *Electric plugs/cords* ❍ Carbon monoxide/*Smoke detectors** ❍ *Hot water <49°C/bath safety** ❍ Choking/safe toys* ❍ *Falls (stairs, walkers, change table)** Behaviour and family issues ❍ Sleeping/crying/**Night waking**** ❍ Soothability/responsiveness ❍ **High risk infants/assess home visit need**** ❍ Siblings ❍ Parenting/bonding ❍ Parental fatigue/postpartum depression** ❍ Family conflict/stress ❍ *Child care***/return to work Other Issues ❍ **Second hand smoke*** ❍ Teething/**Dental cleaning/Fluoride*** ❍ **No OTC cough/cold medn*** ❍ Fever advice/thermometers* ❍ *Temperature control and overdressing* ❍ *OTC/complementary/alternative medicine** ❍ *Encourage reading*** ❍ Sun exposure/sunscreens/insect repellent* ❍ *Pesticide exposure** ❍ *Pacifier use**								
DEVELOPMENT** (Inquiry and observation of milestones) Tasks are set **after** the time of normal milestone acquisition. **Absence of any item suggests consideration for further assessment of development.** NB-Correct for age if < 37 weeks gestation ✓ if attained X if not attained	❍ *Follows movement with eyes* ❍ *Coos - throaty, gurgling sounds* ❍ *Lifts head up while lying on tummy* ❍ *Can be comforted & calmed by touching/rocking* ❍ *Sequences 2 or more sucks before swallowing/breathing* ❍ Smiles responsively ❍ *No parent/caregiver concerns*			❍ *Follows a moving toy or person with eyes* ❍ *Responds to people with excitement (leg movement/ panting/vocalizing)* ❍ *Holds head steady when supported at the chest or waist in a sitting position* ❍ *Holds an object briefly when placed in hand* ❍ *Laughs/smiles responsively* ❍ *No parent/caregiver concerns*			❍ *Turns head toward sounds* ❍ *Makes sounds while you talk to him/her* ❍ *Vocalizes pleasure and displeasure* ❍ *Rolls from back to side* ❍ *Sits with support (e.g. pillows)* ❍ *Reaches/grasps objects* ❍ *No parent/caregiver concerns*		
PHYSICAL EXAMINATION Evidence-based screening for specific conditions is highlighted, but an appropriate age-specific focused physical examination is recommended at each visit. ✓ if normal X if abnormal	❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex*** ❍ *Hearing inquiry/screening** ❍ Heart ❍ Hips* ❍ Muscle tone*			❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex*** ❍ *Hearing inquiry/screening** ❍ Hips* ❍ Muscle tone*			❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex/Cover-uncover test & inquiry**** ❍ *Hearing inquiry/screening** ❍ Hips* ❍ Muscle tone*		
PROBLEMS AND PLANS							❍ Inquire about risk factors for TB		
IMMUNIZATION Provincial guidelines vary	**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record** If HBsAg-positive parent or sibling: ❍ **Hepatitis B vaccine**		
	Signature			**Signature**			**Signature**		

Strength of recommendation based on literature review using the classification of the Canadian Task Force on Preventive Health Care: **Good (bold type)**; *Fair (italic type)*; Consensus (plain type).
(*) see Infant/Child Health Maintenance Selected Guidelines on reverse of Guide I (**) see Healthy Child Development Selected Guidelines on reverse of Guide IV

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Past problems/Risk factors:	Family history:

Rourke Baby Record: Evidence-Based Infant/Child Health Maintenance — GUIDE III

NAME: _____ Birth Day (d/m/yr): _____ M [ ] F [ ]

DATE OF VISIT	**9 months** (optional)			**12-13 months**			**15 months** (optional)		
GROWTH* Correct percentiles until 24-36 months if < 37 weeks gestation	*Height*	*Weight*	*Head circ.*	*Height*	*Weight* (x3 BW)	*HC* (avg 47cm)	*Height*	*Weight*	*Head Circ.*
PARENTAL CONCERNS									
NUTRITION*	❍ **Breastfeeding***/**Vitamin D 400 IU/day*** ❍ *Formula Feeding - iron-fortified* [720-960 mLs(24-32 oz) /day*] ❍ No bottles in bed ❍ Avoid sweetened liquids ❍ Cereal, meat/alternatives, fruits, vegetables ❍ 1st introduction cow's milk products ❍ No egg white, nut products, or honey ❍ Choking/safe foods*			❍ **Breastfeeding*** ❍ Homogenized milk ❍ Encourage standard cup instead of bottle [500-750 mLs(16-24 oz) /day*] ❍ Appetite reduced ❍ Choking/safe foods*			❍ **Breastfeeding*** ❍ Homogenized milk ❍ Encourage standard cup instead of bottle [500-750 mLs(16-24 oz) /day*] ❍ Choking/safe foods*		
EDUCATION AND ADVICE ✓ discussed and no concerns X if concerns	Injury Prevention ❍ **Car seat (infant)*** ❍ **Poisons***; **PCC#*** ❍ **Firearm safety/removal*** ❍ Carbon monoxide/*Smoke detectors** ❍ *Hot water <49°C/bath safety** Childproofing, including: ❍ *Electric plugs/cords* ❍ *Falls/stairs/walkers** ❍ Choking/safe toys* Behaviour and family issues ❍ Sleeping/crying/**Night waking**** ❍ Soothability/responsiveness ❍ **High risk children/assess home visit need**** ❍ Siblings ❍ *Parenting*** ❍ Parental fatigue/depression** ❍ Family conflict/stress ❍ *Child care***/return to work Other Issues ❍ **Second hand smoke*** ❍ Teething/**Dental cleaning/Fluoride/Dentist*** ❍ *Complementary/alternative medicine** ❍ **No OTC cough/cold medn*** ❍ Fever advice/thermometers* ❍ Active healthy living/screen time* ❍ *Encourage reading*** ❍ *Pacifier use** ❍ Footwear* Environmental health including: ❍ Sun exposure/sunscreens/insect repellent* ❍ *Serum lead if at risk** ❍ *Pesticide exposure**								
DEVELOPMENT** (Inquiry and observation of milestones) Tasks are set **after** the time of normal milestone acquisition. **Absence of any item suggests consideration for further assessment of development.** NB-Correct for age if < 37 weeks gestation ✓ if attained X if not attained	❍ *Looks for an object seen hidden* ❍ *Babbles a series of different sounds (eg. baba, duhduh)* ❍ *Responds differently to different people* ❍ *Makes sounds/gestures to get attention or help* ❍ *Sits without support* ❍ *Stands with support when helped into standing position* ❍ *Opposes thumb and fingers when grasps objects* ❍ *Plays social games with you (eg. nose touching, peek-a-boo)* ❍ *Cries or shouts for attention* ❍ *No parent/caregiver concerns*			❍ *Responds to own name* ❍ *Understands simple requests, eg, Where is the ball?* ❍ *Makes at least 1 consonant/vowel combination* ❍ *Says 3 or more words (do not have to be clear)* ❍ *Crawls or 'bum' shuffles* ❍ *Pulls to stand/walks holding on* ❍ *Shows distress when separated from parent/caregiver* ❍ *Follows your gaze to jointly reference an object* ❍ *No parent/caregiver concerns*			❍ *Says 5 or more words (words do not have to be clear)* ❍ *Picks up and eats finger foods* ❍ *Walks sideways holding onto furniture* ❍ *Shows fear of strange people/places* ❍ *Crawls up a few stairs/steps* ❍ Tries to squat to pick up toys from the floor ❍ *No parent/caregiver concerns*		
PHYSICAL EXAMINATION Evidence-based screening for specific conditions is highlighted, but an appropriate age-specific focused physical examination is recommended at each visit. ✓ if normal X if abnormal	❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ *Hearing inquiry/screening** ❍ Hips*			❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ *Hearing inquiry/screening** ❍ Tonsil size/Teeth* ❍ Hips*			❍ Fontanelles ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ *Hearing inquiry/screening** ❍ Tonsil size/Teeth* ❍ Hips*		
PROBLEMS AND PLANS	❍ **Anti-HBs and HbsAG*** (If HbsAg positive mother) ❍ *Hemoglobin (If at risk)**			❍ *Hemoglobin (If at risk)**					
IMMUNIZATION Provincial guidelines vary	**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record**		
	Signature			**Signature**			**Signature**		

Strength of recommendation based on literature review using the classification of the Canadian Task Force on Preventive Health Care: **Good (bold type)**; *Fair (italic type)*; Consensus (plain type).
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Pregnancy/Birth remarks/Apgar:	Risk factors/Family history:

Rourke Baby Record: Evidence-Based Infant/Child Health Maintenance

GUIDE IV (Ontario)

NAME: _____ Birth Day (d/m/yr): _____ M [ ] F [ ]

DATE OF VISIT	18 months			2-3 years			4-5 years	
GROWTH* Correct percentiles until 24-36 mos if < 37 weeks gestation	*Height*	*Weight*	*Head circ.*	*Height*	*Weight*	*HC* if prior abN	*Height*	*Weight*
PARENTAL CONCERNS								
NUTRITION*	❍ **Breastfeeding*** ❍ Homogenized milk ❍ No bottles [500-750 mLs(16-24 oz) /day*]			❍ 1% to 2% milk ❍ *Gradual transition to lower fat diet** ❍ Canada's Food Guide* [~ 500 mLs(16 oz) /day*]			❍ 1% to 2% milk ❍ Canada's Food Guide* [~ 500 mLs(16 oz) /day*]	
EDUCATION AND ADVICE								
Injury Prevention	❍ **Car seat (child)*** ❍ *Bath safety** ❍ Choking/safe toys*			❍ **Car seat** (child/booster)* ❍ Carbon monoxide/*smoke detectors** ❍ **Bike helmets*** ❍ Matches ❍ **Firearm safety/removal*** ❍ *Water safety**				
Behaviour	❍ Parent/child interaction ❍ *Discipline/Parenting skills programs***			❍ Parent/child interaction ❍ Parental fatigue/depression* ❍ *Discipline/parenting skills programs*** ❍ Family conflict/stress ❍ **High-risk children**** ❍ Siblings				
Family	❍ Parental fatigue/stress/depression** ❍ **High-risk children****			❍ **Second-hand smoke*** ❍ *Complementary/alternative medicine** ❍ Active healthy living/screen time* ❍ **Dental cleaning/Fluoride/Dentist*** ❍ Toilet learning** ❍ Socializing opportunities ❍ *No pacifiers** ❍ **No OTC cough/cold medn*** ❍ *Encourage reading*** ❍ **Assess child care** */preschool needs/*school readiness**				
Other	❍ Socializing/peer play opportunities ❍ *Wean from pacifier** ❍ **Dental care/Dentist*** ❍ Toilet learning** ❍ *Encourage reading***			Environmental health including: ❍ Sun exposure/sunscreens/insect repellent* ❍ *Pesticide exposure** ❍ *Serum lead if at risk**				
✓ discussed and no concerns X if concerns								
DEVELOPMENT** (Inquiry and observation of milestones) Tasks are set **after** the time of normal milestone acquisition. **Absence of any item suggests consideration for further assessment of development.** NB-Correct for age if < 37 weeks gestation ✓ if attained X if not attained	Enhanced inquiry after Nipissing Developmental Screen (NDDS) ** List NDDS items not yet attained: _____ Social/Emotional ❍ *Child's behaviour is usually manageable* ❍ *Interested in other children* ❍ *Usually easy to soothe* ❍ *Comes for comfort when distressed* Communication Skills ❍ *Points to several different body parts* ❍ *Tries to get your attention to show you something* ❍ *Turns/responds when name is called* ❍ *Points to what he/she wants* ❍ *Looks for toy when asked or pointed in direction* ❍ *Imitates speech sounds and gestures* ❍ *Says 20 or more words (words do not have to be clear)* ❍ *Produces 4 consonants, e.g. B D G H N W* Motor Skills ❍ *Walks alone* ❍ *Feeds self with spoon with little spilling* Adaptive Skills ❍ *Removes hat/socks without help* ❍ *No parent/caregiver concerns*			2 years ❍ *Combines 2 or more words* ❍ *Understands 1 and 2 step directions* ❍ *Walks backward 2 steps without support* ❍ *Tries to run* ❍ *Puts objects into small container* ❍ *Uses toys for pretend play (eg. give doll a drink)* ❍ Continues to develop new skills ❍ *No parent/caregiver concerns* 3 years ❍ *Understands 2 and 3 step directions (eg. "Pick up your hat and shoes and put them in the closet.")* ❍ *Uses sentences with 5 or more words* ❍ *Walks up stairs using handrail* ❍ *Twists lids off jars or turns knobs* ❍ *Shares some of the time* ❍ *Plays make-believe games with actions and words (eg. pretending to cook a meal, fix a car)* ❍ Turns pages one at a time ❍ Listens to music or stories for 5 - 10 minutes ❍ *No parent/caregiver concerns*			4 years ❍ *Understands 3-part directions* ❍ *Asks and answers lots of questions (eg."What are you doing?")* ❍ *Walks up/down stairs alternating feet* ❍ *Undoes buttons and zippers* ❍ *Tries to comfort someone who is upset* ❍ *No parent/caregiver concerns* 5 years ❍ *Counts out loud or on fingers to answer "How many are there?* ❍ *Speaks clearly in adult-like sentences most of the time* ❍ *Throws and catches a ball* ❍ *Hops on 1 foot several times* ❍ *Dresses and undresses with little help* ❍ *Cooperates with adult requests most of the time* ❍ *Retells the sequence of a story* ❍ *Separates easily from parent/caregiver* ❍ *No parent/caregiver concerns*	
PHYSICAL EXAMINATION Evidence-based screening for specific conditions is highlighted, but an appropriate age-specific focused physical examination is recommended at each visit. ✓ if normal X if abnormal	❍ Fontanelles closed ❍ **Eyes (red reflex)*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ Hearing inquiry ❍ Tonsil size/Teeth*			❍ *Blood pressure* ❍ **Eyes (red reflex)/Visual acuity*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ Hearing inquiry ❍ Tonsil size/Teeth*			❍ *Blood pressure* ❍ **Eyes (red reflex)/Visual acuity*** ❍ **Corneal light reflex/Cover-uncover test & inquiry*** ❍ Hearing inquiry ❍ Tonsil size/Teeth*	
PROBLEMS AND PLANS								
IMMUNIZATION Provincial guidelines vary	**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record**			**Record on Guide V: Immunization Record**	
	Signature			**Signature**			**Signature**	

Strength of recommendation based on literature review using the classification of the Canadian Task Force on Preventive Health Care: **Good (bold type)**; *Fair (italic type)*; Consensus (plain type).
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DEVELOPMENT

Maneuvers are based on the Nipissing District Development Screen™ (www.ndds.ca) and other developmental literature. They are not a developmental screen, but rather an aid to developmental surveillance. They are set **after** the time of normal milestone acquisition. Thus, absence of any one or more items is considered a high-risk marker and indicates consideration for further developmental assessment, as does parental or caregiver concern about development at any stage.

- "Best Start" website contains resources for maternal, newborn, and early child development - www.beststart.org/
- OCFP Healthy Child Development: Improving the Odds publication is a toolkit for primary healthcare providers - www.cfpc.ca/English/OCFP/CME/HCDMainproC/default.asp?s=1
- www.cdc.gov/ncbddd/child/screen_provider.htm
- Centre of Excellence for Early Childhood Development: www.child-encyclopedia.com

BEHAVIOUR

Crying: Excessive crying may be caused by behavioral or physical factors or be the upper limit of the normal spectrum. Evaluation of these etiological factors and of the burden for parents is essential and raises awareness of the potential for the shaken baby syndrome.
Shaken baby syndrome: www.cps.ca/english/statements/PP/cps01-01.htm
Night waking: occurs in 20% of infants and toddlers who do not require night feeding. Counselling 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 counselling begins in the first 3 weeks of life.

- www.mja.com.au/public/issues/182_05_070305/sym10800_fm.html

Swaddling: Proper swaddling of the infant for the first 6 months of life 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.

- http://pediatrics.aappublications.org/cgi/reprint/120/4/e1097

PARENTING/DISCIPLINE

Inform parents that warm, responsive, flexible & consistent discipline techniques are assoc with positive child outcomes. Over reactive, inconsistent, cold & coercive techniques are assoc with negative child outcomes.

- www.cps.ca/english/statements/PP/pp04-01.htm
- http://www.cheo.on.ca/english/pdf/joint_statement_e.pdf
- www.cfpc.ca/English/OCFP/CME/HCDMainproC/default.asp?s=1 (section 3)

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, Right from the Start, COPE program).
http://www.child-encyclopedia.com/en-ca/parenting-skills/how-important-is-it.html

LITERACY

Encourage parents to read to their children within the first few months of life and to limit TV, video and computer games to provide more opportunities for reading.

- http://www.cps.ca/english/statements/PP/pp06-01.htm
- http://pediatrics.aappublications.org/cgi/content/abstract/105/4/S1/927
- Arch Dis Child; 2008;93:554-7

PARENTAL/FAMILY ISSUES - HIGH RISK INFANTS/CHILDREN

- 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.
  - www.cps.ca/english/statements/PP/pp04-03.htm
- Fetal alcohol spectrum disorder (FASD) - Canadian Guidelines:
  - www.cmaj.ca/cgi/content/full/172/5_suppl/S1
- **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.
  - www.cmaj.ca/cgi/content/full/163/11/1451
- *Risk factors for physical abuse*: low SES; young maternal age (<19 years); single parent family; parental experiences of own physical abuse in childhood; spousal violence; lack of social support; unplanned pregnancy or negative parental attitude towards pregnancy.
- *Risk factors for sexual abuse*: living in a family without a natural parent; growing up in a family with poor marital relations between parents; presence of a stepfather; poor child-parent relationships; unhappy family life.

NONPARENTAL CHILD CARE

Inquire about current child care arrangements. High quality child care is associated with improved paediatric outcomes in all children.
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.

- www.cps.ca/english/statements/CP/cp08-02.htm
- www.cps.ca/english/statements/CP/cp2009-01.htm
- Well Beings: www.caringforkids.cps.ca/wellbeings/index.htm

AUTISM SPECTRUM DISORDER

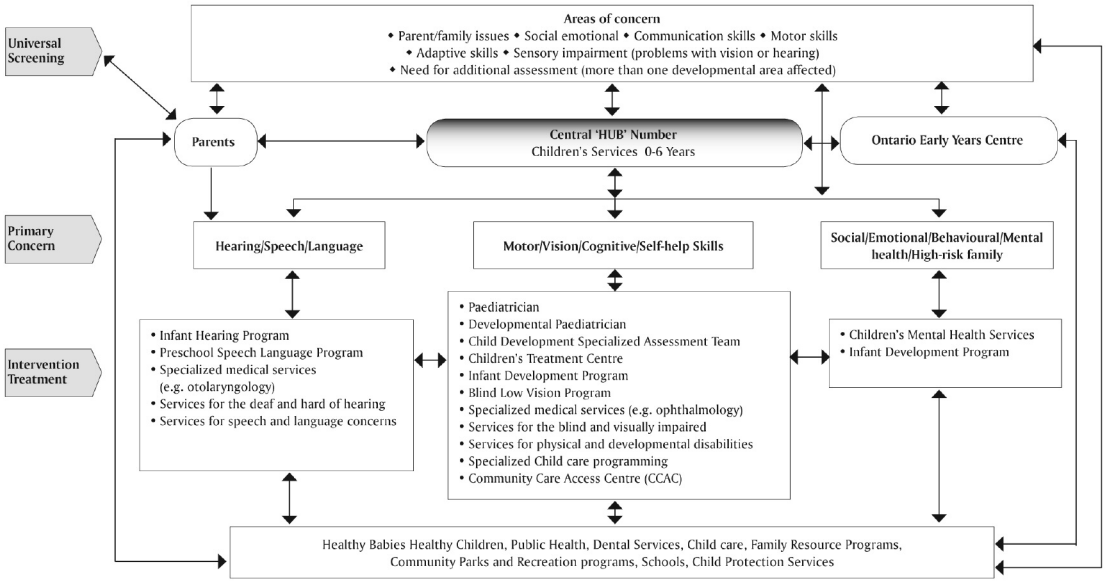
Specific screening for ASD at 18 - 24 months using the M-CHAT should be performed on all children with any of the following: failed items on the social/emotional/communication skills inquiry, sibling with autism, or developmental concern by parent, caregiver, or physician.
If the M-CHAT is abnormal, use the M-CHAT Follow-up Interview to reduce the false positive rate and avoid unnecessary referrals and parental concern. The M-CHAT tool and follow-up interview are found at: www.mchatscreen.com

TOILET LEARNING

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

- www.cps.ca/english/statements/CP/cp00-02.htm
- www.pulsus.com/journals/abstract.jsp?jnlKy=5&atlKy=7859&isuKy=769&isArt=t&HCtype=Consumer

2009 Early Child Development and Parenting Resource System - Ontario



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www.rourkebabyrecord.ca

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Childhood Immunization Record as per NACI Recommendations (as of July 28, 2009)
For additional information, refer to the National Advisory Committee on Immunization website: www.phac-aspc.gc.ca/naci-ccni/

Rourke Baby Record: Evidence-Based Infant/Child Health Maintenance — GUIDE V

NAME: _____ Birth Day (d/m/yr): _____ M [ ] F [ ]

Provincial guidelines are available online: www.phac-aspc.gc.ca/im/ptimprog-progimpt/table-1_e.html

Date given	NACI recommendations	Injection site	Lot number	Expiry date	Initials	Comments
DTaP/IPV/ Hib	4 doses (2, 4, 6, 18 months) dose #1 (2 months)					
	dose #2 (4 months)					
	dose #3 (6 months)					
	dose #4 (18 months)					
Pneu-Conj	4 doses (2, 4, 6, 12-15 months) dose #1 (2 months)					
	dose #2 (4 months)					
	dose #3 (6 months)					
	dose #4 (12-15 months)					
Men-Conjugate	Men-C-C:2-3 doses under 12 mos (2-11 mos) AND booster dose between 12-24 months OR Men-C-C: 1 dose at 12 months					
	Men-C-C or Men-C-ACWY:1 dose at 12 years or during adolescence					
Hepatitis B	3 doses in infancy OR 2-3 doses preteen/teen dose #1					
	dose #2					
	± dose #3					
MMR	2 doses (12 months, 18 months OR 4 years) dose #1 (12 months)					
	dose #2 (18 months OR 4 years)					
Varicella	1 dose (12 months - 12 years) OR 2 doses ≥ 13 years dose #1					
	± dose #2					
DTaP/IPV	1 dose (4-6 years)					
HPV	In females 9 - 26 years, 3 doses at 0, 2, and 6 months. dose #1					
	dose #2					
	dose #3					
dTap	1 dose (14-16 years)					
Influenza	1 dose annually (6-23 months and high risk > 2 years) First year only for < 9 years - give 2 doses one month apart					
Other						

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ROUTINE IMMUNIZATION

National Advisory Committee on Immunization (NACI) recommended immunization schedules for infants, children and youth can be found at the following website:
www.phac-aspc.gc.ca/naci-ccni/

Provincial/territorial immunization schedules may differ based on funding differences. For provincial/territorial immunization schedules, see Canadian Nursing Coalition on Immunization chart on the website of the Public Health Agency of Canada: www.phac-aspc.gc.ca/im/ptimprog-progimpt/table-1_e.html

Additional information for parents on vaccinations can be accessed through: http://www.caringforkids.cps.ca/immunization/index.htm and http://pediatrics.aappublications.org/cgi/reprint/115/5/1428

VACCINE NOTES (Adapted from NACI website: July 28, 2009)

Diphtheria, Tetanus, acellular Pertussis and inactivated Polio virus vaccine (DTaP-IPV): DTaP-IPV vaccine is the preferred vaccine for all doses in the vaccination series, including completion of the series in children < 7 years who have received ≥ 1 dose of DPT (whole cell) vaccine (e.g., recent immigrants).

Haemophilus influenzae type b conjugate vaccine (Hib): Hib schedule shown is for the Haemophilus b capsular polysaccharide – PRP conjugated to tetanus toxoid (Act-HIBTM) or the Haemophilus b oligosaccharide conjugate - HbOC (HibTITERTM) vaccines. This vaccine may be combined with DTaP in a single injection.

Measles, Mumps and Rubella vaccine (MMR): A second dose of MMR is recommended, at least 1 month after the first dose for the purpose of better measles protection. For convenience, options include giving it with the next scheduled vaccination at 18 months of age or at school entry (4-6 years) (depending on the provincial/territorial policy), or at any intervening age that is practical. The need for a second dose of mumps and rubella vaccine is not established but may benefit (given for convenience as MMR). The second dose of MMR should be given at the same visit as DTaP-IPV (± Hib) to ensure high uptake rates. MMR and varicella vaccines should be administered concurrently (at different sites if the combined MMR/varicella vaccine is not available) or separated by at least 4 weeks.

Varicella vaccine: Children aged 12 months to 12 years who have not had varicella should receive one dose of varicella vaccine. Unvaccinated individuals ≥ 13 years who have not had varicella should receive two doses at least 28 days apart. Varicella and MMR vaccines should be administered concurrently (at different sites if the combined MMR/varicella vaccine is not available) or separated by at least 4 weeks.

Hepatitis B vaccine (Hep B): Hepatitis B vaccine can be routinely given to infants or preadolescents, depending on the provincial/territorial policy. For infants born to chronic carrier mothers, the first dose should be given at birth (with Hepatitis B immune globulin), otherwise the first dose can be given 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. A two-dose schedule for adolescents is an option.
(See also SELECTED INFECTIOUS DISEASES RECOMMENDATIONS below.)

Pneumococcal conjugate vaccine - 7-valent (Pneu-Conj): Recommended schedule, number of doses and subsequent use of 23 valent polysaccharide pneumococcal vaccine depend on the age of the child, if at high risk for pneumococcal disease, and when vaccination is begun.

Meningococcal conjugate vaccine (Men-C): Monovalent vaccine to Type C (Men-C-C) is indicated for all ages, and quadravalent to Types A/C/W/Y (Men-C-ACWY) for age 2 yrs and over. Recommended vaccine, schedule and number of doses of meningococcal vaccine depend on the age of the child and vary between provinces/territories.
Possible schedules include:
- Men-C-C: 2 - 3 doses under 12 mos of age AND booster dose between 12 - 24 mos age.
  OR
- Men-C-C: 1 dose at 12 mos of age.

Men-C-C or Men-C-ACWY booster dose should also be given at 12 yrs of age or during adolescence.

Diphtheria, Tetanus, acellular Pertussis vaccine - adult/adolescent formulation (dTap): a combined adsorbed "adult type" preparation for use in people ≥ 7 years of age, contains less diphtheria toxoid and pertussis antigens than preparations given to younger children and is less likely to cause reactions in older people. This vaccine should be used in individuals > 7 years receiving their primary series of vaccines.

Influenza vaccine: Recommended for all children between 6 and 23 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.

Rotavirus vaccine: Universal rotavirus vaccine is being considered by NACI and CPS.
AAP recommendation - http://aapredbook.aappublications.org/resources/2009_0-6yrs_Schedule_FINAL.pdf

SELECTED INFECTIOUS DISEASES RECOMMENDATIONS

See CPS position statements of the Infectious Diseases and Immunization Committee: www.cps.ca/english/publications/InfectiousDiseases.htm

- **Hepatitis B immune globulin and immunization:**
  Infants with HBsAg-positive parents or siblings require Hepatitis B vaccine at birth, at 1 month, and 6 months of age.
  Infants of HBsAg-positive mothers also require Hepatitis B immune globulin at birth.

  Hepatitis B vaccine should also be given to all infants from high-risk groups, such as:
  - infants where at least one parent has emigrated from a country where Hepatitis B is endemic;
  - infants of mothers positive for Hepatitis C virus;
  - infants of substance-abusing mothers.

- **Human Immunodeficiency Virus type 1 (HIV-1) maternal infections:**
  Breastfeeding is contraindicated for an HIV-1 infected mother even if she is receiving antiretroviral therapy.

- **Hepatitis A or A/B combined (when Hepatitis B vaccine has not been previously given):**
  These vaccines should be considered when traveling to countries where Hepatitis A or B are endemic.

- **Tuberculosis - TB skin testing:**
  TB skin testing should be done if the infant is living with anyone being investigated or treated for TB. TB skin testing should also be considered in high-risk groups, including Aboriginal people, immigrants and long-term travellers from areas with a high prevalence of TB.

Disclaimer: Given the constantly evolving nature of evidence and changing recommendations, the Rourke Baby Record is meant to be used as a guide only.
Financial support has been provided by the Government of Ontario, with funds administered by the Ontario College of Family Physicians.

WHO GROWTH CHARTS FOR CANADA

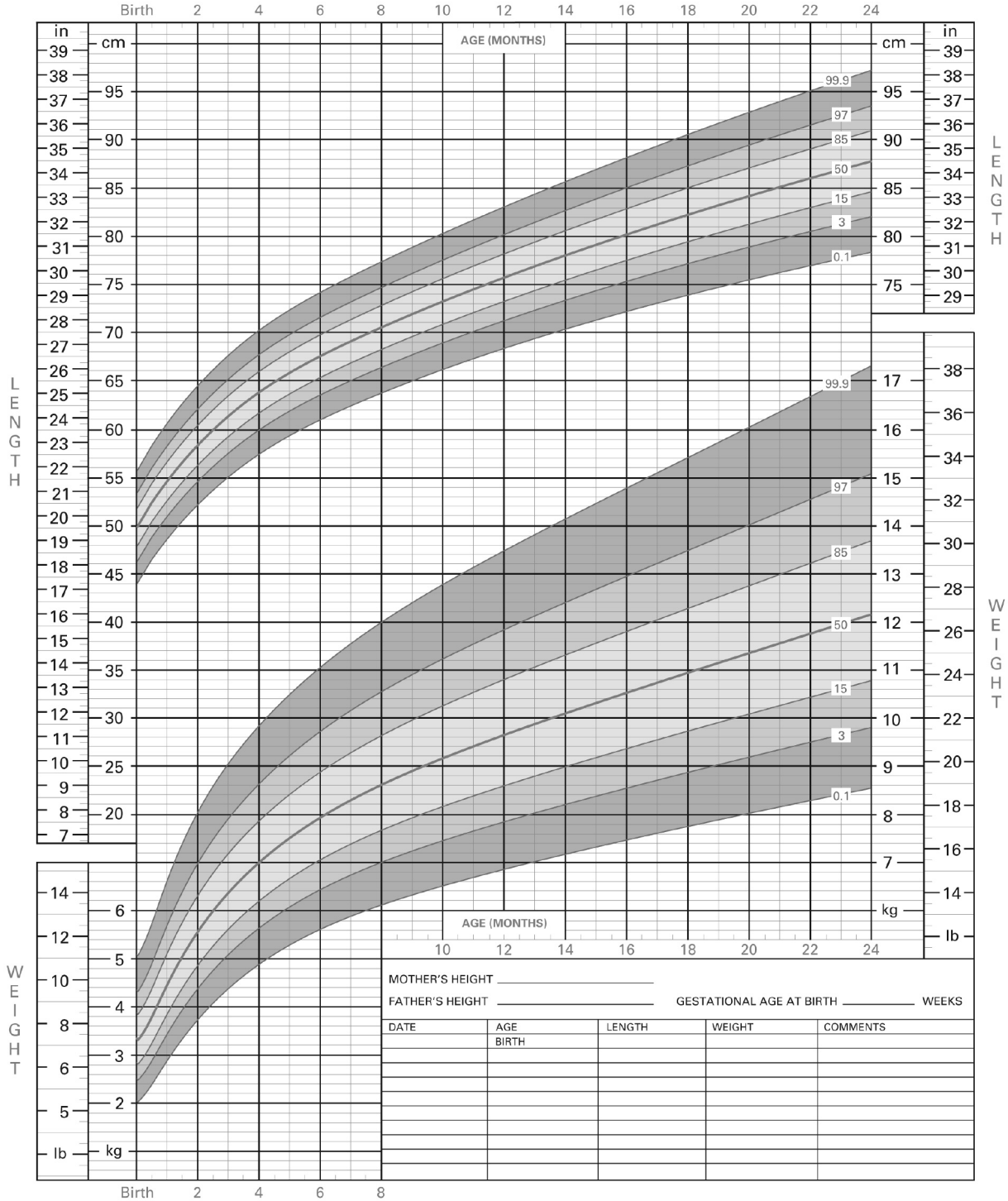
BOYS

BIRTH TO 24 MONTHS: BOYS

Length-for-age and Weight-for-age percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

WHO GROWTH CHARTS FOR CANADA

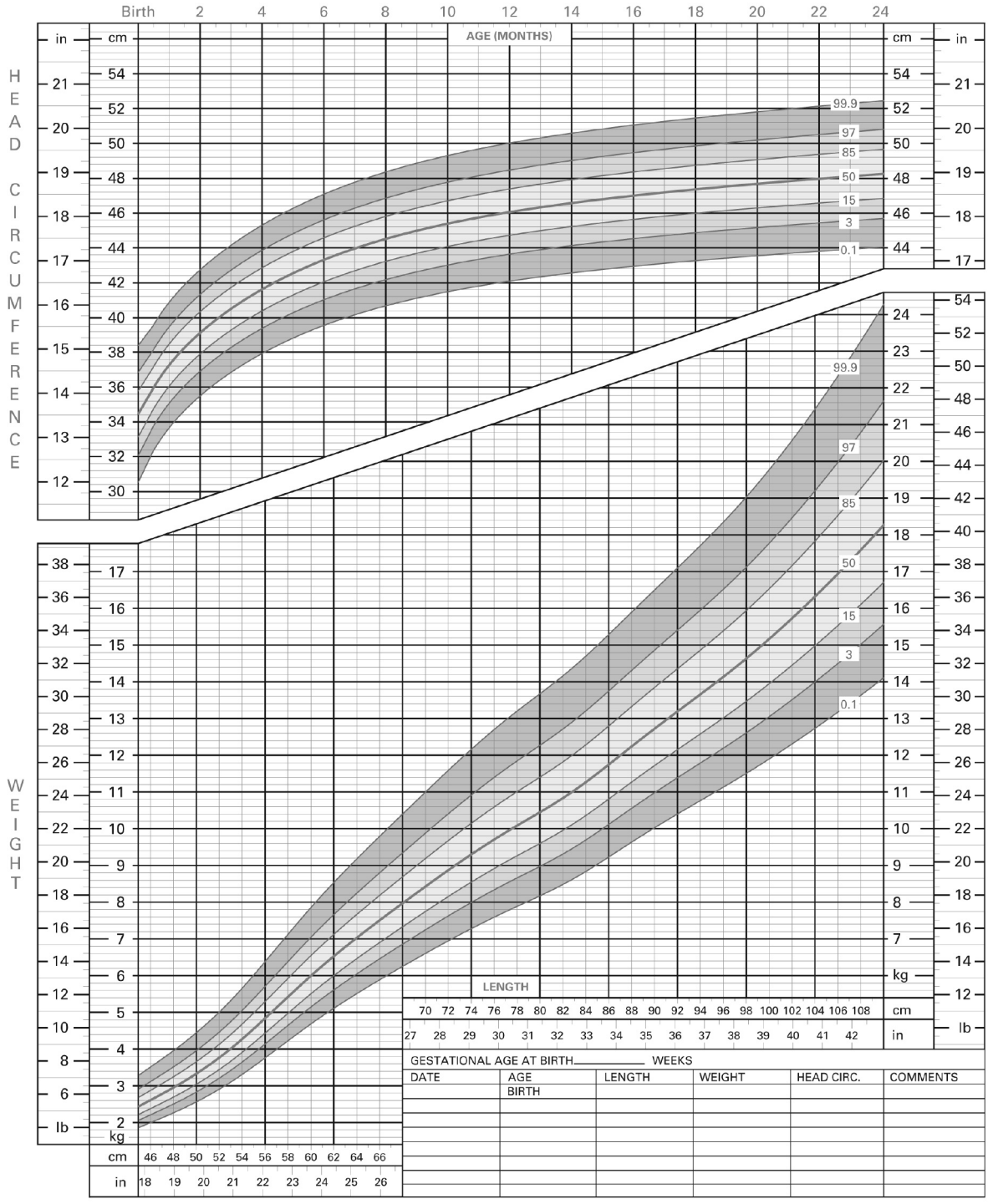
BOYS

BIRTH TO 24 MONTHS: BOYS

Head Circumference and Weight-for-length percentiles

NAME: _____

DOB: _____ RECORD # _____



GESTATIONAL AGE AT BIRTH _____ WEEKS

DATE	AGE	LENGTH	WEIGHT	HEAD CIRC.	COMMENTS
	BIRTH				

SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

www.dietitians.ca/growthcharts

WHO GROWTH CHARTS FOR CANADA

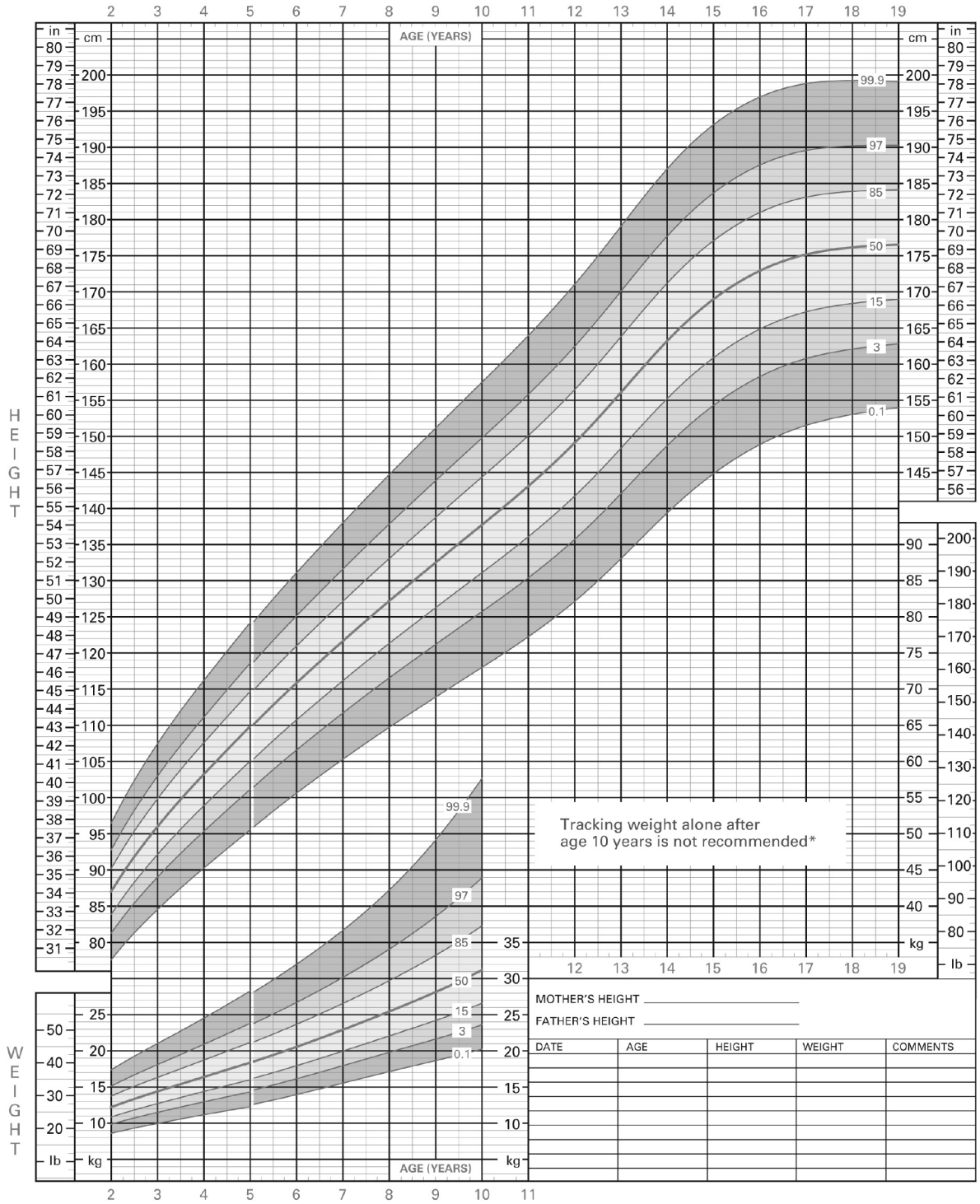
BOYS

2 TO 19 YEARS: BOYS

Height-for-age and Weight-for-age percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and WHO Reference (2007) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

*BMI is a better measure due to variable age of puberty.

WHO GROWTH CHARTS FOR CANADA

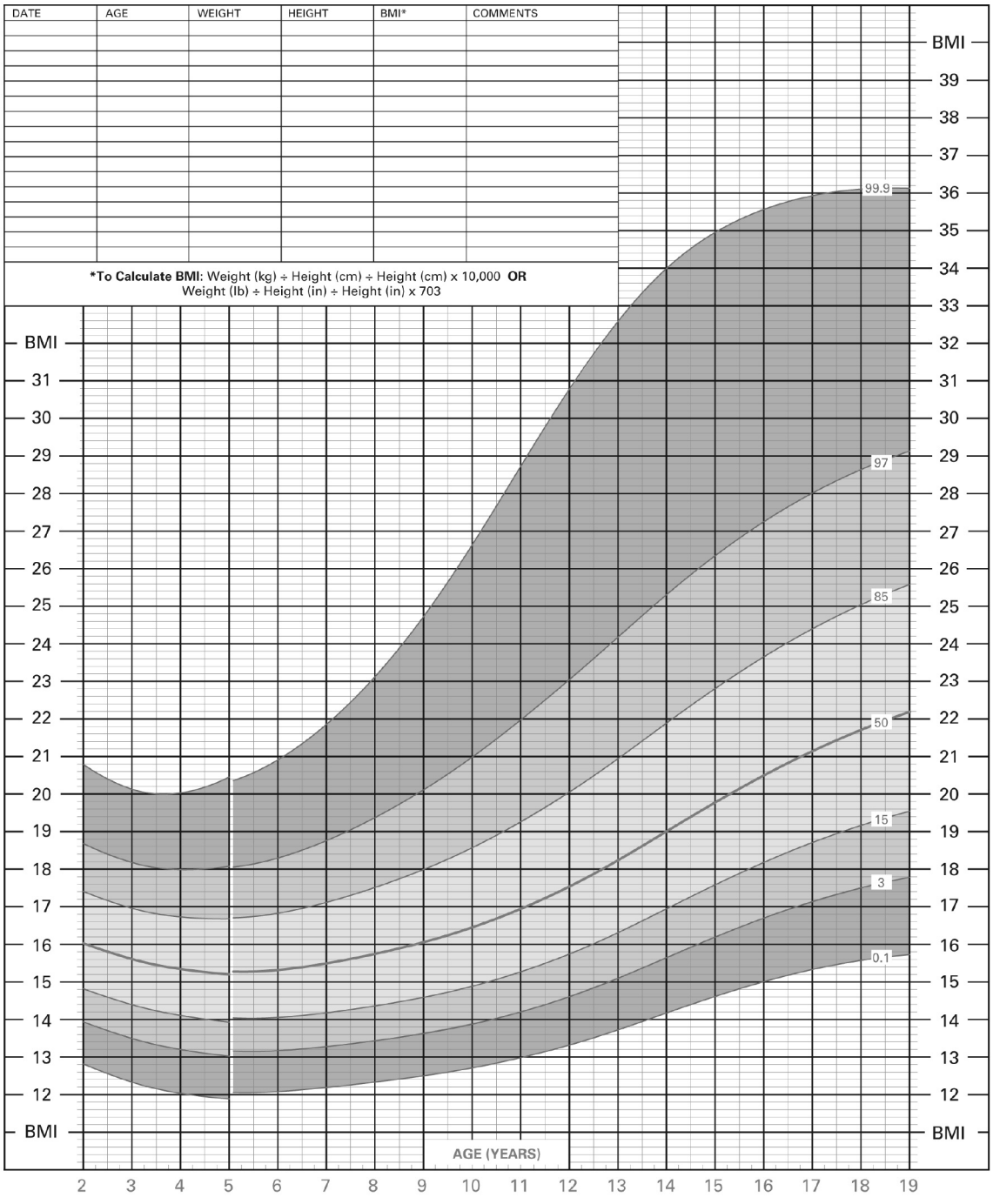
BOYS

2 TO 19 YEARS: BOYS
Body mass index-for-age percentiles

NAME: _____
DOB: _____ RECORD # _____

DATE	AGE	WEIGHT	HEIGHT	BMI*	COMMENTS

***To Calculate BMI:** Weight (kg) ÷ Height (cm) ÷ Height (cm) x 10,000 **OR**
Weight (lb) ÷ Height (in) ÷ Height (in) x 703



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and WHO Reference (2007) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

WHO GROWTH CHARTS FOR CANADA

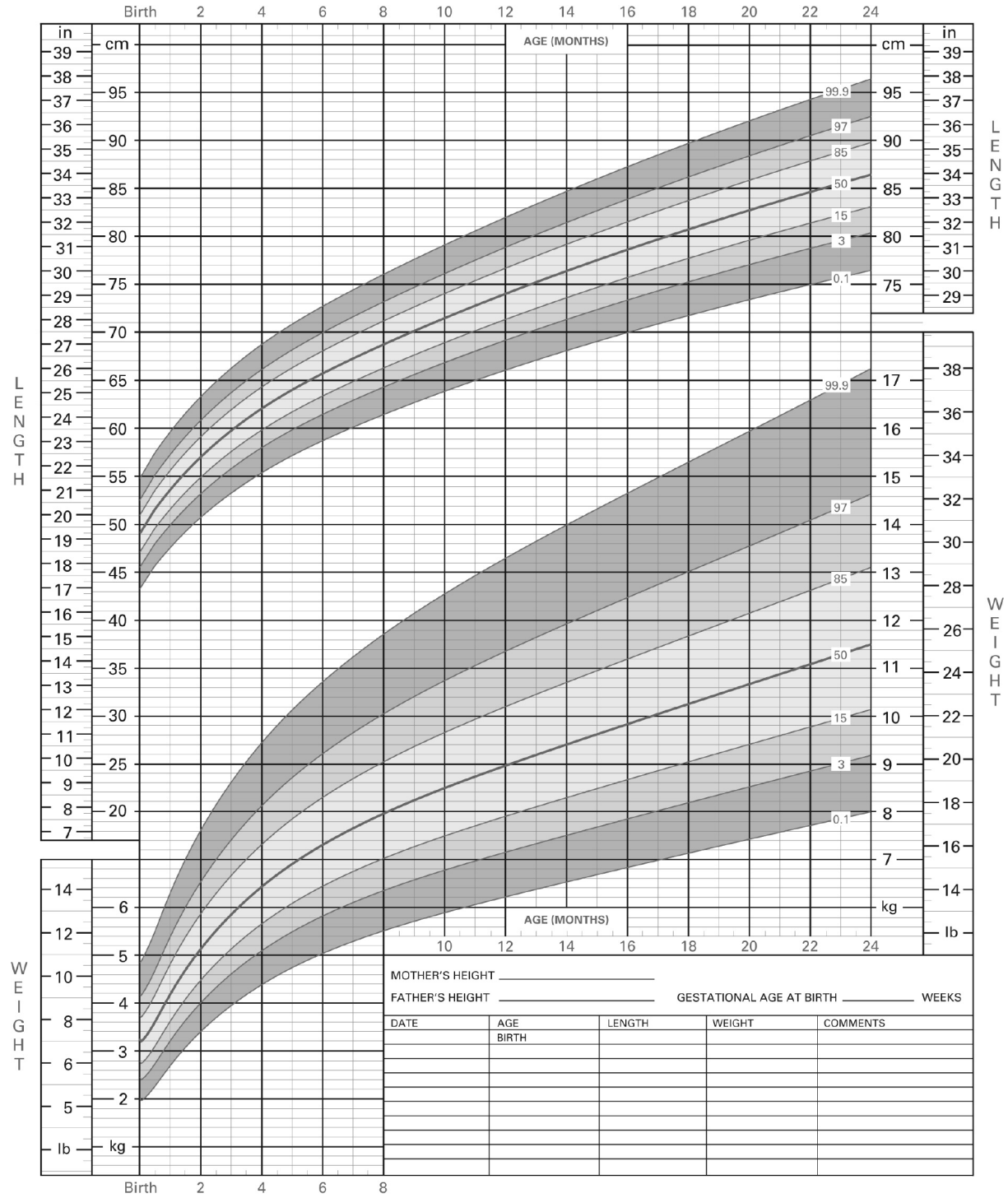
GIRLS

BIRTH TO 24 MONTHS: GIRLS

Length-for-age and Weight-for-age percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

www.dietitians.ca/growthcharts

WHO GROWTH CHARTS FOR CANADA

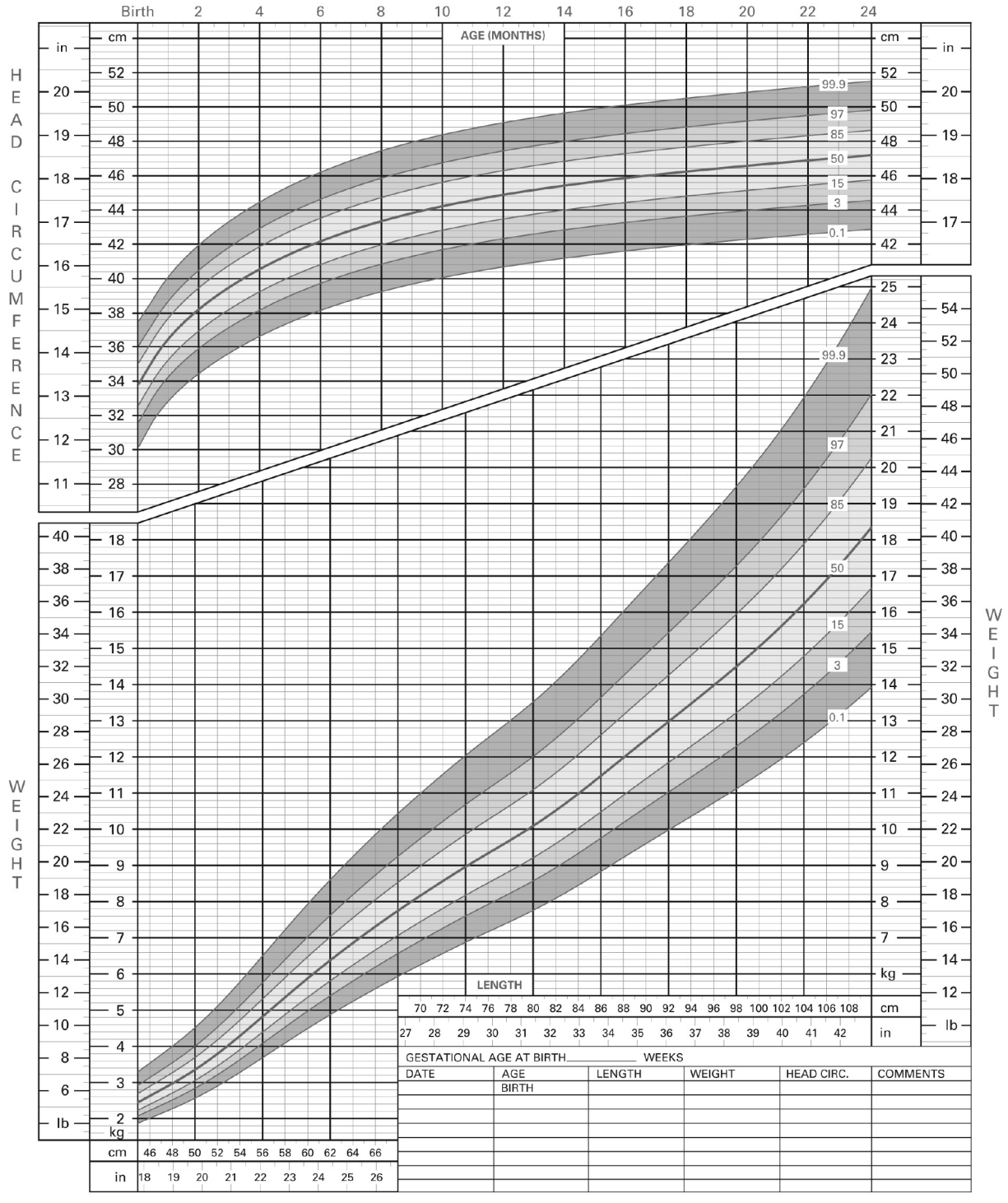
GIRLS

BIRTH TO 24 MONTHS: GIRLS

Head Circumference and Weight-for-length percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

www.dietitians.ca/growthcharts

WHO GROWTH CHARTS FOR CANADA

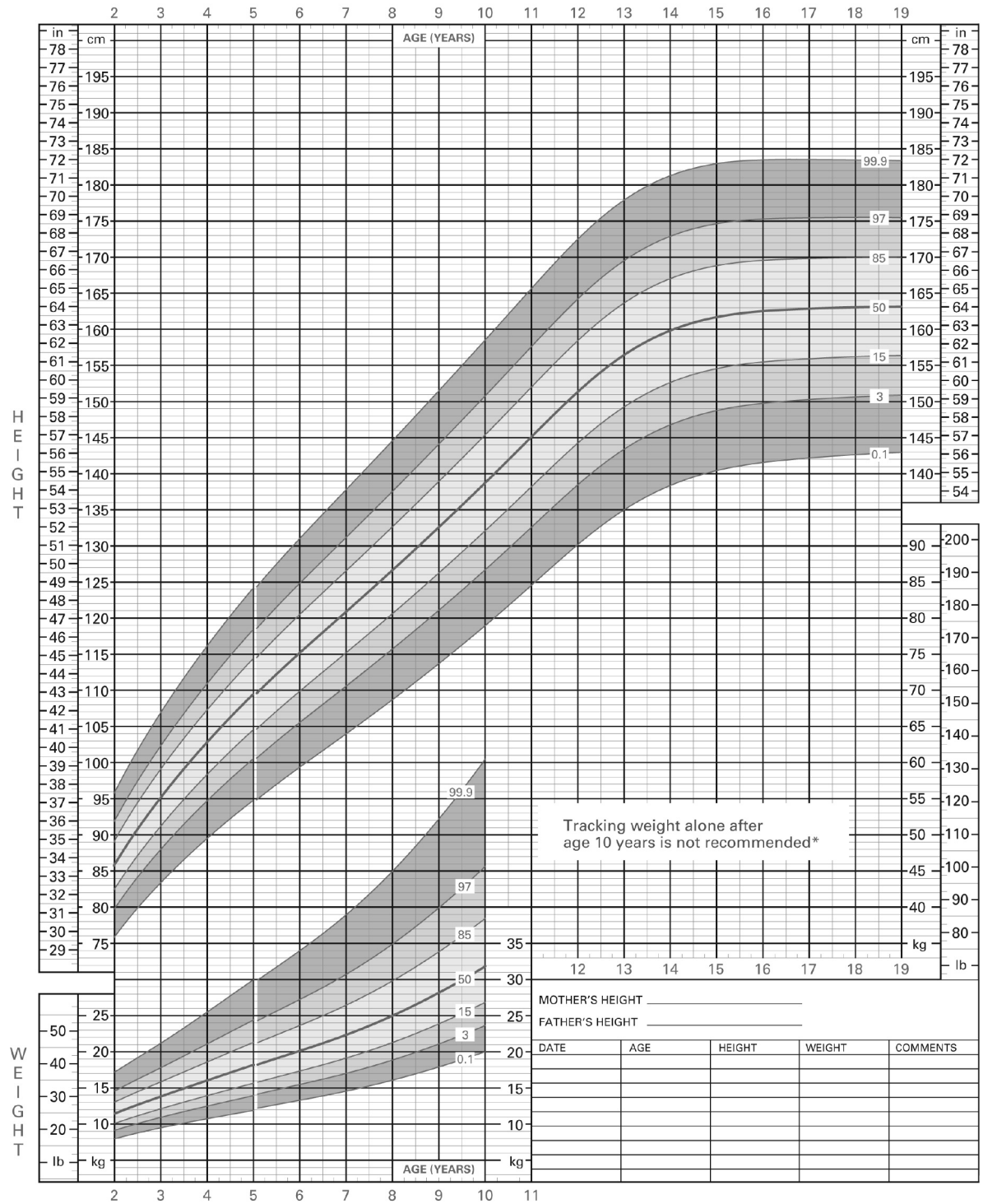
GIRLS

2 TO 19 YEARS: GIRLS

Height-for-age and Weight-for-age percentiles

NAME: _____

DOB: _____ RECORD # _____



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and WHO Reference (2007) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

*BMI is a better measure due to variable age of puberty.

WHO GROWTH CHARTS FOR CANADA

GIRLS

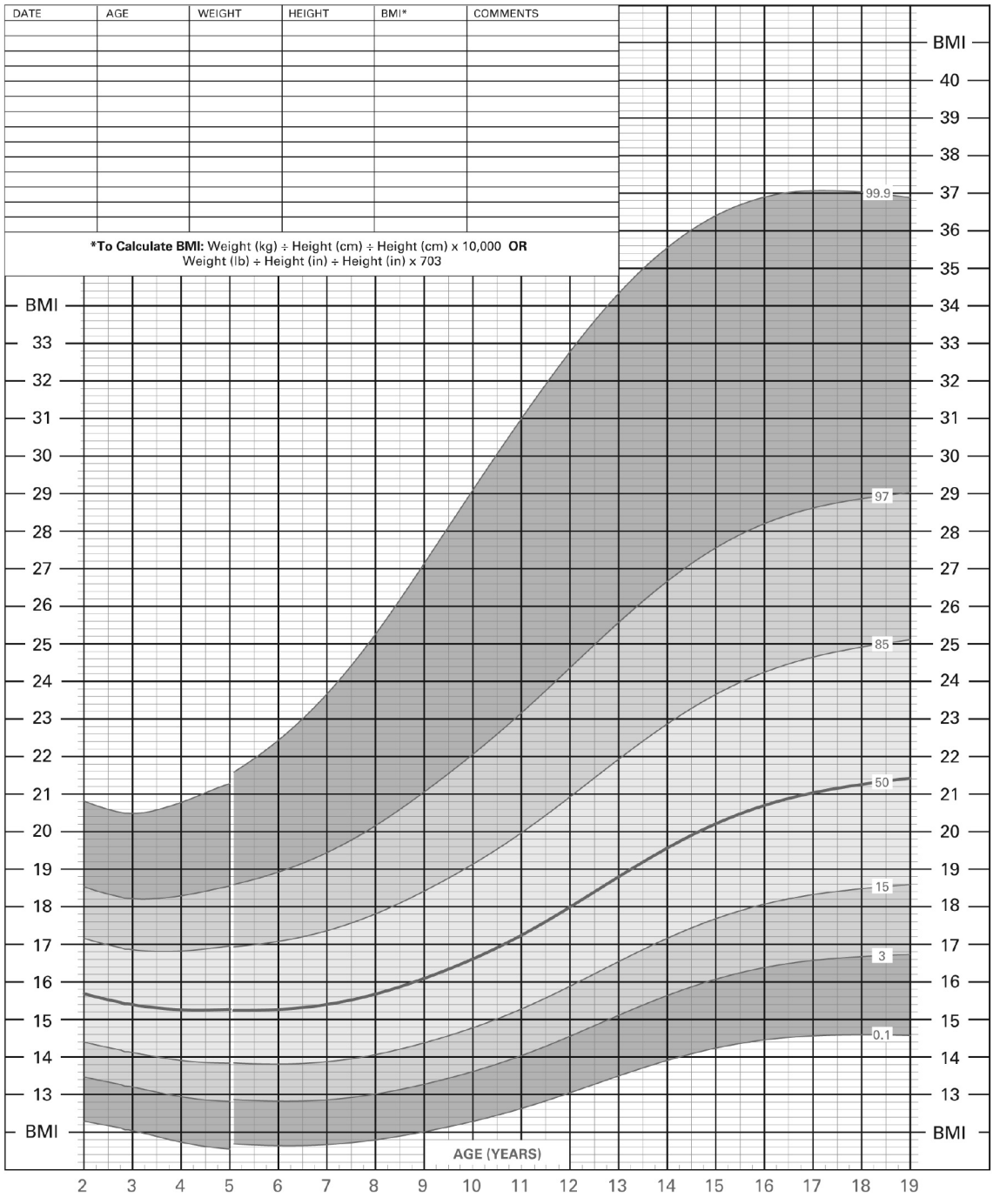
2 TO 19 YEARS: GIRLS
Body mass index-for-age percentiles

NAME: _____

DOB: _____ **RECORD #** _____

DATE	AGE	WEIGHT	HEIGHT	BMI*	COMMENTS

***To Calculate BMI:** Weight (kg) ÷ Height (cm) ÷ Height (cm) x 10,000 **OR**
Weight (lb) ÷ Height (in) ÷ Height (in) x 703



SOURCE: Based on the World Health Organization (WHO) Child Growth Standards (2006) and WHO Reference (2007) adapted for Canada by Dietitians of Canada, Canadian Paediatric Society, the College of Family Physicians of Canada and Community Health Nurses of Canada.

www.dietitians.ca/growthcharts

Appendix I: Nipissing District Developmental Screen™

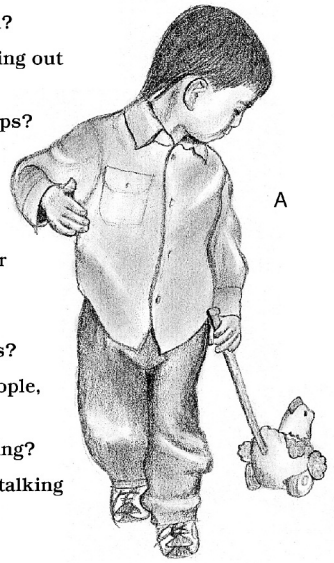
Nipissing District
Developmental Screen™

Child's Name _____

Birth Date _____ Today's Date _____

The Nipissing District Developmental Screen™ is a checklist designed to help monitor your child's development.

✔ Yes	✔ No		*By **Eighteen Months** of age, does your child...*
☐	☐	1.	Identify pictures in a book (e.g. "Show me the baby")?
☐	☐	2.	Use familiar gestures (e.g. waving, pushing away)?
☐	☐	3.	Follow directions when given without gestures (e.g. "Throw me the ball", "Bring me your shoes")?
☐	☐	4.	Use common expressions (e.g. "all gone" or "oh-oh")?
☐	☐	5.	Point to at least three different body parts when asked (e.g. "Where is your nose?")?
☐	☐	6.	Say five or more words? (Words do not have to be clear.)
☐	☐	7.	Hold a cup to drink?*
☐	☐	8.	Pick up and eat finger food?
☐	☐	9.	Help with dressing by putting out arms and legs?*
☐	☐	10.	Crawl or walk up stairs/steps?
☐	☐	11.	Walk alone?
☐	☐	12.	Squat to pick up a toy without falling?
☐	☐	13.	Push and pull toys or other objects while walking? (Picture A)
☐	☐	14.	Stack three or more blocks?
☐	☐	15.	Show affection towards people, pets or toys?
☐	☐	16.	Point to show you something?
☐	☐	17.	Look at you when you are talking or playing together?



A

** item may not be common to all cultures*

18 MONTHS

Always talk to your health care or child care professional if you have any questions about your child's development or well being. See reverse side for instructions, limitation of liability, and product license.

ACTIVITIES FOR YOUR CHILD...

Emotional · Fine Muscle · Large Muscle · Learning/Thinking · Self-Help · Social · Speech/Language

Nipissing District
Developmental Screen™

The following activities will help you play your part in your child's development.

- Help me to notice familiar sounds, such as birds chirping, car or truck motors, airplanes, dogs barking, sirens, or splashing water. Imitate the noise you hear and see if I will imitate you. Encourage me by smiling and clapping.
- I am learning new words every day. Play games to help me learn the names of things. Put pictures of familiar things such as toy animals, people or objects in a bag and say "One, two, three, what do we see?" and pull a picture from the bag.
- Pretend to talk to me on the phone or encourage me to call someone.
- Don't be afraid to let me see what I can do with my body. I need to practise climbing, swinging, jumping, running, going up and down stairs, and going down slides. Stay close to me so I don't get hurt.
- Play some of my favorite music. Encourage me to move to the music by swaying my arms, moving slowly, marching to the music, hopping, clapping my hands, tapping my legs, etc. Let's have fun doing actions while listening to the music.
- Let me play with balls of different sizes. Take some of the air out of a beach ball. Watch me kick, throw, and try to catch it.
- I like toys that I can pull apart and put back together: large "LEGO", containers with lids, or plastic links. Talk to me about what I am doing using words like "push" and "pull".
- I'm not too little to play with large crayons. Let's scribble and talk about our art work.
- I like simple puzzles with two to four pieces and shape-sorters with simple shapes. Encourage me to match the pieces by taking turns with me.
- I want to do things just like you. Let me have toys so I can pretend to dress up, have tea parties, and play mommy or daddy.
- I feel safe and secure when I know what is expected of me. You can help me with this by following routines and setting limits. Praise my good behaviour.
- I like new toys so find the local toy lending library or play groups in our community.

I enjoy exploring the world but I need to know that you are close by. I may cry when you leave me with others, so give me a hug and tell me you will be back.

18 MONTHS

Always talk to your health care or child care professional if you have any questions about your child's development or well being. See reverse side for instructions, limitation of liability, and product license.

Instructions for the Nipissing District Developmental Screen™

The Nipissing District Developmental Screen™ (NDDS™) is a tool designed to provide an easy-to-use method of recording the development and progress of infants and children. The areas of development covered by the Screen Forms include vision, hearing, communication (note: the language items refer to the child's ability in his/her first language), gross and fine motor, cognitive, social/emotional, and self-help. The Screens coincide with immunization schedules as well as key developmental stages up to age six. The ages are noted at the top of each Screen. The child's chronological age will determine which Screen to use. If the child falls between two ages, use the earlier Screen (e.g. for a 4 1/2 year old use the Screen for a 4 year old).

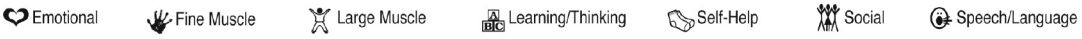
The skills in each Screen are expected to be mastered by most children by the age shown. **If two or more "No" responses are marked a referral to a health care and/or child care professional is recommended.** While the NDDS™ was designed to be completed by a parent or caregiver, the Screen Forms are not meant to be a substitute for professional advice, assessment and/or treatment from a health care and/or child care professional.

Parents should always talk to their health care and/or child care professional if they have questions or concerns about their child's development or well being.

Additional information is available on our website. Visit us at www.ndds.ca.

Activities for Your Baby/Child

The "Activities for Your Baby/Child" section of the Screen Forms is intended to provide parents and other caregivers with some information and activities to enhance their infant's/child's development. Each activity is coded with an icon to represent a primary area of development. **If parents have questions or concerns about the appropriateness of any activity for their infant/child they should contact a health care or child care professional.**



Limitation of Liability

Nipissing District Developmental Screen™ (NDDS™) has created and provides the Screen Forms to assist parents, health care and child care professionals (users) with a convenient and easy to use method of recording the development and progress of infants and children within certain age groupings. The Screen Forms are not meant to be a substitute for the advice and/or treatment of health care and child care professionals trained to properly and professionally assess the development and progress of infants and children. As such, the Screen Forms are not intended or designed to be "do it yourself" substitutes for proper and professional advice and/or treatment.

Although the Screen forms may help users to determine when they need to seek out the advice and/or treatment of health care and child care professionals, it must be clearly understood by users that the Screen Forms can not substitute for the advice and/or treatment of health care and child care professionals.

Users of the screen forms should consult with competent health care and child care professionals for advice and/or treatment respecting specific children and their particular needs.

Users should bear in mind the following when using the Screen Forms:

(i) The needs of each infant/child are unique. Each infant/child will develop differently and as such, any perceived limitations in development must be reviewed by a health care and/or child care professional to be properly assessed;

(ii) While every effort has been made to make the Screen Forms as culturally, economically and geographically neutral as possible, it must be understood by users that they may still reflect some cultural, economic or geographic prejudices. As such, these prejudices may affect a specific infant's/child's results in a Screen Form without actually reflecting a developmental limitation. Again, users should contact a health care and/or child care professional to review the needs of an individual infant/child;

(iii) The Screen Forms cannot contain every possible indicator of developmental limitations or goals to be met. As such, the Screen Forms are not designed for and should not be used to diagnose or treat perceived developmental limitations or other health needs.

Every effort has been made to ensure that the Screen Forms have been formulated with a reasonable standard of care. Except for this representation, and as otherwise specifically provided in the Screen Forms, NDDS™ make no representation or warranties, express or implied. This includes, but is not limited to, any implied warranty or merchantability of fitness for a particular use or purpose, and specifically disclaims any such warranties and representations. NDDS™ expressly disclaims any liability for loss, injury or damages incurred or occasioned as a consequence, directly or indirectly, of the use of the Screen Form.

The Screen Forms are sold with the understanding that NDDS™ is not engaged in rendering medical or child care advice or other professional services.

ndds.ca

nipissing district developmental screen

nipissing district developmental screen™ order form

Screen Sets consist of 13 pads of 50 sheets with detachable activity sheets.

Specific Screens consist of one pad of 50 sheets with detachable activity sheets for one of the following ages:

1 & 2 months, 4 months, 6 months, 9 months, 12 months, 15 months, 18 months, 2 years, 30 months, 3 years, 4 years, 5 years, and 6 years.

English _____ Set Price $100 / Unit Price $8
French _____ Set Price $100 / Unit Price $8
Spanish _____ Set Price $100 / Unit Price $8
Chinese _____ Set Price $100 / Unit Price $8
Vietnamese _____ Set Price $100 / Unit Price $8
Laminated Set of 13 Screens _____ $50

Please MAIL this form along with cheque or money order made payable to:

Nipissing District Developmental Screen™
P.O. Box 1493, North Bay, ON Canada P1B 8K6
Phone (705) 752-5081 • 1-888-582-0944 • Fax: (705) 752-4247

Name

Organization

Address

City Province

Country Postal Code

( )
Telephone E-mail

Payment Method: ☐ Cheque ☐ Money Order ☐ MasterCard ☐ Visa

Card Number Expiry Date

Name On Card

Signature

Product Description	Age Specific Screens Only	Quantity	Set / Unit Price	Total Quantity X Price

☐ Ontario residents, please check here to confirm awareness of the availability of the free NDDS screens on the website: www.ndds.ca

Screens Total	
Shipping *	
Subtotal	
GST †	
PST ‡ on Screens Total only	
TOTAL	

* Canadian orders subject to $15.[00] minimum or 10% shipping & handling, whichever is more. All others add 15%.
† GST (Subtotal X 5%) applies to Canadian orders only.
‡ PST (Screens Total X 8%) applies to Ontario orders only.

SEE LIMITATION OF LIABILITY AND INSTRUCTIONS ON REVERSE.

Prices subject to change. Revised April 2008

Appendix J: Developmental Monitoring in Primary Care – Journal Article

Developmental monitoring in primary care

CYNTHIA E. GOLDFARB, MD, FRCPC
WENDY ROBERTS, MD, FRCPC

SUMMARY

Monitoring child development is an essential part of primary health care. Successful surveillance depends on physicians' thorough knowledge of normal progress along the four developmental streams: motor, language, cognitive, and social and emotional. Being alert to "red flags" that suggest problems is important. Effective interventions can minimize developmental problems.

RÉSUMÉ

La surveillance du développement de l'enfant est une composante essentielle des soins de première ligne. La réussite de cette surveillance dépend du niveau de connaissances que possèdent les médecins de la croissance normale en fonction des quatre axes de développement : motricité, langage, cognition, et développement social et émotionnel. Il est important d'être vigilant pour bien identifier les « drapeaux rouges » indiquant la présence de problèmes. Les interventions efficaces peuvent minimiser les problèmes de développement.

Can Fam Physician 1996;42:1527-1536.

EARLY DETECTION OF DEVELOPMENTAL problems is increasingly being identified as one of the important tasks of physicians providing primary care to children. Emerging evidence supports the efficacy of early intervention. Recent statements by the American Academy of Pediatrics[1] and the British Joint Working Party of Child Health Supervision[2] recommend that developmental monitoring be an integral part of child health supervision. Both organizations suggest that monitoring be done by the process of "developmental surveillance."

Developmental surveillance is a flexible, continuous process in which knowledgeable professionals observe children during all health care encounters.[3] It encompasses both identification and anticipatory guidance and can be accomplished by monitoring developmental milestone attainment, eliciting parental concerns, informally observing age-appropriate tasks, and sometimes using screening tests. Effective surveillance requires physicians to have thorough knowledge of normal child development, to understand factors that might interfere with it, and to be actively monitoring for symptoms that should elicit concern.

This article focuses on the background knowledge essential for developmental surveillance. Some general guidelines for dealing with detected delays are outlined.

Dr Goldfarb *is a Fellow in Child Development at the Hospital for Sick Children in Toronto, Ont.* **Dr Roberts**, *a Developmental Pediatrician, is Education Program Director in Developmental Pediatrics and an Associate Professor in Pediatrics at the University of Toronto.*

Getting started

The process of development can be conceptualized as the result of interaction between a child and his or her environment, each profoundly influencing the other. Development proceeds along four basic streams: motor, language, cognitive, and social and emotional development. While these are clearly interdependent, they should be assessed individually in each child. The skills we use when we listen to heart sounds or examine cranial nerves (focusing attention on a series of objective findings) can be applied to developmental assessment.

Equally important to the process of surveillance are the skills of good listening and sensitive questioning. These lead to trusting relationships with parents that facilitate sharing concerns. This atmosphere is conducive to early discovery of developmental problems and to a more thorough understanding of the environmental factors (eg, psychosocial, health, economic) that affect child development.

Although most physicians find assessing child development enjoyable and often enriching, many

Table 1. **"Red flags" indicating risk of developmental problems**

AREA and AGE	FINDINGS
MOTOR	
4 ½ mo	Does not pull up to sit
5 mo	Does not roll over
7-8 mo	Does not sit without support
9-10 mo	Does not stand while holding on
15 mo	Not walking
2 y	Not climbing up or down stairs
2 ½ y	Not jumping with both feet
3 y	Unable to stand on one foot momentarily
4 y	Not hopping
5 y	Unable to walk a straight line back and forth or balance on one foot for 5 to 10 seconds
FINE MOTOR	
3 ½ mo	Persistence of grasp reflex
4-5 mo	Unable to hold rattle
7 mo	Unable to hold an object in each hand
10-11 mo	Absence of pincer grasp
15 mo	Unable to put in or take out
20 mo	Unable to remove socks or gloves alone
2 y	Unable to stack five blocks, not scribbling
2 ½ y	Not turning a single page of a book
3 y	Unable to stack eight blocks or draw a straight line
4 y	Unable to stack 10 blocks or copy a circle
4 ½ y	Unable to copy a square
5 y	Unable to build a staircase of blocks or copy a cross
LANGUAGE	
5-6 mo	Not babbling
8-9 mo	Not saying "da" or "ba"
10-11 mo	Not saying "dada" or "baba"

AREA and AGE	FINDINGS
LANGUAGE	**(continued)**
18 mo	Has less than three words with meaning, unable to achieve shared attention
2 y	No two-word phrases or repetition of phrases
2 ½ y	Not using at least one personal pronoun
3 ½ y	Speech only half understandable
4 y	Does not understand prepositions
5 y	Not using proper syntax in short sentences
COGNITIVE	
2-3 mo	Not alert to mother with special interest
6-7 mo	Not searching for dropped object
8-9 mo	No interest in peek-a-boo
12 mo	Does not search for hidden object
15-18 mo	No interest in cause-and-effect games
2 y	Does not categorize similarities (eg, animals vs vehicles)
3 y	Does not know own full name
4 y	Cannot pick shorter or longer of two lines
4 ½ y	Cannot count sequentially
5 y	Does not know colours or any letters
5 ½ y	Does not know own birthday or address
PSYCHOSOCIAL	
3 mo	Not smiling socially
6-8 mo	Not laughing in playful situations
1 y	Hard to console, stiffens when approached
2 y	Kicks, bites, and screams easily and without provocation. Rocks back and forth in crib. No eye contact or engagement with other children or adults
3-5 y	In constant motion. Resists discipline. Does not play with other children

Adapted from First and Palfrey.[6]

dread detecting abnormalities because they are unsure how to intervene effectively in the face of diminishing community resources. This is particularly true for physicians in isolated or remote communities that lack medical specialists and ancillary services, such as speech pathologists, psychologists, physiotherapists, and occupational therapists. Finding whatever local resources are available, private and public, is the first step to being able to make recommendations that can be carried out.

Many areas in Canada now have, or will soon have, access to early interventionists, professionals from many backgrounds (such as speech therapy, nursing, and early childhood education) who are trained to work with parents and preschool staff to provide optimal developmental programming. Some local day-care centres and preschools have highly skilled professionals, and interested nurses can be trained to administer formal developmental assessment tools such as the DISC[4] (Diagnostic Inventory for Screening Children). Where no intervention services are readily available, family members can be taught how to stimulate a child's development. Physicians can advocate for their communities by lobbying for improved developmental intervention services.

A physician's role in dealing with developmental problems goes well beyond referral for assessment and therapy by other professionals. Having a child with a developmental problem can cause parents grief, a sense of loss, and feelings of helplessness. As the child develops, new issues and concerns are likely to arise. Appreciating this and providing ongoing support and guidance can improve the quality of life of the whole family.

Making objective observations, creating a setting in which parents are comfortable sharing concerns, finding the best available resources, and providing support are important aspects of surveillance, regardless of which stream of development is being examined. Each stream has unique features relevant to the surveillance process.

Motor development

When parents boast about a child's early ability to sit, crawl, or walk, or fearfully mention that a child seems behind in these skills, they convey the widely held belief that a close connection exists between motor development and intelligence. Of all the streams of development, however, gross motor development is the least predictive of cognitive potential.[5] Monitoring motor development is important primarily because of the many underlying medical conditions that can manifest as motor delays.

For genetic counseling or therapeutic intervention, such conditions should be identified as early as possible. A range of normal variation in the development of gross and fine motor skills makes it necessary for physicians to recognize "red flags" that suggest problems (*Table 1*[6]).

Physicians should be concerned if an infant is not sitting independently at 7 to 8 months, or is unable to hold an object in each hand at that age. A 15-month-old should be walking and well able to put objects in and out of large containers. Attention is warranted if a 2-year-old cannot climb up or down stairs or scribble or if a 3-year-old cannot stand briefly on one foot or draw a straight line. A 4-year-old should be able to hop and copy a circle, and a 5-year-old should be able to walk a straight line and copy a cross.

Even if normal milestones are being attained, more subtle clinical findings might suggest underlying motor problems: persistent fisting of the hands (more than 50% of the time) at 3 months is not normal and might be an early sign of cerebral palsy; development of hand dominance before 15 months is unusual, and might reflect neurologic impairment of the contralateral side; precocious ability to elevate the head and neck in ventral suspension (before 3 months) might suggest hypertonia.

What to do if motor delay is detected

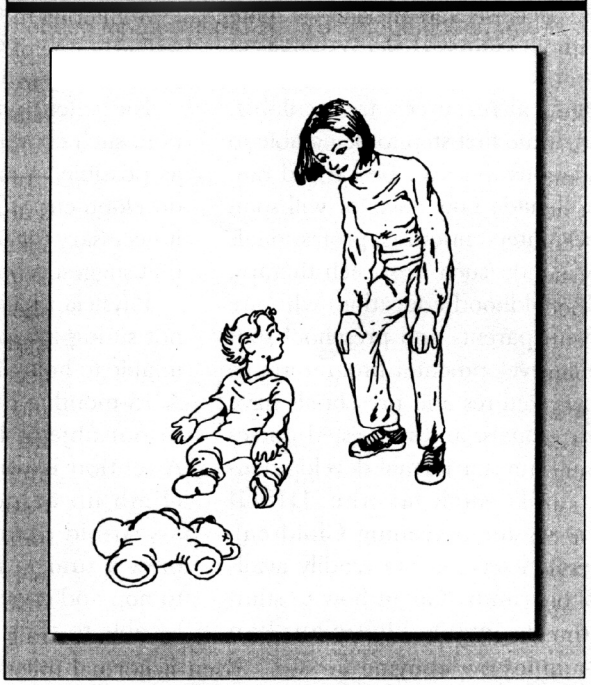
Delays in motor development might indicate underlying disease. Problems of the central nervous system, such as cerebral palsy, or the peripheral nervous system, such as muscular dystrophy, must be considered. Metabolic conditions (eg, hypothyroidism) and genetic syndromes (eg, fragile X syndrome) might be responsible. Clues to underlying etiology should be sought through a thorough history and physical examination. Particular attention to birth history, family histo-

ry, and developmental history could yield valuable information.

Abnormal physical findings, such as dysmorphic features; persistent primitive reflexes; asymmetric deep tendon reflexes; or abnormal muscle bulk, tone, or strength, are all especially relevant. If an underlying neurologic or medical condition is suggested, referral to a pediatrician or neurologist for further evaluation might be warranted.

Whether or not disease is suspected, referral for early intervention is indicated. Local availability and local practice patterns will dictate whether this is to an occupational therapist, physical therapist, early intervention therapist, or other professional. Children with no specific etiology for delays should be monitored every 3 to 4 months to ensure continued progress and to detect the emergence of new factors. Because many families believe that motor delays imply diminished intelligence, educating them about the nature of a child's difficulties can often be highly reassuring. Families also often underestimate the important role they have in creating an environment conducive to optimal motor development. Being taught specific techniques for helping motor skills develop can be both empowering for parents and therapeutic for children.

Figure 1. **Shared attention:** *Children should be able to direct the attention of another person to share their interest in something they have noticed.*



Language development

The fascination of baby with parent and parent with baby ensures attachment in the baby's first social relationship and facilitates the natural emergence of language in normal babies. Within a few years, a child progresses from a few words to virtual mastery of language. This magical process follows a predictable pattern, but has considerable normal variation in the rate and quality of its unfolding.

Significant deviations from normal development can be identified early if doctors are familiar with prelinguistic and linguistic milestones. Some physicians keep a checklist of milestones nearby; others use formal instruments, such as the Early Language Milestone Scale.[7] This tool has been shown to have relatively good sensitivity and specificity for children younger than 3 years.[8,9]

Red flags that signal a need for further evaluation include not beginning to babble by 8 months and having fewer than three meaningful words at 18 months. By 1 ½ years, a child should be able to achieve shared attention (*Figure 1*). A 2-year-old should be putting two words together, and a 3 ½-year-old's speech should be almost fully understandable. We should be concerned if a 4-year-old cannot use prepositions or if a 5-year-old is not speaking in grammatically correct, albeit short, sentences.

Physicians should remember some other important points.

- Recurrent otitis media rarely produces long-term language delays.[10,11]
- Congenitally deaf children typically have normal motor, cognitive, and psychological development in the first year of life and reach essentially normal language milestones in the first 6 to 8 months of life.[5] Examiners must assess auditory responses in young infants very carefully. Up to two thirds of congenitally deaf children can be

identified if all infants on the High Risk Registry (*Table 2*[12]) are screened early.[13]

- Deterioration or plateauing of language skills at 18 to 24 months is cause for serious concern.[14] In the past, parents reporting this were often ignored. However, it is now well recognized that, when combined with flat affect, social withdrawal, or poor engagement, this pattern can signify the onset of pervasive developmental disorder (PDD).

What to do if language delay is detected

Language is a complex skill; its development can have aberrations ranging from dysfluencies and articulation deficits to pure expressive or receptive delays to aberrant nonfunctional use of language, as in PDD. Possible causes include structural or functional abnormalities of the oromotor apparatus, hearing impairment, global developmental delay, pure language disorders, and PDD. History or physical examination sometimes suggest that referral to speech pathologists, audiologists, psychologists, neurologists, or psychiatrists could help.

Whether or not a child has a specific, intrinsic abnormality, the environment strongly influences development of language skills. Assessing such influence can help identify avenues for intervention, or, less commonly, actually determine the cause of language delay. Factors that can render a parent ineffective at teaching language include poverty, substance abuse, depression, and cognitive impairment.[15]

Reliable audiology is indicated for all children with language delay, as is referral to local early intervention services. In areas where speech and language evaluation is accessible, refer early. Putting a child into nursery school can usually be achieved fairly quickly and some children benefit greatly. Some communities have the Hanen program, a course of short workshops designed to teach parents how best to foster language development in their children.

Physicians can make practical suggestions for promoting language skills and enhancing cognitive and social skills that parents can implement immediately.

- When you have a young infant's gaze or obvious attention, make noises and sounds or sing softly.
- Repeat sounds or words the child utters.
- Repeat simple nursery rhymes in a predictable way.
- Ask questions or make comments that naturally lead to response.
- Label concrete objects in a child's environment.
- Emphasize action words in conversation with the child.
- Read to the child, and let the child see you reading for pleasure.
- Use simple language delivered slowly.

Table 2. **High Risk Registry of risk factors for sensorineural hearing loss**

Family history of hearing loss
Congenital infection
Craniofacial anomalies
Birth weight less than 1500 g
Hyperbilirubinemia at level exceeding indication for transfusion
Ototoxic medications used for more than 5 days
Bacterial meningitis
Asphyxia or low Apgar score at birth
Prolonged mechanical ventilation
Findings associated with a syndrome known to include sensorineural hearing loss (eg, Waardenburg or Usher's syndrome)

Adapted from American Speech-Language-Hearing Association.[12]

Cognitive development

Most parents delight in watching their children learn to understand the world and marvel as they acquire basic intellectual skills. One of the greatest fears parents have is that a child might be cognitively impaired. The tremendous emotional overlay associated with cognitive deficits might lead to confusion regarding terminology. The term "mental retardation" has much more serious social and prognostic implications than the term "developmental delay." The latter term

implies that a child will continue to make cognitive gains throughout development. This is often reassuring to parents, but they must understand that with time the gap between global delay and the norm typically widens.

Detecting cognitive impairment in children can be difficult. While profound mental retardation is hard to miss, milder forms can be subtly manifested in young children. Most globally delayed children achieve gross motor milestones at approximately normal times. Red flags for cognitive impairment include not alerting to mother by 3 months or not looking for dropped objects by 7 months. By 1 year babies should be searching for hidden objects, revealing a well established concept of object permanence. Two-year-olds should be able to categorize similarities (eg, big, red), and 3-year-olds should be able to say their full names when asked. By 4 ½ years a child should be able to count, and by 5 years should know several colours and some letters. Psychological testing can usually be attempted by 3 years, but might not be predictive of later outcome until a child is older than 5 years.

What to do if cognitive delay is detected

Differential diagnosis of global developmental delay is vast and is well documented elsewhere.[16] A detailed history and physical examination are essential for finding causative factors. History should particularly include prenatal factors, such as exposure to toxins or infection, and perinatal factors, such as complicated deliveries. Although birth events are generally poor predictors of developmental problems,[17] reviewing birth records can help parents who have unresolved concerns about that period. Family history should be probed for similarly affected relatives, possibly suggesting inherited conditions (eg, neurofibromatosis or fragile X syndrome). History can also clarify the adequacy of a child's environment and identify factors that might prevent a child from reaching maximum potential.

Physical examination must likewise be thorough. Focus should be on head growth, neurologic findings, and associated dysmorphic or neurocutaneous features. While investigations will be guided by historical and physical findings, hearing and vision should also be assessed. If the child is not microcephalic, DNA might be analyzed for the fragile X syndrome mutation.[18] Doing karyotype, lead level, metabolic screen,[6] or thyroid-stimulating hormone tests should be based on findings. Computed tomography is rarely clinically useful; magnetic resonance imaging sometimes aids diagnosis.

Cognitive impairment in a child is usually devastating for parents. Physicians can help immeasurably in an advocacy role. Helping families find appropriate preschools and ensuring that the child is properly identified by the school is helpful. If the community has an Association for Community Living, a family might benefit from contact with it. Parents sometimes feel deceived if a referral is made without fully explaining the child's diagnosis to them first.

Primary care physicians can help families access support groups, ministry-funded social workers, respite care, and government benefits and tax credits. Although no clear evidence indicates that globally delayed children's intelligence quotients can be improved by early intervention, children can be helped to function better and avoid secondary behavioural problems, and parents could experience less stress.[19]

Most families require emotional support and ongoing guidance as they come to terms with having a cognitively impaired child, work out plans for the future, and deal with the still-present social stigma.

Social and emotional development

The relationship between parent and child that develops in the first years of life is the springboard for the child's future interactions with other people, the template of how he or she views himself or herself, and the raw material for functioning in society, achieving happiness, and being emotionally intact.

Sadly, disruptions to this process are all too common. Countless examples of undesirable

social conduct and people with emotional disability are easily found. Primary prevention and pre-empting development of these problems has profound ramifications for both individuals and society. Understanding a child's biological endowment (ie, temperament) and knowing a child's psychosocial environment are key to successfully monitoring social and emotional development.

Since the landmark work of Chess and Thomas,[20] we have recognized that an infant's mind, far from being a tabula rasa, has a complex, unique pattern of responsiveness innate to his or her personality. Differences between infants are termed temperament and include a baby's activity level, rhythmicity, mood, and intensity and threshold of responding. Infants typically have been classified as "easy," "difficult," or "slow to warm up."

A child's temperament influences the parents' attitude and behaviour toward him or her; a child's temperament, and the degree to which it matches the parents' temperament, mediates a child's response to parental practices. Helping parents understand the role that temperament plays in a child's behaviour can be very useful. For example, if the parents of a "slow to warm up" child, who is reluctant to start a new preschool, view the behaviour as part of the child's normal style, they will allow him or her time to adapt positively and will not be concerned. If they do not appreciate this, they might view the child as timid or anxious and, instead of being patient, pressure the child to join the group, resulting in an even more difficult situation.

Among the myriad environmental variables that affect social and emotional development are family, health, economics, and culture. Children born into poverty, for example, experience not only economic deprivation but different psychological and social experiences from their better off peers.[21] Families under stress from marital conflict, parental depression, extended family problems, and so on often have difficulty nurturing their children's psychological development.

At the heart of social and emotional development lies the foundation upon which all future interactions with the social world rest: attachment of child to primary caregiver. This should be well established and evident by 12 to 14 months and is characterized by proximity-seeking behaviour, separation anxiety, and fear of strangers. Office visits are often ideal for witnessing these phenomena. Ample evidence now supports a link between secure attachment and later social development.[21]

Problems in social and emotional development are shown through a child's temperament, environmental factors, and attachment experience. Red flags include not developing a social smile by 3 months or not laughing in playful situations by 8 months. Poor eye contact or inability to be comforted by a parent is worrying at any age, as are excessive aggression, repetitive movements, and lack of interest in people.

Pervasive developmental disorders, characterized by impaired social interaction and communication and restricted, repetitive, and stereotypical patterns of behaviour, are being shown increasingly to respond to intervention, which should be sought early.[14] These conditions are biologically based, and are not the result of suboptimal social circumstances.

What to do if social and emotional problems are detected

Early intervention is essential. If a child's environment is highly disturbed, abusive, or neglectful, physicians must advocate for the child and might need to enlist child protection services.

In less severe social situations, physicians could support and guide families to remove obstacles preventing children from reaching maximum potential. Pointing out the child's temperament, and providing basic information on common behavioural challenges at different stages could help parents give better care.

Many children with social or emotional problems, even those with PDDs, appear to benefit from increased contact with other children, perhaps through play groups or library programs. Extended family members playing and reading with a child can provide the extra attention that parents sometimes cannot give.

Finally, children with social or emotional problems should be referred to early intervention therapists, if available. Some communities have more

specific supportive or therapeutic programs that might be appropriate, such as groups for depressed parents and their children or nursery programs for autistic children.

Conclusion

Watching over children as they grow and develop is one of the most rewarding, enjoyable, and challenging aspects of medical practice. Having a solid knowledge of the four streams of development enables physicians to take on the task with confidence and pleasure. Knowing the spectrum of normal and the indicators of serious delays is an ongoing learning process and is key to managing developmental surveillance effectively. Because developmental disabilities are so common (up to 10% prevalence[22]), physicians who look for them are likely to find them. Putting needed services into place in a timely fashion can be frustrating and time-consuming, particularly for those in rural areas. Once you are familiar with the services in your area, advocating for improved services might be necessary.

Despite the frustrations, watching the process of development, establishing supportive and trusting relationships with parents, and being able to make early developmental diagnoses that result in effective interventions are uniquely satisfying and enjoyable aspects of primary care medicine. ■

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Assessment of Developmental Delay

Developmental Area	Significant Red Flags	Intervention
Growth Growth charts are designed for typically developing children in North America. They may be misleading for children from other countries or children with a specific concern such as Down syndrome or premature delivery.	-Weight and height below 3rd percentile -Growth velocity less than expected -crosses 2 percentile lines -Weight less than 80% expected for age and height -Weight below 5th percentile on weight for height chart	-Examine re intake, output -Physical examination and tests to rule out syndromes, chronic disease -Psychosocial – eating and sleeping behaviour -Referral: pediatric, public health -Growth charts are available for children with Down syndrome
Motor Motor delay is not a reliable predictor of cognitive development	-41/2 mo not pulling to sit -5 mo not rolling over -7-8 mo not sitting unsupported -9-10 mo not standing holding on -15 mo not walking	-Look for neurological signs -Clues from birth history, family history -Abnormal physical findings? -Referral: pediatric or neurological, early infant development, physiotherapy -No specific cause – monitor and educate family, encourage motor development
Cognitive	-2-3 mo not alert to mother -6-7 mo not searching for dropped object -8-9 mo no interest in peek a boo -12 mo doesn't search for hidden object	-Detailed history and physical – prenatal, review birth records (not usually significant), family history -Child's environment -Support for parents re diagnosis -Advocate for support for parents and family -Look to avoid secondary problems
Language and Communication	-5-6 mo not babbling -8-9 mo not saying da or ba -10-11 mo not saying dada or baba -12 mo not gesturing – pointing or waving -24 mo no 2 word phrases -Loss of language at any age	-Audiology testing -Environment strongly influences language skills. Assess these influences – parental time, substance abuse, depression etc -Referral: speech and language evaluation, psychology, neurology, psychiatry -Possible problems: hearing problem, global delay, pure language disorders, autism spectrum disorder -Practical suggestions -Nursery school, Hanen programs etc
Social and Emotional	-3 mo not smiling socially -6-8 mo not laughing in playful situations -1 year hard to console, stiffens -2 years bites, kicks, screams easily, poor eye contact or engagement	-Early intervention needed – is child's environment abusive, neglectful, disturbed – child protection issue? -Parent training – re difficult behaviour -Increase contact with other children, extended family, extra attention -Referral: early intervention therapist – public health, developmental pediatrics etc

The Key to Developmental Surveillance is the knowledge of the spectrum of normal and the indicators of serious delays – this is an ongoing learning process. Developmental delays are common and occur in up to 10% of children.

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