

# Developmental milestones among Aboriginal children in Canada

Leanne Findlay PhD<sup>1</sup>, Dafna Kohen PhD<sup>1</sup>, Anton Miller MB ChB FRCPC<sup>2</sup>

L Findlay, D Kohen, A Miller. Developmental milestones among Aboriginal children in Canada. *Paediatr Child Health* 2014;19(5):241-246.

**BACKGROUND:** Windows of achievement provide age ranges for the attainment of early developmental skills. Group-specific research is warranted given that development may be influenced by social or cultural factors.

**OBJECTIVES:** To examine developmental milestones for Inuit, Métis and off-reserve First Nation children in Canada, based on developmental domains collected from the 2006 Aboriginal Children's Survey. Sociodemographic and health predictors of risk for developmental delay were also examined.

**RESULTS:** The ranges in which children achieve certain developmental milestones are presented. Gross motor and self-help skills were found to be achieved earlier (across the three Aboriginal groups), whereas language skills were achieved slightly later than in Canadian children in general. Furthermore, health factors (eg, low birth weight, chronic health conditions) were associated with late achievement of developmental outcomes even when sociodemographic characteristics were considered.

**CONCLUSIONS:** Findings suggest that the timing of milestone achievement may differ for Aboriginal children, highlighting the importance of establishing culturally specific norms and standards rather than relying on those derived from general populations. This information may be useful for practitioners and parents interested in identifying the age ranges for development, as well as age ranges indicating potential for developmental risk and opportunities for early intervention among Aboriginal children.

**Key Words:** *Child development; Indigenous population; Infant child; Preschool child*

Developmental milestones are markers of infant and child skill attainment occurring in a predictable sequence over time. They can be used by parents and clinicians to promote healthy development by identifying children who may be at risk for developmental problems as well as to provide opportunities for early intervention. To account for variability in development, 'windows of achievement' have been suggested to provide standard age ranges for children's attainment of gross motor, fine motor, social/emotional, cognitive and language skills (1-4).

Given that milestones represent skill attainment based on an interaction of neurological and physical development with the environment, and that development can be influenced by social or cultural expectations, group-specific research is warranted (5,6). Developmental milestones are often assessed using screening tools, such as the Denver Developmental Screening Test (7), in ethnically diverse populations, with the purpose of examining comparability among cultures (5,6,8). Differences in attainment of social

## Les étapes du développement chez les enfants autochtones du Canada

**HISTORIQUE :** Les tranches d'âge auxquelles certaines habiletés précoces du développement sont acquises s'inscrivent dans des fenêtres de réalisation. Des recherches au sein de certains groupes s'imposent, puisque des facteurs sociaux ou culturels peuvent influencer sur le développement.

**OBJECTIFS :** La présente étude visait à examiner les étapes du développement des enfants inuits, métis et des Premières nations vivant hors réserve au Canada, d'après les étapes du développement colligées dans l'Enquête sur les enfants autochtones de 2006. Les chercheurs ont également évalué les données sociodémographiques et les prédicteurs de risque de retard du développement liés à la santé.

**RÉSULTATS :** Les tranches d'âge auxquelles les enfants atteignent certaines étapes du développement sont présentées. Les étapes liées à la motricité globale et à l'autonomie étaient réalisées plus tôt (dans les trois groupes autochtones), tandis que les aptitudes langagières l'étaient un peu plus tard que chez l'ensemble des enfants canadiens. De plus, des facteurs liés à la santé (p. ex., petit poids de naissance, maladie chronique) s'associaient à l'atteinte tardive des étapes du développement, même lorsqu'on tenait compte des caractéristiques sociodémographiques.

**CONCLUSIONS :** Selon les observations, l'atteinte des étapes du développement diffère peut-être chez les enfants autochtones. Il est donc d'autant plus important de dégager des normes adaptées à la culture plutôt que de se fier à celles dérivées des populations en général. Cette information peut être utile pour les praticiens et les parents désireux de déterminer les tranches d'âge pour l'atteinte des étapes du développement et celles qui évoquent un problème de développement, de même que les possibilités d'intervention rapide auprès des enfants autochtones.

developmental milestones have particularly been linked to cultural differences (5).

A culturally diverse group that is of particular interest in Canada is the Aboriginal population. Aboriginal children are known to be at higher risk for living in poor socioeconomic conditions (9) and are also at risk for poor neonatal outcomes (10), language problems (11) and poor school outcomes (12). Gaps exist in the understanding of Canadian Aboriginal children's development due, in part, to a lack of monitoring or screening tools validated for Aboriginal children (13,14), and despite recommendations to collect and report on indicators of Aboriginal children's development during the preschool period (13,15). While studies reporting on early developmental milestone attainment for Aboriginal children are notably sparse, some research has suggested that certain developmental skills, including gross and fine motor skills, may be attained earlier than in the general population (16,17). These differences have been attributed to

<sup>1</sup>Statistics Canada, Health Analysis Division, Ottawa, Ontario; <sup>2</sup>Sunny Hill Health Centre for Children, Vancouver, British Columbia  
Correspondence: Dr Leanne Findlay, Statistics Canada, Health Analysis Division, 100 Tunney's Pasture Way, RH Coats, 24A, Ottawa, Ontario  
K1A 0T6. Telephone 613-951-4648, fax 613-951-3959, e-mail [leanne.findlay@statcan.gc.ca](mailto:leanne.findlay@statcan.gc.ca)  
Accepted for publication February 6, 2014

Aboriginal children's life experiences, including differences in cultural values and practices, which may vary even within Aboriginal groups (ie, for First Nations, Métis and Inuit children).

The current study examined developmental milestones for Aboriginal children in Canada, based on developmental skills collected in the 2006 Aboriginal Children's Survey (ACS) (18). Where possible, the current study considered Métis, Inuit and off-reserve First Nations children separately. Similar to the WHO approach (1), 'windows of achievement' were generated to examine the age range in which most Aboriginal children in the sample attained various developmental milestones. The establishment of ranges in which Aboriginal children generally attain skills is meaningful in terms of the identification of risk of atypical development (4).

To examine construct validity, we also explored several predictors of risk for late achievement of developmental milestones. These included health factors and social determinants of health previously associated with developmental risk for children in general, including physical health conditions such as low birth weight (19), chronic health conditions and/or physical activity limitations (20,21), and nutritional markers such as having been breastfed (22). Sociodemographic risk factors known to be associated with developmental delay were also considered, including sex, lower household income and parental education, and the number of individuals raising the child. Previous research has found children in poor socioeconomic conditions to be at greater risk for developmental delay (23,24). Finally, birth order was included because it is possible that it may be related to the attainment of developmental milestones.

## METHODS

### Sample

Data from the 2006 ACS were used to examine developmental milestones for Métis, Inuit and off-reserve First Nations children. The ACS is a nationally representative survey of Aboriginal children <6 years of age living off-reserve in Canada, and was developed by Statistics Canada and Aboriginal advisors from across the country (18). The ACS target population consisted of First Nations children living off reserve, Métis and Inuit children living in the 10 provinces as well as all children living in the three territories. The overall ACS response rate was 81%, resulting in a sample size of 12,845 children. For the current study, only children who reported single or multiple First Nations (n=5167), Métis (n=3793) or Inuit (n=1693) identity were included. Children with multiple Aboriginal group identities were included in each of the subgroup analyses.

### Measures

**Family and child sociodemographic characteristics:** Parents/guardians reported child age, sex and Aboriginal identity. Other reported characteristics included parental education, number of siblings and the number of individuals raising the child. Total household income was obtained from the 2006 Census.

**Child health:** Parents/guardians reported on the child's general health, which was dichotomized into better health (excellent or very good) versus poorer health (good, fair or poor), and whether the child's physical activity was limited by a health condition. Birth weight was dichotomized into low (<2500 g) versus not low birth weight (25). Parents also reported on the presence of one or more of a series of chronic health conditions that had lasted or were expected to last six months or more (eg, asthma, diabetes, heart conditions, etc). Finally, parents were asked whether the child was ever breastfed.

**Developmental milestones:** Parents were asked whether the child was capable of a list of development skills (categorical). These gross motor, fine motor, language, cognitive and self-help skills (Appendix 1) were selected by a Technical Advisory Group composed of Aboriginal leaders and specialists in Aboriginal child development. Different skills were asked based on child age (zero to 23 months of age versus  $\geq 24$  months to five years of age). Comparative data for children  $\leq 5$  years of age from the general Canadian population were obtained from the National Longitudinal Survey of Children and Youth (NLSCY) (2006/2007, n=11,735), although comparable information was only available for a few of the items.

For four of these skills (sitting unassisted, making a sound, first word and walking), if the child could complete the skill, parents retrospectively reported the age (in months) at which the skill was attained. Parent-reported recall of milestone achievement may become less reliable over time (2); however, preliminary analyses compared the concurrence of the 90th percentile between the categorical and continuous data. The age at which 90% of children were reported to have accomplished the skill was generally within one month of the age at which  $\geq 90\%$  of parents reported that their child was able to perform the task. These findings suggest that parents were relatively accurate in retrospectively reporting the age of skill attainment.

### Analytical strategy

The proportion of children performing each of the developmental skills was examined according to current age (in months) within each Aboriginal group. These cross-tabulations were examined to determine the age at which  $\geq 90\%$  of children in that age group attained the skill. Two consecutive months of  $\geq 90\%$  achievement were required to establish this cutpoint, and a minimum by-month cell size of 20 was necessary. Children who were older than the cutpoint and had not attained the skill were considered to be 'at risk' (2,4,16).

Next, the continuous data were used to determine the window of achievement (ie, the age range in which each developmental skill was achieved). Percentiles (10th, 50th and 90th) and SEs were calculated for each Aboriginal group separately based on continuous age.

Finally, the presence of risk for developmental delay was regressed onto health and sociodemographic factors. Three logistic regression analyses were conducted: late running (children up to 24 months of age [n=2816]), late counting three objects (children  $\geq 24$  months of age [n=6640]), and late dressing oneself (children  $\geq 24$  months of age [n=6640]). These skills were selected to represent different domains of development. Small sample sizes of at-risk children precluded performing the logistic regression analyses according to Aboriginal group. Significant associations between developmental outcomes and child health were examined, controlling for sociodemographic characteristics.

Survey sampling weights were applied to account for the complex survey design and to render the analyses representative of Métis, Inuit and off-reserve First Nations children in Canada in 2006. Finally, the complex survey design required that bootstrap weights be applied (using SUDAAN 11.0 [RTI International, USA]) to account for the underestimation of SEs (26).

## RESULTS

Sociodemographic and health characteristics of the entire sample are presented in Table 1. Table 2 demonstrates the 90% cutpoints for the age attainment of the categorical outcomes. By 17 months of age, at least 90% of Métis and off-reserve First Nations children were reported as being able to run. For Inuit,

**TABLE 1**  
Characteristics of the sample

Characteristic	%	SE	95% CI
Child age, months			
0–23	25.9	0.4	25.2–26.6
≥24	74.1	0.4	73.4–74.8
General health			
Excellent or very good	85.3	0.4	84.5–86.0
Good, fair or poor	14.7	0.4	14.0–15.5
Birth weight			
Not low	88.8	0.4	88.1–89.5
Low (<2500 g)	11.2	0.4	10.5–11.9
Any long-term health condition			
No	64.2	0.5	63.1–65.2
Yes	35.8	0.5	34.8–36.9
Physical activity limitation			
Yes	4.3	0.2	3.9–4.7
No	95.7	0.2	95.3–96.1
Breastfed			
No	27.1	0.5	26.2–28.2
Yes	72.9	0.5	71.8–73.8
Child sex			
Female	48.9	0.5	47.8–49.9
Male	51.1	0.5	50.1–52.2
Highest level of parent/guardian education			
Elementary or less	2.6	0.2	2.4–3.0
Some high school	26.5	0.5	25.5–27.5
Completed high school	26.0	0.5	25.0–27.0
Some or completed postsecondary nonuniversity	28.8	0.5	27.8–29.9
University (some or completed)	16.1	0.4	15.3–16.9
Individuals raising the child, n			
1	9.5	0.3	8.9–10.2
2	35.8	0.5	34.7–36.8
≥3	54.7	0.6	53.6–55.8
Siblings, mean	1.3	0.0	1.3–1.3

Source: Aboriginal Children's Survey 2006, Statistics Canada

90% were able to run at 18 months of age, and for Canadian children in general, the 90% cutpoint was at 20 months of age. Variability according to group was found for the social skill of taking turns; this skill was attained by 90% of Inuit children at 30 months of age, 27 months of age for Métis children and 25 months of age for off-reserve First Nations children. For counting three objects, similarity was observed across groups, with the 90% cutpoint being 35 months of age for off-reserve First Nations children, 34 months of age for Métis children, 36 months of age for Inuit children and 33 months of age for the NLSCY sample. As an illustration of a language skill, expressing a need in sentences was attained by at least 90% of children by 45 months of age, 36 months of age and 42 months of age among off-reserve First Nations children, Métis children and Inuit children, respectively.

The windows of achievement for Métis, Inuit and off-reserve First Nations children are shown in Figures 1 to 3, respectively. The figures show the age ranges in which most children in the sample achieved the developmental milestones of sitting unassisted, making a sound, expressing their first words and walking. For example, parents reported that Métis children expressed their first word between 6.9 and 23.1 months of age, Inuit children between 6.1 and 23.3 months of age, and off-reserve First Nations

**TABLE 2**  
Age at which 90% of off-reserve First Nations, Métis and Inuit children were able to attain developmental skill

Developmental skill				NLSCY comparison sample
	First Nations	Métis	Inuit	
Ever run	17	17	18	20
Made a line	23	19	NA*	NA*
Copied actions or sounds	8	7	12	
Offered toys	13	12	14	
Taken turns when playing games or talking	25	27	30	
Dressed himself/herself	37	37	36	46
Toilet trained	46	41	37	
Found items	20	19	22	
Counted three objects	35	34	36	33
Sorted objects	43	35	36	
Shows that he/she understands how many three is	38	41	41	
Counted out loud up to 10	55	46	60	NA*
Stopped making sounds and looked at someone or something	8	8	NA†	
Use gestures	9	8	16	
Expressed needs using sounds other than crying	14	12	15	14
Understands the names of common objects	NA*	21	23	
Says the name of familiar objects	NA*	22	NA†	19
Expressed needs using two to three words	28	27	28	
Expressed needs using sentences	45	36	42	
Told or retold a story	41	38	46	
Drawn a picture and told a story about it	55	56	59	

\*Not attained by 90% of the sample by the age at which the question was included, †By-month sample too small to determine cutpoint. NA Not available; NLSYC National Longitudinal Survey of Children and Youth

children between 6.3 and 23.4 months of age. For comparison, children in the NLSCY comparison group achieved first words between 5.3 and 12.9 months of age (50th percentile 8.8 months of age; SE=0.1).

The final analysis used regression models to examine factors associated with meeting developmental milestones later than 90% of peers (Table 3). Girls were significantly less likely to demonstrate late achievement, particularly for counting and dressing. Lower levels of parental education tended to be associated with late milestone achievement for counting, and a single individual raising the child was associated with increased odds of late counting (with a similar yet nonsignificant trend for late dressing).

Several health factors were associated with late achievement of developmental outcomes even when sociodemographic characteristics were considered. Aboriginal children rated by their parents as being in poorer health were more likely to be at risk for late achievement of counting than those reported to be in better health; those born at low birth weight were more likely to be at risk for achieving running late than non-low birth weight children. Children with any reported chronic health condition(s) had higher odds of achieving counting and dressing late than those without a chronic condition. Compared with those without a limitation, Aboriginal children with a physical activity limitation were more likely to achieve all three developmental domains late (running, counting and dressing). Finally, children who were not

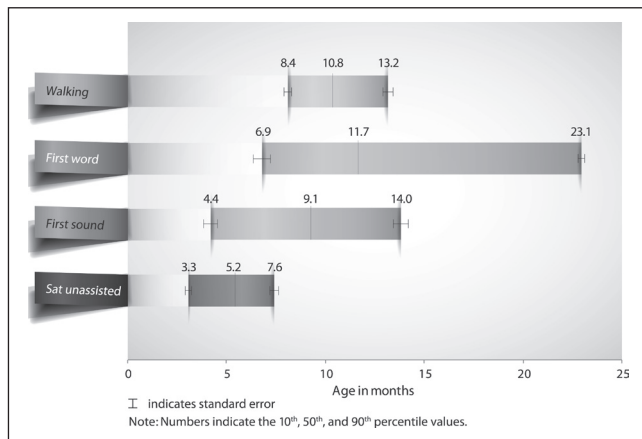


Figure 1) Windows of achievement: Métis children

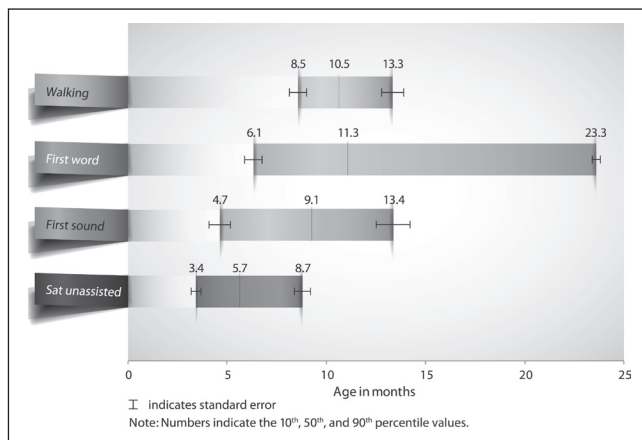


Figure 2) Windows of achievement: Inuit children

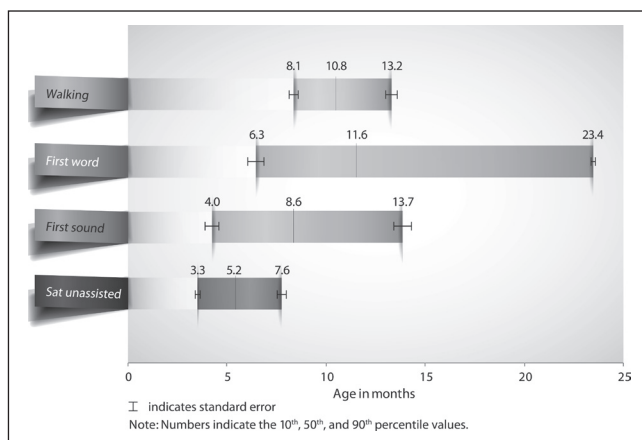


Figure 3) Windows of achievement: Off-reserve First Nations children

breastfed had higher odds of late running than those who were breastfed.

### DISCUSSION

The current study describes windows of achievement for several developmental outcomes among Aboriginal children in Canada. Although only a few developmental skills could be compared, the developmental milestone achievement of Métis, Inuit and off-reserve First Nations children were generally different than that of

TABLE 3  
Logistic regression predicting late achievement of milestones

	Late running* (n=64)	Late counting† (n=173)	Late dressing‡ (n=175)
<b>General health</b>			
Excellent/very good‡	1.00	1.00	1.00
Good/fair/poor	1.07 (0.51–2.21)	1.92 (1.25–2.95)§	1.08 (0.70–1.69)
<b>Birth weight</b>			
Not low‡	1.00	1.00	1.00
Low (<2500 g)	4.04 (2.06–7.92)§	1.33 (0.83–2.13)	1.52 (0.99–2.33)
<b>Any long-term health condition</b>			
No‡	1.00	1.00	1.00
Yes	1.11 (0.58–2.10)	1.64 (1.10–2.44)§	1.90 (1.25–2.88)§
<b>Physical activity limitation</b>			
Yes	5.23 (2.30–11.91)§	3.63 (2.18–6.06)§	3.14 (1.91–5.17)§
No‡	1.00	1.00	1.00
<b>Breastfed</b>			
No	2.67 (1.53–4.68)§	1.21 (0.85–1.73)	1.26 (0.85–1.87)
Yes	1.00	1.00	1.00
<b>Child sex</b>			
Female	0.56 (0.30–1.04)	0.61 (0.42–0.88)§	0.34 (0.23–0.51)§
Male‡	1.00	1.00	1.00
<b>Household income (adjusted for household size, per \$10,000)</b>			
0.92 (0.80–1.06)	0.96 (0.85–1.08)	1.02 (0.94–1.11)	
<b>Highest level of PMK education</b>			
Elementary or less	1.54 (0.33–7.21)	3.17 (1.38–7.28)§	0.93 (0.37–2.34)
Some high school	1.52 (0.60–3.82)	1.61 (0.81–3.18)	0.70 (0.41–1.21)
Completed high school	1.53 (0.52–4.46)	1.43 (0.71–2.87)	0.72 (0.40–1.33)
Some or completed postsecondary nonuniversity	0.81 (0.27–2.43)	0.89 (0.43–1.84)	0.58 (0.35–0.96)
University (some or completed)‡	1.00	1.00	1.00
<b>Number of siblings (per sibling)</b>			
1.01 (0.81–1.25)	1.18 (1.03–1.36)§	0.99 (0.86–1.14)	
<b>Number of people raising the child</b>			
1	1.16 (0.47–2.84)	1.88 (1.12–3.14)§	1.58 (0.83–3.00)
2‡	1.00	1.00	1.00
≥3	1.16 (0.62–2.18)	0.89 (0.60–1.33)	1.32 (0.87–2.00)

Source: Aboriginal Children's Survey 2006, Statistics Canada. \*Age ≤24 months; †Age ≥24 months; ‡Reference category; §Significant OR (P≤0.05)

the NLSCY comparison sample, with achievement occurring earlier and sometimes later, depending on the domain of skills. Thus, the age ranges provide information for Aboriginal children's attainment, which may be useful for practitioners and parents interested in Aboriginal child development, developmental risk and opportunities for early intervention.

For gross motor skills, Aboriginal children achieved the sitting and walking milestones earlier than the internationally established WHO windows of achievement at 4.6 to 7.5 months of age and 10 to 14.4 months of age, respectively (1). For the cognitive/language domain, the window of achievement for counting three objects was slightly later than that found for

Canadian children in general. Furthermore, the window of achievement observed for first words was quite large, suggesting a wide range in the age at which Métis, Inuit and off-reserve First Nations children in the sample first use words to express needs. Other research has also suggested that Aboriginal children achieve gross motor skills earlier and language skills later than non-Aboriginal children (16). Aboriginal children are often raised in a bilingual environment, which may be associated with a lag in the development of some language skills, albeit with eventual mastery of both languages (27).

The findings suggest that a culture-specific examination of milestones is necessary for outcomes in various areas of development (motor, cognitive), as well as for social skills where practices such as living with extended family members may influence the attainment of some developmental skills (8,28). Extended family or elders may facilitate development by providing additional support and modelling behaviours for Aboriginal children. This may vary within Aboriginal identity groups, in particular for social skills, which may be highly dependent on group norms, and cultural and family practices. Parents of Métis, Inuit and First Nations children may have different expectations for young children or different goals for teaching independence behaviours (5,8,16). Moreover, differences in milestone attainment compared with non-Aboriginal populations may not necessarily indicate a risk, especially in the case where culture-specific norms and practices may be influential (6). However, milestones attained outside of the age window achieved by the majority of children within the same culture group may be more likely to be an indicator of risk. Failure to consider population-specific age-ranges can lead to over- or underidentification of children at risk for developmental delays (7).

The current findings affirm previously demonstrated associations between sociodemographic and early health condition risk factors with later achievement of developmental milestones (21,24), based on culture-specific cutpoints for being at risk for developmental delay. For example, late milestone attainment was associated with poorer health, low birth weight, and reported chronic conditions and/or physical activity limitations, demonstrating that Aboriginal children with early health conditions may be at risk in terms of development. Physical activity limitation was of particular interest because it was related to all three outcomes. Future research could explore longitudinal associations between milestone attainment and developmental delay. In addition, a better understanding of cultural influences and expectations for the timing of attainment of skills in various domains would be of interest, as well as possible Aboriginal-specific interventions and supports to assist in mitigating the risks associated with child health problems.

The present study is the first known examination of developmental milestones using a nationally representative sample of Métis, Inuit and off-reserve First Nations children in Canada. However, several limitations should be noted. First, the ACS only considered a subset of skills included on more comprehensive lists of development and should be viewed as a point of reference for Aboriginal children's development rather than a clinical tool. Children living on-reserve were not included in the ACS sample or the NLSCY comparison group; thus, the results cannot be generalized to the on-reserve population. The current study did not control for gestational age at birth because this information was not collected on the ACS. However, other developmental milestone research involving the general population has not excluded premature children (7). Furthermore, windows of achievement were based on parental reports. Parental reports are

a widely used source of information on child development, particularly in the absence of standardized Aboriginal-specific measures (29).

## CONCLUSIONS

The present study provides one of the first references for the attainment of developmental milestones, assessed using population-based data, for the early skills of Métis, Inuit and off-reserve First Nations children in Canada. Findings suggest that milestone achievement may differ for these culturally specific subgroups of children, highlighting the importance of establishing culturally specific age ranges and not relying solely on those derived from general populations. Furthermore, culture-specific interventions and recommendations are warranted. While windows of achievement provide guidelines for parents and practitioners, individual differences and circumstances must also be considered to provide the most comprehensive and accurate understanding of Aboriginal children's development.

**ACKNOWLEDGEMENTS:** This research was supported by the Strategic Research Directorate at Aboriginal Affairs and Northern Development Canada. The views expressed in this document are those of the authors and do not necessarily represent the position of Aboriginal Affairs and Northern Development Canada or Statistics Canada.

## APPENDIX 1 Developmental milestones collected on the 2006 Aboriginal Children's Survey

Item	Age range of collection sample
Has the child ever looked for someone or something that was lost or out of sight?	0–23 months
<b>Age in months he/she first started looking for someone or something that was lost or out of sight</b>	0–23 months
Has the child sat up by him/herself?	0–23 months
<b>Age when the child sat up by him/herself</b>	0–23 months
Has the child started walking on his/her own?	0–23 months
<b>Age when child began walking on own</b>	0–23 months
Has the child ever run?	0–23 months
Has the child ever made a line with a crayon, stick or other object?	0–23 months
Has the child ever waited his/her turn when asked or reminded?	0–23 months
Has the child ever offered toys, food or other items to others?	0–5 years
Has the child ever sorted objects, clothes, food or other items by groups?	0–5 years
Has the child ever found things he/she needs with or without prompting?	0–5 years
Has the child ever expressed his/her needs using gestures, including facial expressions?	0–5 years
Has he/she ever copied or imitated someone else's actions or sounds?	0–23 months
Has he/she ever stopped making sounds or looked at you when you speak to him/her?	0–23 months
Has the child expressed his/her needs using sounds, other than crying?	0–5 years
<b>Age in months that the child first used sounds other than crying to express needs</b>	0–23 months
Has the child ever expressed his/her needs using a single word?	0–5 years

Continued on next page

**APPENDIX 1 – CONTINUED**  
**Developmental milestones collected on the 2006**  
**Aboriginal Children's Survey**

<b>Item</b>	<b>Age range of collection sample</b>
<b>Age in months that the child first used single words to express needs</b>	0–5 years
Has the child ever shown that he/she understands names of common objects?	0–23 months
Has the child ever said the name of a familiar object?	0–23 months
Has the child ever expressed needs using two to three words?	0–5 years
Has the child ever expressed needs using full sentences?	0–5 years
How often does the child understand you when you speak to him/her?	0–5 years
How often can you understand what he/she is saying?	0–5 years
How often can other people understand what he/she is saying?	0–5 years
Has the child ever counted three objects correctly?	0–23 months
Has he/she ever dressed him/herself without any help except for tying shoes and buttoning the backs of outfits?	2–5 years
Is the child toilet trained?	2–5 years
Has the child ever taken turns when playing games or talking to you or others?	2–5 years
Has the child ever told or retold a story using own words?	2–5 years
Has the child ever drawn a picture and told a story about it?	2–5 years
Has the child ever counted out loud up to 10?	2–5 years
Has the child ever counted three objects correctly?	2–5 years
Can the child show that he/she understands how many three is?	2–5 years

*Items in bold represent continuous age values (in months) rather than categorical responses*

**REFERENCES**

- WHO Multicentre Growth Reference Study Group. WHO Motor Development Study: Windows of achievement for six gross motor development milestones. *Acta Paediatr Suppl* 2006;450:86-95.
- Neligan G, Prudham D. Norms for four standard developmental milestones by sex, social class and place in family. *Dev Med Child Neurol* 1969;11:413-22.
- Capute AJ, Accardo PJ. The Infant Neurodevelopmental Assessment: A clinical interpretive manual for CAT-CLAMS in the first two years of life, Part 1. *Curr Probl Pediatr* 1996;26:238-57.
- Dosman CF, Andrews D, Goulden KJ. Evidence-based milestone ages as a framework for developmental surveillance. *Paediatr Child Health* 2012;17:561-8.
- Gladstone MJ, Lancaster GA, Jones AP, et al. Can Western developmental screening tools be modified for use in a rural Malawian setting? *Arch Dis Child* 2008;93:23-9.
- Williams PD, Williams AR. Denver Developmental Screening Test norms: A cross-cultural comparison. *J Pediatr Psychol* 1987;12:39-59.
- Bryant GM, Davis KJ, Newcombe RG. The Denver Developmental Screening Test. Achievement of test items in the first year of life by Denver and Cardiff infants. *Dev Med Child Neurol* 1974;16:475-84.
- Wijedasa D. Developmental screening in context: Adaptation and standardization of the Denver Developmental Screening Test-II (DDST-II) for Sri Lankan children. *Child Care Health Dev* 2012;38:889-99.
- Aboriginal well-being: Canada's continuing challenge. Toronto: Thompson Educational Publishing Inc, 2007.
- Simonet F, Wilkins R, Luo Z-C. Temporal trends in Inuit, First Nations and non-Aboriginal birth outcomes in rural and northern Quebec. *Int J Circumpolar Health* 2012;71.
- Findlay LC, Kohen DE. Neighbourhood factors and language outcomes of First Nations preschoolers living off reserve: Findings from the Aboriginal Children's Survey. *International Indigenous Policy Journal* 2012;3(2).
- British Columbia Ministry of Education. Aboriginal report 2004/05-2008/09: How are we doing? Victoria: British Columbia Ministry of Education, 2010.
- Ball J. Aboriginal young children's language and literacy development: Research evaluating progress, promising practices, and needs. Ottawa: Canadian Language and Literacy Networked Centre of Excellence, 2007.
- Ball J, Lewis M. First Nations elders' and parents' views on supporting children's language development. Report presented at the Canadian Association of Speech-Language Pathologists and Audiologists, Regina, Saskatchewan, May 6, 2005.
- Assembly of First Nations. Tradition and education: Towards a vision of our future. A declaration of First Nations jurisdiction over education. Summerstown: Assembly of First Nations, 1988.
- Kerfeld CI, Guthrie MR, Steward KB. Evaluation of the Denver II as applied to Alaska Native children. *Pediatric Physical Therapy* 1997;9:23-31.
- Chisholm JS. Swaddling, cradleboards and the development of children. *Early Hum Dev* 1978;2:255-75.
- Statistics Canada. Aboriginal Children's Survey, 2006: Concepts and Methods Guide. Ottawa: Minister of Industry, 2008.
- McCormick MC, McCarton C, Manascia J, Brooks-Gunn J. Early educational intervention for very low birth weight infants: Results from the Infant Health and Development Program. *J Pediatr* 1993;123:527-33.
- Marino BS, Lipkin PH, Newburger JW, et al; American Heart Association Congenital Heart Defects Committee, Council on Cardiovascular Disease in the Young, Council on Cardiovascular Nursing, and Stroke Council. Neurodevelopmental outcomes in children with congenital heart disease: Evaluation and management: A scientific statement from the American Heart Association. *Circulation* 2012;126:1143-72.
- Newacheck PW, Stoddard JJ. Prevalence and impact of multiple childhood chronic illnesses. *J Pediatr* 1994;124:40-8.
- Sacker A, Quigley MA, Kelly YJ. Breastfeeding and developmental delay: Findings from the Millennium Cohort study. *Pediatrics* 2006;118:e683-e689.
- Najman JM, Bor W, Morrison J, Anderson M, Williams G. Child developmental delay and socio-economic disadvantage in Australia: A longitudinal study. *Soc Sci Med* 1992;34:829-35.
- Ozkan M, Senel S, Arslan EA, Karacan CD. The socio-economic and biological risk factors for developmental delay in early childhood. *Eur J Pediatr* 2012;171:1815-21.
- United Nations Children's Fund and World Health Organization. Low birth weight: Country, regional and global estimates. New York: UNICEF, 2004.
- Rust K, Rao J. Variance estimation for complex surveys using replication techniques. *Stat Methods Med Res* 1996;5:281-310.
- Hoff E. How social contexts support and shape language development. *Developmental Review* 2006;26:55-88.
- Cappiello M, Gahagan S. Early child development and developmental delay in Indigenous communities. *Pediatr Clin North Am* 2009;56:1501-17.
- Ball J, Janyst P. Screening and assessment of Indigenous children: Community-university partnered research findings. Policy Brief presented at the Early Years Policy Forum, Vancouver, British Columbia, November 2008.