



Infant Feeding in Ottawa 2012 to 2014

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Acknowledgements

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Acronyms

BFI	Baby-Friendly Initiative
BORN	Better Outcomes Registry & Network
CCHS	Canadian Community Health Survey
CI	Confidence interval
IFSS	Infant Feeding Surveillance System
ISCIS	Integrated Services for Children Information System
NR	Not reportable
OPH	Ottawa Public Health
OR	Odds ratio
PHN	Public health nurse
WHO	World Health Organization

Executive Summary

This infant feeding report is the first to present statistics on selected infant feeding indicators for Ottawa mothers from Ottawa Public Health's Infant Feeding Surveillance System (IFSS), the Better Outcomes Registry & Network (BORN) Ontario and Statistics Canada's Canadian Community Health Survey (CCHS). The results in this report are intended to inform service providers who work with mothers during preconception, prenatal and the perinatal period, those who work in child health, and to inform program planning and policy development.

Summary of Findings

Nearly all mothers intended to – and initiated breastfeeding

- Approximately 96% of Ottawa mothers intended to breastfeed their infant in 2014 and 88% intended to exclusively breastfeed. This proportion was higher than Ontario where 93% intended to breastfeed their infant and 84% intended to do so exclusively. Teen mothers were less likely to intend to breastfeed (85%, on average) compared to mothers 20 years and older (95%, on average).
- Nearly all mothers tried to breastfeed their baby (98% in 2012, 97% in 2013, and 95% in 2014). First-time mothers with higher household income were five times more likely to try to breastfeed than first-time mothers with low household income. Experienced (multiparous) mothers were more likely to try to breastfeed if they had breastfed another child, had a full-term birth, were born outside Canada, were younger (20-29 years), or if they had a household income of \$30,000 or more.

Nine out of ten mothers breastfed on discharge from their hospital stay; seven out of ten continued to breastfeed at six months

- Upon discharge from hospital or midwifery care, the proportion of mothers in Ottawa who breastfed their infant rose slightly between 2012 and 2014 (92% in 2012, 93% in 2013, 94% in 2014).
- At six months of age, seven out of ten Ottawa mothers breastfed their infant (68% in 2012, 72% in 2013, 68% in 2014). Fewer mothers across Ontario (59% in 2013, CCHS) reported breastfeeding their infant at six months of age.
- The strongest predictor of any breastfeeding at six months among first-time mothers was not feeding formula in the hospital. Waiting until six months to introduce cereal and higher education were also predictive of breastfeeding at six months among first-time mothers. First-time mothers with French mother tongue language were half as likely as those with English mother tongue to breastfeed at six months.

There is a large drop in exclusive breastfeeding between hospital discharge and two weeks of age particularly for first-time mothers; eight percent of mothers exclusively breastfed at six months

- On average, sixty percent of mothers exclusively breastfed upon discharge from hospital or midwifery care and this falls to 39% by two weeks of age. At two weeks, first-time mothers were less likely to breastfeed exclusively compared to experienced mothers.
- While the decline in exclusive breastfeeding is small between two weeks (39%) and four months of age (27%), it is more apparent between four and five months (20%), with a high drop-off of exclusive breastfeeding occurs between five and six months of age. On average, 8% of mothers report exclusively breastfeeding at six months of age or more and this proportion was similar from 2012 to 2014.
- The strongest predictor of exclusive breastfeeding at six months of age among first-time mothers was higher education. First-time mothers who had a vaginal birth were nearly twice as likely to exclusively breastfeed at six months of age as those who had a caesarean section.

Close to half of breastfed infants were fed formula in-hospital

- Close to half of breastfed infants were fed formula in the hospital (47% in 2012, 43% in 2013, 46% in 2014).
- Three quarters of mothers reported introducing formula before six months of age (75% in 2012, 71% in 2013, 75% in 2014).

Concern about inadequate milk supply was the most common reason for early breastfeeding cessation and formula introduction

- The five main reasons for breastfeeding cessation before six months of age were:
 1. Milk supply concerns (56%)
 2. Difficulties with breastfeeding (24%)
 3. Medical condition of mother or infant (13%)
 4. Inconvenience, fatigue, lack of time or breastfeeding too demanding (9%)
 5. Baby was ready, preferred formula, or refused the breast (7%).
- The five main reasons for introducing formula were:
 1. Milk supply concerns (54%)
 2. Medical condition of mother or infant (18%)
 3. Difficulties with breastfeeding (14%)
 4. Lifestyle reasons (9%)
 5. Inconvenience, fatigue, lack of time or breastfeeding too demanding (6%).

Two thirds of mothers introduce complementary foods before six months of age

- Over two-thirds of mothers (69% in 2012, 67% in 2013, 69% in 2014) reported that they introduced complementary foods before six months of age.
- The three main reasons for introducing complementary foods were:
 1. The infant was ready for solids (41%)
 2. A health professional advised them (32%)
 3. Parents thought their infant was not getting enough milk (14%).

At least 23% of mothers continue to breastfeed at 12 months

- At minimum, 23% of Ottawa mothers (21% in 2012 and 25% in 2013) continued to breastfeed their infant at 12 months of age.
- Two thirds (67%) of mothers who stopped breastfeeding between six and 12 months did so when their infant was between eight and less than 12 months of age. The most common infant age for stopping breastfeeding between six and 12 months was 11 to less than 12 months of age (22%).

Return to work and milk supply concerns were the most common reasons for breastfeeding cessation between six and 12 months

- The five main reasons for breast milk feeding cessation between six and 12 months of age were:
 1. Return to work or school (25%)
 2. Milk supply concerns (22%)
 3. Difficulties with breastfeeding (11%)
 4. Baby self-weaned, preferred formula or refused the breast (8%)
 5. Baby was old or big enough (7%)
 6. Teething (7%)

Close to half of mothers breastfeeding at 12 months of age intended to continue until their child self-weans

- Forty-five percent of mothers who were breastfeeding at 12 months reported that they would continue to breastfeed until their child self-weans. Approximately 20% planned to stop breastfeeding when their child is between 13 and 15 months, 12% planned to stop when their child is 18 months old and 9% planned to stop when their child is 24 months old.

Nearly all mothers would consider breastfeeding again

- While a high proportion of mothers said that if they were to become pregnant again, they would consider breastfeeding as an option to feed their infant (98% in 2012, 95% in 2013, 94% in 2014), this proportion decreased slightly between 2012 and 2014.

Supporting Breastfeeding in the City of Ottawa

It is encouraging to see there is a high prevalence of breastfeeding intention and initiation. While it is positive to see the percentage of mothers breastfeeding at six months, there is still much room for improvement. Very low exclusivity rates despite the recommendation for exclusive breastfeeding to six months and duration rates far below the recommendation of up to two years and beyond could be improved by addressing:

- high use of formula among breastfed infants in-hospital;
- real and perceived concerns about milk supply;
- the large drop in exclusive breastfeeding rates between discharge and two weeks post partum and again between four and six months of age;
- the common introduction of complementary foods before the recommended six months of age; and
- support for long term breastfeeding including mothers who are returning to work or school.

OPH is using the results of this report to inform a comprehensive breastfeeding strategy. The aim of this strategy will be to create a breastfeeding friendly city. Components of the strategy may include:

- provision of a variety of seven day a week breastfeeding services and supports throughout the community. Visit parentinginottawa.com to find the closest drop in.
- integrated services and supports with community partners for all families;
- education, awareness and normalization of breastfeeding; and
- environments that support and encourage breastfeeding.

Introduction

The World Health Organization (WHO) and Health Canada recommend that mothers exclusively breastfeed infants for the child's first six months to achieve optimal growth, development and health. Thereafter, they should be given nutritious complementary foods and continue breastfeeding up to the age of two years or beyond.^{1,2} "Exclusive breastfeeding" is defined as giving no other food or drink – not even water – to an infant, except breast milk. It does, however, allow the infant to receive oral rehydration salts, drops and syrups (vitamins, minerals and medicines).^{2,3}

Throughout this report, we have used the term *breastfeeding* to indicate providing breast milk at the breast or expressed breast milk by alternate method (bottle, cup, spoon or supplemental nursing system). The term *complementary foods* refers to solid foods and liquids other than breast milk or formula. The term *multiparous* refers to women who have given birth two or more times.

Data Sources

BORN Ontario is a registry, established in 2009, that captures information on every birth and young child in Ontario. Infant feeding data collected include intention to breastfeed, feeding in hospital, feeding on discharge and reason for supplemented formula feeding.

Statistics Canada's Canadian Community Health Survey (CCHS) collects data on breast milk feeding initiation and duration in Ottawa and Ontario among women aged 15 to 55 years who gave birth in the past five years.

In 2012, the Ottawa Public Health (OPH) Infant Feeding Surveillance System (IFSS) was developed to meet the Baby-Friendly Initiative (BFI) requirements in monitoring:

- breastfeeding, including initiation, duration and exclusivity up to six months and 12 months of age;
- disparities between populations based on socioeconomic status such as immigration status, language, education, income and age;
- reasons for breastfeeding cessation, reasons for formula and solid food introduction; and
- infant feeding supports (not included in this report).

Methods

IFSS: data collection

Between July 1, 2012 and December 31, 2014, mothers living in Ottawa were asked for their consent to participate in the IFSS at their Healthy Babies Healthy Children (HBHC) 48 hour postpartum telephone call by a public health nurse (PHN). During this time, all mothers giving birth in Ottawa were included in the 48 hour postpartum telephone call. Between July 2012 and September 2013, a sample of mothers who consented to participate was selected on a monthly basis. The sample consisted of an age-stratified sample (15-19, 20-29, 30-34, and ≥ 35 years) that included all teenage mothers and a random sample of mothers in the other age groups. Between October 2013 and December 2014, due to a decrease in asking consent from mothers at the post-partum contact, all mothers who consented to participate were included.

Consenting mothers were called by a PHN when their infant was between six and seven months old. Up to three attempts were made to contact those selected and the interviews lasted on average less than eight minutes. The mother's preferred language of communication was identified in the postpartum contact. The calls were made by the PHN in English and French or an interpretation service was used for other languages. Calls were made during weekdays between 8am and 5pm.

Respondents who identified as breastfeeding their infant at the initial interview (between six and seven months) were asked to participate in a follow-up interview when their infant was between 12 and 13 months of age. All respondents who agreed to participate were included in the follow-up 12 month sample. Up to three attempts were made to contact these respondents and the interviews lasted on average less than three minutes.

Research ethics approval for the IFSS was obtained through Ottawa Public Health's Research Ethics Board.

IFSS: recruitment and completion of the survey

The six-month sample

Of the approximately 23400 deliveries in Ottawa from July 2012 to December 2014, 6783 (29%) women were contacted and gave consent to be called and 4961 were selected for the six-month sample, which represents 21% of all Ottawa deliveries. Of those that were selected for the six-month sample, 2648 completed the survey, which is a completion rate of 53% (Table 1).

Data analyses were performed by birth year (birth cohort). Currently the IFSS has three cohorts for which six-month survey data have been collected. The first cohort is formed of a sample of 460 babies born in 2012 (from the initial enrolment date July 1 to December 31, 2012). The second cohort includes 1065 babies born in 2013 (January 1 to December 31, 2013). The third cohort includes 1123 babies born from January 1 to December 31, 2014 (Table 1).

Table 1. Number of hospital deliveries, consents, mothers selected and completed six-month surveys and completion rate by birth year.

Birth Year	# Hospital Deliveries	# Consents	# Selected	# Completed 6 month surveys	Proportion completed
July 1 – December 31, 2012	4770 (half of yearly 9540)	2030	1063	460	43%
January 1 – December 31, 2013	9441	2657	1926	1065	55%
January 1 – December 31, 2014	9214	2096	1980	1123	57%
Total	23425	6783	4969	2648	53%

Ottawa Public Health, Infant Feeding Surveillance System.

The 12-month sample

Of the 1525 mothers in the 2012 and 2013 birth cohort who completed the six-month survey, 1045 (69%) were currently breastfeeding at the time of the survey and thus eligible for the 12-month survey. Of those who were eligible, 1002 (96%) agreed to be followed-up when their infant was 12 months old. Responses to the 12-month survey were obtained from 609 mothers – a completion rate of 61%.

Table 2. Number of completed six-month surveys, eligible mothers, consents, completed 12-month surveys and completion rate by birth year.

Birth Year	# Completed 6-month surveys	# Eligible for 12-month survey	# Agreed to be followed-up	# Complete 12-month survey	Proportion completed
July 1 – December 31, 2012	460	301	284	163	58%
January 1 – December 31, 2013	1065	744	718	446	62%
Total	1525	1045	1002	609	61%

Ottawa Public Health, Infant Feeding Surveillance System.

Demographics of the respondents

Overall, 2648 mothers responded to the six-month survey. See Appendix Table A1 for a full description of the respondents. Most respondents identified (as):

- 30 years or older in 2012 (71%), 2013 (68%) and 2014 (70%). Between 2012 and 2014, there was an increase in the proportion of respondents aged 30-34 years and a decrease in the proportion of respondents aged ≥ 35 years.
- Canadian-born (71% in 2012, 73% in 2013, 72% in 2014).
- English as their mother tongue language (61% in 2012, 64% in 2013 and 63% in 2014). Approximately 10% of respondents (9% in 2012, 10% in 2013, 11% in 2014) spoke French only as their mother tongue language. Approximately one-quarter of respondents (26% in 2012, 24% in 2013, 24% in 2014) identified a language other than English or French as their mother tongue.
- Educated with a university degree (46% in 2012, 43% in 2013, 41% in 2014). Twenty percent were highly educated with post-graduate (Masters or PhD) education (20% in 2012, 21% in 2013, 20% in 2014). Between 2012 and 2013, there was an increase in respondents with a college degree (20% in 2012, 26% in 2013, 26% in 2014).
- Having a household income of \$100,000 or more: 42% in 2012, 47% in 2013, and 45% in 2014. Approximately 10% of respondents reported an income of less than \$30,000 (11% in 2012, 8% in 2013, 8% in 2014).

Birth characteristics of the respondents

Compared to the general population of women who give birth in Ottawa (Appendix Table Alb), the IFSS sample was very similar in age, type of pregnancy (singleton and multiple) and gestational age (preterm and full term). The IFSS sample, however, had slightly more first time mothers and more caesarean section births (Appendix Table A1).

Analysis

As BORN Ontario's data are from a registry of all births in Ontario, Ottawa and Ontario-less-Ottawa estimates from this source are not presented with confidence intervals. As well, indicators using BORN Ontario data were calculated excluding any missing data.

For the IFSS, sample weights were generated to account for the probability of selection at the postpartum contact and the probability of selection into the sample. Post-stratification weights were based on the number of hospital deliveries by age per year respective to each birth cohort. Estimates calculated using IFSS and CCHS data are presented with their 95% confidence intervals (CI).

Significance testing was conducted using Chi-square testing at a significance level of $p < 0.05$. Multiple comparisons over time or between pairs were performed and adjusted using a Bonferroni correction. Findings that were statistically significant after adjustment are reported, unless otherwise stated. Findings that were significant prior to adjustment are presented, but with acknowledgement that they are important, but not statistically significantly different.

Multiple logistic regression was used to examine associations between the feeding outcomes and mother and birth characteristics collected in the IFSS six-month interview. Adjusted odds ratios and 95 percent confidence intervals are presented. Odds ratios allow us to measure the degree to which feeding outcomes are linked to mother and birth characteristics when these are held constant – that is controlling for mother and birth influences that might also be associated with the feeding outcome of interest. Data were analyzed using Stata version 13.1.

As the IFSS is a local data source, there is not a direct provincial comparator. Approximate comparisons can be made for Ontario-less-Ottawa data on breastfeeding initiation and six and 12 month duration from the 2013 CCHS. However, caution should be taken when comparing the two data sources since they collect data on breastfeeding differently. Breastfeeding indicators from the CCHS include mothers who gave birth in the last five years.

Note that in this report, an *Ontario* or *Ontario-less-Ottawa* estimate does not include Ottawa counts/responses in the numerator or denominator. Any differences between Ottawa and Ontario should be interpreted as Ottawa being different from the average of individuals across Ontario excluding those individuals from the Ottawa area.

Infant Feeding – Prenatal to six months

Intention to breastfeed

Between 2012 and 2014, the proportion of mothers in Ottawa who intended to breastfeed their infant rose slightly from 94% in 2012 to 96% in 2014. In 2014, 88% of mothers intended to exclusively breastfeed their infant (Table 3). This is higher than the proportion across the rest of Ontario where in 2014, 93% of mothers intended to breastfeed their infants and 84% intended to do so exclusively.

Nearly all mothers (96%) intended to breastfeed and first-time mothers were more likely to intend to breastfeed.

Primiparous (first-time) mothers were more likely to intend to breastfeed their infant (96% in 2012, 98% in 2014) compared to multiparous mothers (gave birth two or more times) (93% in 2012, 95% in 2014). In 2014, first-time mothers (93%) were also more likely than multiparous mothers (86%) to intend to exclusively breastfeed their infant (Table 3).

Teenage mothers (≤ 19 years of age) were less likely to intend to breastfeed (85% on average between 2012-2014) compared to mothers 20 years and older (95% on average between 2012-2014).

At birth: breastfeeding initiation

Nearly all (97%) Ottawa mothers tried^a (initiated) to breastfeed their baby (98% in 2012, 97% in 2013, and 95% in 2014) (Table 3). Fewer mothers across the rest of Ontario (91% in 2013, CCHS) reported ever having tried to breastfeed their infant.

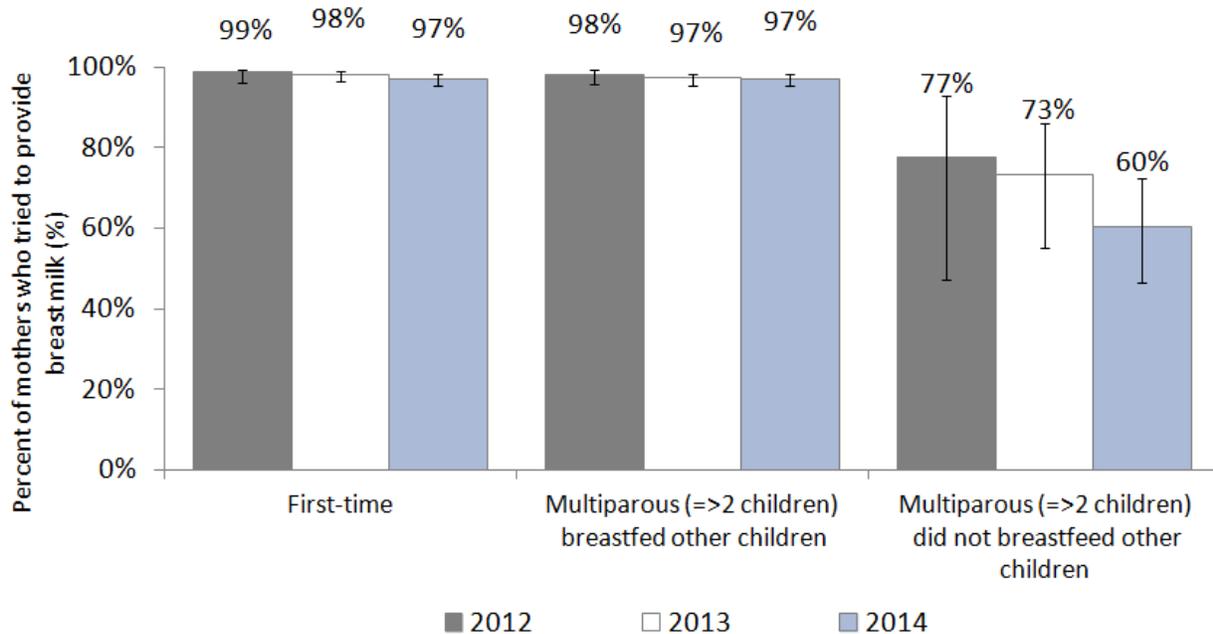
Nearly all first-time mothers tried to breastfeed and multiparous mothers who did not breastfeed other children were less likely to try again.

The proportion of first-time mothers who tried to breastfeed remained stable between 2012 and 2014 (Figure 1). The proportion of multiparous mothers with previous breastfeeding experience who tried to breastfeed also remained steady between 2012 and 2014. Multiparous mothers who did not breastfeed their other child(ren) were less likely than those who previously breastfed their other child(ren) to try to breastfeed (Figure 1). In other words, multiparous mothers who did not breastfeed earlier-born children are very unlikely to try to breastfeed their subsequent infants.

^a Mothers were asked "Have you ever tried to feed breast milk to your baby?"

Figure 1. Breastfeeding initiation among first-time and multiparous mothers.

In Ottawa, multiparous mothers who did not breastfeed their other child(ren) were less likely to try to breastfeed than mothers who had previously breastfed.



Ottawa Public Health, Infant Feeding Surveillance System.

There are maternal socio-demographic and birthing characteristics that vary from year-to-year for breastfeeding initiation (Appendix Table 2A). Previous breastfeeding experience seems to play a role in breastfeeding initiation (Figure 1). To explore relationships of maternal socio-demographic (age, immigration, mother tongue, language, education and income), birth characteristics (gestational age, type of delivery, singleton/multiple delivery) while controlling for parity, we looked at the association of these characteristics with breastfeeding initiation among first-time and multiparous mothers.

First-time mothers with a household income of \$100,000 or more were five times more likely to try to breastfeed than first-time mothers with a household income of less than \$30,000 (Appendix Table A2b).

Multiparous mothers were more likely to try to breastfeed if they had breastfed another child, had a full-term birth, were born outside Canada, were younger (20-29 years), or if they had a household income of \$30,000 or more (Appendix Table A2c).

Table 3. Breastfeeding intent, initiation and feeding upon discharge, Ottawa birth cohorts 2012 - 2014.

	2012		2013		2014	
	%	95% CI	%	95% CI	%	95% CI
Intention to breastfeed ^α	94.1	NA	95.1	NA	96.1	NA
Intention to breastfeed among first-time mothers ^α	96.0	NA	96.4	NA	97.8	NA
Intention to breastfeed among multiparous mothers ^α	93.4	NA	94.5	NA	95.2	NA
Intention to exclusively breastfeed ^β	NA		NA		88.1	
Intention to exclusively breastfeed among first-time mothers ^β	NA		NA		93.4	NA
Intention to exclusively breastfeed among multiparous mothers ^β	NA		NA		85.8	NA
Ever tried to breastfeed [£]	97.6	95.9 – 98.6	96.9	95.7 – 97.8	95.5	94.1 – 96.6
Ever tried to breastfeed among first-time mothers [£]	98.7	96.1 – 99.6	98.1	96.5 – 99.0	97.2	95.4 – 98.3
Ever tried to breastfeed among multiparous mothers who previously breastfed [£]	98.2	95.8 – 99.3	97.3	95.5 – 98.4	97.2	95.3 – 98.4
Ever tried to breastfeed among multiparous mothers who did not previously breastfeed [£]	77.5	47.2 – 93.0	73.4	55.0 – 86.1	60.2	46.5 – 72.5
Any breastfeeding on discharge from hospital or midwifery care ^α	91.9	NA	92.5	NA	94.2	NA
Any breastfeeding on discharge among first-time mothers ^α	94.7	NA	94.7	NA	96.1	NA
Any breastfeeding on discharge among multiparous mothers ^α	90.8	NA	91.5	NA	93.2	NA
Exclusive breastfeeding on discharge from hospital or midwifery care ^α	61.3	NA	62.8	NA	59.6	NA
Exclusive breastfeeding on discharge among first-time mothers ^α	61.2	NA	62.8	NA	58.3	NA
Exclusive breastfeeding on discharge among multiparous mothers ^α	60.7	NA	62.8	NA	60.2	NA

^α Data are from the Better Outcomes Registry & Network (BORN Ontario). Extracted 10-July-2015 and 21-July 2015

^β Intention to exclusively breastfeed became available in BORN in April 2014.

[£] Ottawa Public Health, Infant Feeding Surveillance System.

CI – Confidence Interval. NA – not available.

Birth to six months: any breastfeeding

Between 2012 and 2014, upon discharge from hospital or midwifery care, the proportion of mothers in Ottawa who breastfed their infant increased slightly from 92% in 2012 to 93% in 2013 to 94% in 2014 (Table 3). This was higher than the Ontario-less-Ottawa proportion where 84% in 2012, 90% in 2013 and 90% in 2014 breastfed their infants on discharge from hospital or midwifery care.

Nine out of ten mothers breastfed upon discharge from hospital or midwifery care.

From 2012 to 2014, the proportion of Ottawa mothers who breastfed their infants declined as their infants grew older (Figure 2). The proportion of mothers breastfeeding at two weeks of age decreased slightly but not significantly ($p=0.056$) between 2012 (94%) and 2014 (91%). However, the proportions of any breastfeeding at the other infant ages were similar for each year. At six months of age, an average of 69% (68% in 2012, 72% in 2013, 68% in 2014) of mothers breastfed their infant (Figure 2). Fewer mothers across the rest of Ontario (59% in 2013, CCHS) reported breastfeeding their infant at six months of age.

First-time mothers (95% in 2012, 95% in 2013, 96% in 2014) were more likely than multiparous mothers (91% in 2012, 92% in 2013, 93% in 2014) to breastfeed their infants when they were discharged from the hospital or midwifery care (Table 3). At two weeks after birth, there was no difference in any breastfeeding between first-time (95% in 2012, 92% in 2013, 93% in 2014) and multiparous mothers (94% in 2012, 92% in 2013, 90% in 2014).

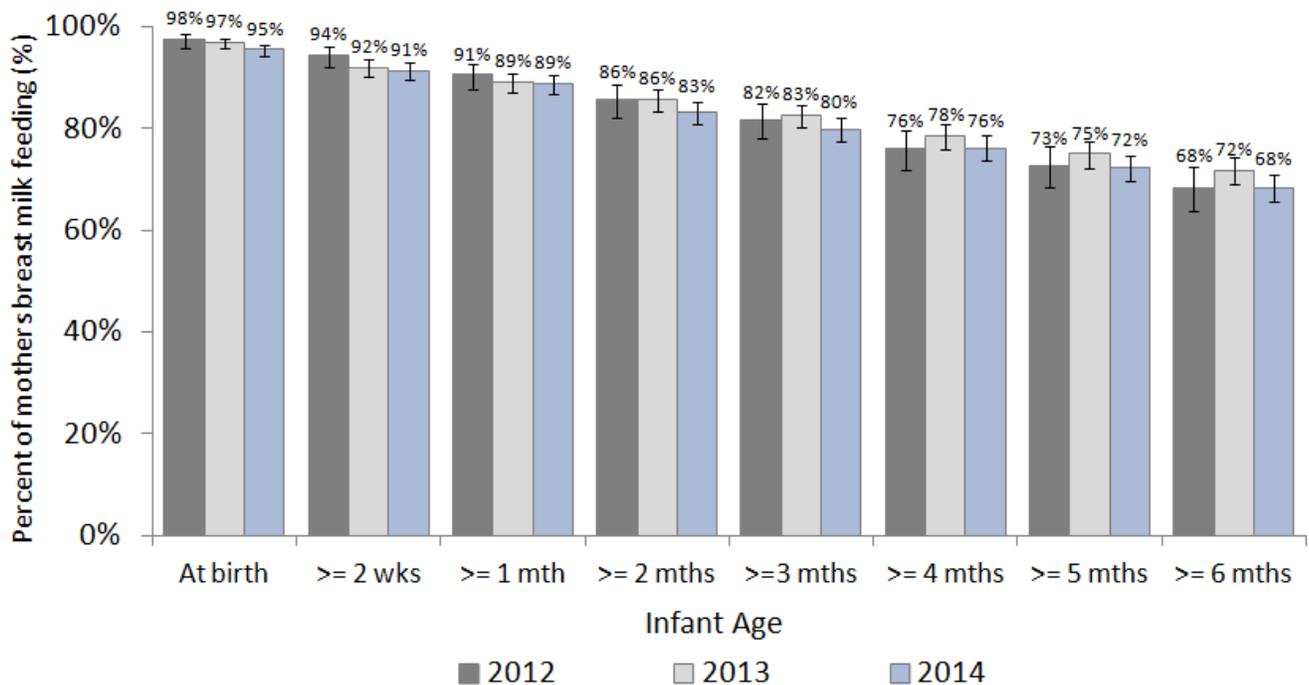
Approximately 70% of mothers breastfed when their baby was six months old.

Similar to mothers who ever tried to breastfeed, there are maternal socio-demographic and birthing characteristics that vary year-to-year (Appendix Table A3a). Previous breastfeeding experience may also play a role in breastfeeding duration. To explore relationships of mother socio-demographic (age, immigration, mother tongue language, education, income), birth characteristics (gestational age, type of delivery, singleton/multiple delivery) and other feeding characteristics (formula supplementation in-hospital, introduction of cereal before six months of age and introduction of other foods before six months of age) while controlling for previous breastfeeding experience, we looked at the association of these characteristics with any breastfeeding at six months among first-time mothers (Appendix Table A3b).

Among first-time mothers, the strongest predictor of any breastfeeding at six months was not providing formula in the hospital (OR = 4.8). Waiting until six months to introduce cereal (OR = 2.2) was also a predictor of any breastfeeding at six months of age among first-time mothers. In addition, first-time mothers who were post-graduates (Masters or PhD) were twice as likely as first-time mothers with high school education or less and first-time mothers with French mother tongue were half as likely as first-time mothers with English mother tongue to breastfeed at six months of age (Appendix Table A3b).

Figure 2. Any breastfeeding by infant age.

Approximately 70% of Ottawa mothers breastfed until their infant was six months or older.



Ottawa Public Health, Infant Feeding Surveillance System.

Birth to six months: exclusive breastfeeding

The proportion of Ottawa mothers exclusively breastfeeding upon discharge from hospital or midwifery care remained at 61% in 2012 and 60% in 2014 (Table 3). In 2014, among mothers who intended to exclusively breastfeed their infants almost all of them (98%) were breastfeeding upon discharge from hospital or midwifery care and 65% were doing so exclusively.

By the time infants were two weeks old, an average of 39% of mothers were breastfeeding exclusively (39% in 2012, 37% in 2013, 41% in 2014). While the decline in exclusive breastfeeding was small between two weeks (39%) and four months of age (27%), it was more apparent between four and five months (20%) with a larger drop-off of exclusive breastfeeding happening between five and six months of age. On average, 8% of mothers reported breastfeeding exclusively at six months of age or more and the prevalence of exclusive breastfeeding was similar from 2012 to 2014 (8% in 2012, 9% in 2013, 8% in 2014) (Figure 3).

60% of mothers exclusively breastfed on discharge from hospital and this dropped to 38% by two weeks of age. At two weeks of age, first-time mothers were less likely than multiparous mothers to breastfeed exclusively.

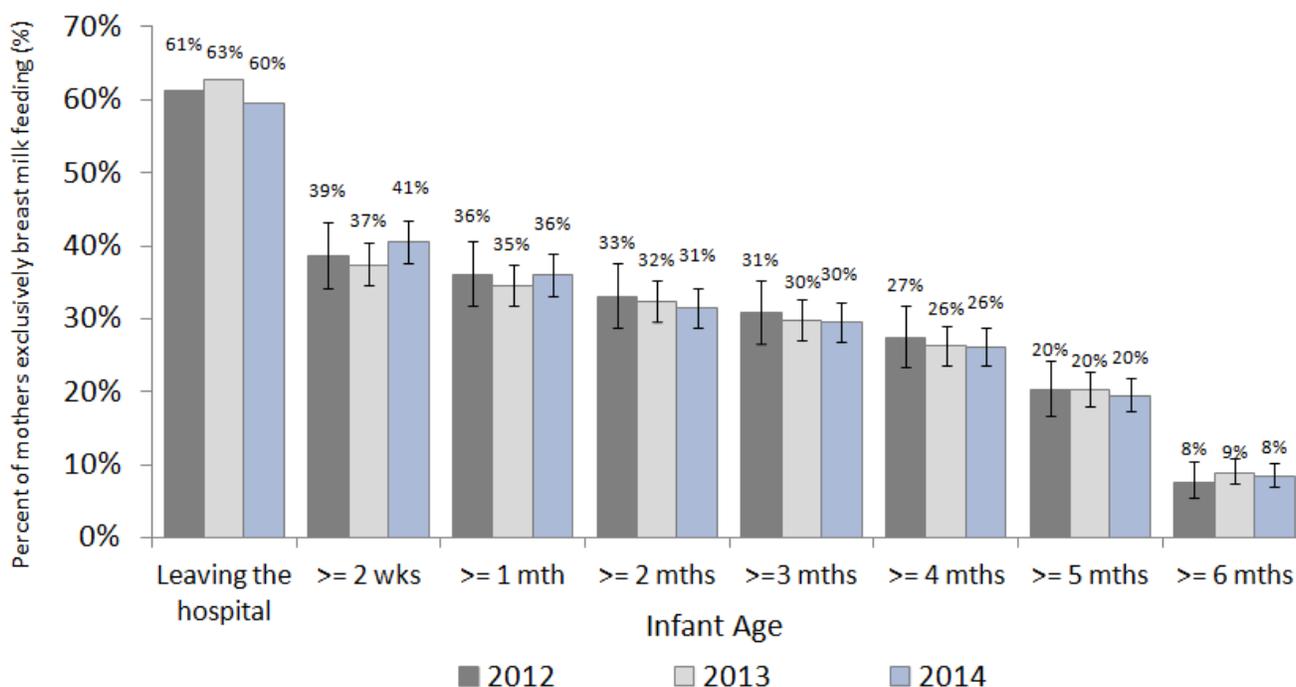
There was no difference in the proportion of first-time and multiparous mothers who were breastfeeding exclusively when they were discharged from the hospital or midwifery care. However, at two weeks, first-time mothers (33% in 2012, 31% in 2013, 39% in 2014) were less likely to breastfeed exclusively compared to multiparous mothers (45% in 2012, 43% in 2014, 43% in 2014).

Since the prevalence of exclusive breastfeeding is low, data were combined across all years of the sample to explore mother socio-demographic and birthing characteristics relationships with exclusive breastfeeding at six months among first-time mothers (Appendix Table A4a). Mother’s age, immigration, and income were removed from the model as no significant association was found. The reduced model included gestational age, type of delivery, mother tongue language and mother’s education (Appendix Table A4b).

The strongest predictor of exclusive breastfeeding at six months of age among first-time mothers was education. Among first-time mothers, those who were post-graduates (Masters or PhD) were nearly six times as likely- and those who were college or university graduates were three and a half times as likely as those with high school education or less to breastfeed at six months of age. First-time mothers who had a vaginal birth were nearly twice as likely to breastfeed exclusively at six months of age as those who had a caesarean-section (Appendix Table A4b).

Figure 3. Exclusive breastfeeding by infant age.

On average, 60% of mothers exclusively breastfed on discharge from hospital or midwifery care and this drops to 38% by two weeks of age.



Leaving the hospital includes discharge from midwifery care. Better Outcomes Registry & Network (BORN Ontario). Extracted 21-July 2015 (Confidence intervals are not calculated).
 >= 2 wks to >= 6 mths: Ottawa Public Health, Infant Feeding Surveillance System.

Reasons for breastfeeding cessation before six months of age

Breastfeeding can be affected by various social and environmental factors. It is important to understand a mother's reasons for stopping breastfeeding, particularly if cessation occurs before an infant is six months old. This information may help to design interventions to reduce discrepancies between a mother's desired breastfeeding goals and her actual breastfeeding duration and to prepare mothers to succeed in their breastfeeding experience.

Perceived or real inadequate milk supply was the most common reason for breastfeeding cessation before six months of age.

If a mother indicated that she stopped breastfeeding before her infant was six months old, she was asked to indicate her reasons for stopping to breastfeeding. Categories were created from the responses that mothers provided and the extended list of reasons can be found in Appendix Table A5. The most common reason for breastfeeding cessation before six months was a perceived or real inadequate milk supply (56%), followed by difficulty with breastfeeding (24%), and a medical condition of the mother or infant (13%). Table 4 lists other common reasons for breastfeeding cessation before six months of age. Reasons for breastfeeding cessation that were stated by fewer than 2% of mothers include: advice of a health professional, mother planned to wean at a particular age, nutritional concerns, infant was ready for solid foods, embarrassed to breastfeed, and formula equally as healthy as breast milk.

Table 4. The most common reasons for breastfeeding cessation before six months of age, Ottawa birth cohorts 2012-2014.

2012- 2014 (N=757)				
Rank	Reason	%	95% CI	
1	Milk supply concerns	55.7	51.8 – 59.6	
2	Difficulty breastfeeding	23.8	20.7 – 27.3	
3	Medical condition of mother or infant	12.7	10.3 – 15.5	
4	Inconvenience, fatigue, lack of time, breastfeeding too demanding	8.6	6.7 – 11.2	
5	Baby was ready, preferred formula, or refused the breast	6.5	4.9 – 8.7	
6	Lifestyle reasons	4.2*	3.0 – 5.9	
7	Return to work or school	3.0*	1.9 – 4.7	
8	Intolerance/allergy to breast milk	2.0*	1.1 – 3.4	
9	Advice of health professional	1.4*	0.7 – 2.6	
9	Mother planned to wean	1.4*	0.7 – 2.6	

CI – Confidence Interval *Interpret with caution – high sampling variability.
Ottawa Public Health, Infant Feeding Surveillance System.

Birth to six months: formula supplementation and feeding

In the IFSS, mothers were asked if their baby was given formula in the hospital. Forty five percent of infants who were initiated on breast milk were also given formula in the hospital (47% in 2012, 43% in 2013, 46% in 2014).

According to BORN, in 2014, 35% of mothers who intended to exclusively breastfeed their infant were providing formula upon discharge from hospital. Twenty percent of those who intended to breastfeed exclusively and provided formula did so for infant-related medical reasons and one percent did so for mother-related medical reasons (Table 5).

Close to half of breastfed infants were supplemented with formula in-hospital and three quarters of mothers reported introducing formula before 6 months of age.

On average, 74% of mothers reported introducing formula before six months of age (Table 5): 6% were feeding formula, 25% were feeding formula and had introduced complementary solids, 12% were breastfeeding and fed formula but had not introduced other complementary solids, and 31% fed formula and breast milk and had introduced other complementary solids before six months of age (Table 6).

Table 5. Formula supplementation and feeding from birth to six months of age, Ottawa birth cohorts 2012-2014.

	2012		2013		2014	
	%	95% CI	%	95% CI	%	95% CI
Formula feeding in-hospital among mothers who tried to breastfeed [£]	46.6	41.9 – 51.4	42.7	39.7 – 45.7	46.5	43.5 – 49.5
Formula feeding upon discharge from hospital or midwifery care among mothers who intended to breastfeed exclusively ^β	NA		NA		35.1	
Infant or mother medical indication for formula feeding upon discharge from hospital or midwifery care among mothers who intended breastfeed exclusively ^β	NA		NA		20.2 (infant) 1.3 (mother)	NA
Formula feeding before six months [£]	75.1	70.8 – 78.9	71.3	68.5 – 73.9	75.6	73.0 – 78.0

^α Better Outcomes Registry & Network (BORN Ontario). Extracted 10-July-2015 and 21-July 2015

^β Intention to breastfeed exclusively became available in BORN in April 2014.

[£] Ottawa Public Health, Infant Feeding Surveillance System.

CI – Confidence Interval. NA – not available.

Table 6. Breastfeeding, formula feeding and introduction of complementary solids before six months of age, Ottawa birth cohorts 2012-2014.

	2012		2013		2014	
	%	95% CI	%	95% CI	%	95% CI
Formula feeding (no breast milk) and have not introduced complementary solids at six months	5.2	3.6 – 7.7	5.5	4.3 – 7.1	5.9	4.6 – 7.4
Formula feeding (no breast milk) and have introduced complementary solids at six months	26.5	22.6 – 30.8	22.8	20.4 – 25.5	26.0	23.5 – 28.6
Breastfeeding at six months of age and have introduced formula but not complementary solids	13.7	10.9 – 17.3	11.2	9.5 – 13.3	11.9	10.1 – 13.9
Breastfeeding at six months of age and have introduced formula and complementary solids	29.6	25.5 – 34.0	31.7	28.9 – 34.5	31.9	29.3 – 34.7
Breastfeeding at six months of age and have introduced complementary solids but not formula	17.3	14.0 – 21.1	19.8	17.5 – 22.3	16.0	14.0 – 18.3
Exclusively breastfeeding at six months	7.7	5.5 – 10.5	9.0	7.4 – 10.8	8.4	6.9 – 10.2

Ottawa Public Health, Infant Feeding Surveillance System.
 CI – Confidence Interval. NA – not available.

Reasons for introducing formula before six months of age

It is important to understand a mother's reasons for introducing formula as a means to supplement breast milk or as an exclusive way of feeding.

If a mother indicated that she had fed formula to her infant, she was asked to indicate the main reason for doing so.

Categories were created from the responses that mothers provided and the extended list of reasons can be found in Appendix Table A6. The most common reason for introducing formula before six months was a perceived or real inadequate milk supply (54%), followed by a medical condition of the mother or infant (18%), and difficulty with breastfeeding (14%). Table 7 lists other common reasons for introducing formula before six months of age. Reasons for introducing formula that were stated by fewer than 1% of mothers include: preterm birth, baby was ready for solids, intolerance or allergic to breast milk (perceived or real), c-section or difficult delivery, personal choice, embarrassed to breastfeed, lack of information, formula equally healthy, lack of instruction, formula easy to access or given free samples, felt they had no choice, and being pregnant.

Perceived or real inadequate milk supply was the most common reason for providing formula before six months of age.

Table 7. The most common reasons for introducing formula before six months of age, Ottawa birth cohorts 2012-2014.

2012- 2014 (N=2003)			
Rank		%	95% CI
1	Milk supply concerns	54.0	51.5 – 56.4
2	Medical condition of mother or infant	17.7	15.9 – 19.6
3	Difficulty breastfeeding	14.4	12.8 – 16.1
4	Lifestyle reasons	9.0	7.9 – 10.4
5	Inconvenience, fatigue, lack of time, breastfeeding too demanding	6.4	5.3 – 7.7
6	Mother planned to wean/introduce formula	4.5	3.6 – 5.7
7	Return to work or school	2.8	2.0 – 3.7
8	Advice of health professional	2.4	1.8 – 3.3
9	Baby self-weaned, preferred formula, or refused the breast	1.7*	1.2 – 2.5

CI – Confidence Interval *Interpret with caution – high sampling variability. Ottawa Public Health, Infant Feeding Surveillance System.

Birth to six months: Introduction of complementary foods

Over two-thirds of mothers (69% in 2012, 67% in 2013, 69% in 2014) reported that they introduced complementary foods before six months of age: on average, 25% were feeding formula and complementary solids, 31% were feeding breast milk, formula and complementary solids, and 18% were feeding breast milk and complementary solids (Table 6). Cereal was the most commonly introduced solid before six months of age (Table 8).

Two thirds of mothers introduced complementary foods before six months of age.

Table 8. The proportion of mothers introducing complementary foods before six months of age, Ottawa birth cohorts 2012-2014.

	2012		2013		2014		2012 - 2014	
	%	95% CI						
Cereal	64.0	59.5 – 68.4	62.5	59.6 – 65.4	63.2	60.3 – 65.9	63.2	61.2 – 65.2
Other foods	44.3	39.7 – 49.0	44.2	41.2 – 47.2	51.0	48.0 – 53.9	46.4	44.3 – 48.5
Water	36.6	32.2 – 41.2	35.7	32.8 – 38.6	35.6	32.8 – 38.4	36.0	34.0 – 38.0
Sugar water	11.0	8.3 – 14.3	20.9	18.6 – 23.5	12.1	10.3 – 14.1	14.7	13.3 – 16.2
Juice	4.1*	2.5 – 6.5	3.6	2.7 – 5.0	4.7*	3.6 – 6.2	4.1	3.4 – 5.1
Milk	NR		NR		NR		0.9*	0.5 – 1.3

CI – Confidence Interval. NR – Data are not reportable due to small sample size.

*Interpret with caution – high sampling variability.

Ottawa Public Health, Infant Feeding Surveillance System.

Reasons for introducing complementary foods before six months of age

It is important to understand a mother’s main reason for first introducing complementary foods if they are introduced before the recommended age of six months.

If a mother indicated that she had introduced infant cereal or other foods, she was asked what her main reason was for first introducing solid foods.

The most common reason for introducing solid foods was that the infant was ready for solids (41%). This includes reference to the mother reporting that the infant was ready, was the right age, or the infant was interested, curious, reaching or grabbing for food. Nearly 32% of mothers stated that a health professional advised them to start solid foods before their infant was six months old. Approximately 14% of mothers started giving solids before six months of age because they thought their infant was not getting enough milk (Table 9).

“My baby was ready for it” and “My health care provider recommended it” were the most common reasons for introducing complementary foods before six months of age.

Table 9. The most common reasons for introducing solid foods, Ottawa birth cohorts 2012-2014.

2012- 2014 (N=1782)			
Rank	Reasons	%	95% CI
1	Ready for solids	41.4	39.0 – 44.0
2	Advice of health professional	31.5	29.1 – 33.9
3	Milk not enough	13.9	12.3 – 15.8
4	Baby sleep	3.3	2.5 – 4.4
5	General knowledge	3.1	2.3 – 4.1
6	Weight concerns	2.6*	1.8 – 3.7
7	Advice of social network	0.9*	0.5 – 1.5
8	Other media (online, pamphlets, books, course)	0.6*	0.3 – 1.1
9	Getting baby used to solids/textures/taste	0.5*	0.2 – 0.8

CI – Confidence Interval *Interpret with caution – high sampling variability.
Ottawa Public Health, Infant Feeding Surveillance System.

Infant feeding – Six to 12 months and beyond

Six to 12 months: any breastfeeding

Mothers who indicated that they were breastfeeding when their infant was six months old were asked to be contacted when their infant was 12 months old. Mothers who were not breastfeeding their infant at six months of age were assumed not to be breastfeeding their infant at 12 months of age and are included as not breastfeeding at 12 months. As 42% of the sample of mothers (birth cohorts 2012 and 2013) providing breast milk at six months were either lost-to-follow-up or refused to participate in the 12-month survey, it is difficult to estimate overall 12-month breastfeeding prevalence without caution. The estimates provided can be understood as a minimum prevalence since it is likely that a number of mothers who were lost-to-follow-up or refused to participate were still breastfeeding when their infant was 12 months of age.

At least 23% of mothers continued to breastfeed at 12 months of age.

At minimum, 23% of Ottawa mothers (21% in 2012 and 25% in 2013) continued to breastfeed their infant at 12 months of age (Table 10). Since those mothers who were lost-to-follow-up or refused to be contacted at 12 months were all breastfeeding at six months of age, it is likely that this estimate is higher. Across the rest of Ontario, 17% (2013, CCHS) of mothers reported breastfeeding their infant for one year or more.

Table 10. Proportion of mothers who are breastfeeding at 12 months, Ottawa birth cohorts 2012-2013.

	2012		2013		2012-2013	
	%	95% CI	%	95% CI	%	95% CI
Breastfeeding	21.4	17.9 – 25.3	25.0	22.5 – 27.7	23.2	21.0 – 25.5
Not breastfeeding	47.9	43.3 – 52.5	47.1	44.1 – 50.1	47.5	44.8 – 50.3
Lost-to-follow-up	27.1	23.1 – 31.4	25.5	22.9 – 28.2	26.3	23.9 – 28.8
Refused to be contacted at 12 months	3.7*	2.3 – 5.8	2.4*	1.6 – 3.5	3.0	2.2 – 4.2

CI – Confidence Interval *Interpret with caution – high sampling variability.

Lost-to-follow-up means that the mother consented but was not able to be reached for the 12 month survey.

Ottawa Public Health, Infant Feeding Surveillance System.

Of the mothers who were breastfeeding their infant at six months and completed the 12 month survey, 67% stopped breastfeeding between eight and less than 12 months of age. The most common infant age for stopping breastfeeding was between 11 to less than 12 months of age (22% stopped breastfeeding), followed by eight to less than nine months (17%) and ten to less than 11 months of age (17%) (Table 11).

Table 11. Proportion of mothers who stop breastfeeding between six and 12 months by age of cessation, Ottawa birth cohorts 2012-2013.

July 2012- December 2013 (N=222)

Infant Age	%	95% CI
6 months to <7 months	5.1*	2.9 – 8.9
7 months to <8 months	13.8*	9.0 – 20.7
8 months to <9 months	16.9*	11.8 – 23.6
9 months to <10 months	12.1*	8.1 – 17.6
10 months to <11 months	16.8*	11.9 – 23.3
11 to <12 months	21.6	16.0 – 28.4
12 months or more	13.7*	9.2 – 20.0

CI – Confidence Interval *Interpret with caution – high sampling variability.
Ottawa Public Health, Infant Feeding Surveillance System.

Reasons for breastfeeding cessation between six and 12 months

Reasons for breastfeeding cessation between six and 12 months of age likely differ compared to reasons for breastfeeding cessation before six months of age given the recommendations to introduce complementary foods at six months of age and the fact that a number of mothers prepare to or have returned to work around this time period.^{4,5} Despite this, the WHO and Health Canada recommend that mothers continue breastfeeding until at least two years of age.^{1,4}

Return to work or school and inadequate milk supply concerns were the most common reasons for breastfeeding cessation between six and 12 months.

Mothers who indicated that they had stopped breastfeeding before their child was 12 months old were asked to indicate the reasons that they stopped breastfeeding. Categories were created from the responses provided by mothers and the extended list of reasons can be found in Appendix Table A7. The most common reason for stopping breastfeeding between six and 12 months was a return to work or school (25%), followed by a perceived or real inadequate milk supply (22%), and difficulty with breastfeeding (11%). Table 12 lists other common reasons for introducing formula before six months of age. Reasons for breastfeeding cessation that were stated by fewer than 4% of mothers include: insufficient baby weight gain, pumping milk was too much work, pregnant or trying to conceive, mother planned to wean at a particular age or achieved her breastfeeding goals, mother-baby separation due to travel, mother medical condition, sleep, baby not satisfied with breast milk, wanted to use formula or formula is easier to use, felt baby overly attached to mother, interference with social life, wanting other family members involved in feeding, advice of health professional, lack of time or breastfeeding too demanding, wanting your body back and diet intolerances.

Table 12. The most common reasons for breastfeeding cessation between six and 12 months of age, Ottawa birth cohorts 2012-2013.

July 2012- December 2013 (N=237)			
Rank		%	95% CI
1	Return to work or school	24.7	19.1 – 31.3
2	Milk supply concerns	22.4	17.2 – 28.6
3	Difficulty breastfeeding	11.0*	7.3 – 16.3
4	Baby self-weaned, preferred formula, or refused the breast	8.3*	5.1 – 13.1
5	Baby was too old or big enough	7.4*	4.5 – 11.8
6	Teething	7.2*	4.5 – 11.1
7	Started baby on alternate milk	6.9*	4.0 – 11.7
8	Mother did not want to provide breast milk anymore	5.7*	3.0 – 10.3

CI – Confidence Interval *Interpret with caution – high sampling variability.
Ottawa Public Health, Infant Feeding Surveillance System.

Intention to continue breastfeeding past 12 months

Mothers who indicated that they were still breastfeeding at the 12-month survey were asked how long they planned to continue breastfeeding their child. Forty five percent of mothers who breastfeeding at 12 months indicated that they would continue to breastfeed until their child self weans or is no longer interested. Forty three percent of mothers who breastfeeding at 12 months reported that they would continue to breastfeed until a specific age, with approximately 20% planning to stop when their child is between 13 and 15 months, 12% planning to stop when their child is 18 months old and 9% planning to stop when their child is 24 months old (Table 13).

Close to half of mothers breastfeeding at 12 months will continue until their child self-weans.

Table 13. Proportion of mothers breastfeeding at 12 months who plan to continue, Ottawa birth cohorts 2012-2014.

July 2012- December 2013 (N=375)

How long do you plan to continue feeding breast milk to your baby?	%	95% CI
Until child is a specific age:	42.7	36.7 – 48.8
13 months old	7.2*	4.5 – 11.3
14 months old	8.4*	5.4 – 12.9
15 months old	4.6*	2.6 – 8.0
16-17 months old	NR	
18 months old	11.7*	8.3 – 16.1
19 to <24 months old	NR	
24 months old	9.0*	6.1 – 13.1
Until child self weans or is no longer interested	45.4	39.5 – 51.5
Don't know	12.7	9.2 – 17.4

CI – Confidence Interval *Interpret with caution – high sampling variability.

NR – Data are not reportable due to small sample size.

Ottawa Public Health, Infant Feeding Surveillance System.

Intention to breastfeed future children

While a high proportion of mothers said that if they were to become pregnant again, they would consider breastfeeding as an option to feed their infant (98% in 2012, 95% in 2013, 94% in 2014), this proportion decreased slightly between 2012 and 2014.

Nearly all mothers intended to breastfeed future children.

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Appendix

Table A1a. Birth characteristics of Ottawa mothers, 2012-2014.

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)	
	No.	%	No.	%	No.	%
Age categories						
<=19	8	1.7	17	1.6	16	1.4
20-29	125	27.2	324	30.4	326	29.0
30-34	162	35.2	429	40.3	470	41.9
>=35	165	35.9	295	27.7	311	27.7
Type of pregnancy						
Singleton	449	97.6	1047	98.3	1107	98.6
Multiple	11	2.4	18	1.7	16	1.4
Mode of delivery						
Vaginal	326	70.9	712	66.9	759	67.6
C-section	134	29.1	352	33.1	364	32.4
Missing	0	0	1	0.1	0	0
Gestational Age						
Preterm	30	6.5	78	7.3	70	6.2
Full term	426	92.6	979	91.9	1051	93.6
Don't know	4	0.9	1	0.1	1	0.1
Missing	0	0	7	0.7	1	0.1
Parity						
Primiparous	223	48.5	510	47.9	577	51.4
Multiparous	231	50.2	552	51.8	540	48.1
Missing	6	1.3	3	0.3	6	0.5
Birth country						
Canada	326	70.9	775	72.8	811	72.2
Other	128	27.8	281	26.4	306	27.2
Missing	6	1.3	9	0.8	6	0.5
Mother tongue language						
English only	281	61.1	686	64.4	707	63.0
French only	40	8.7	103	9.7	120	10.7
English and French	4	0.9	5	0.5	18	1.6
English and other	2	0.4	2	0.2	4	0.4
French and other	2	0.4	2	0.2	2	0.2
Other only	118	25.7	255	23.9	265	23.6
Don't know	1	0.2	0	0	0	0
Missing	12	2.6	12	1.1	7	0.6

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)	
	No.	%	No.	%	No.	%
Highest level of education						
High school or less	56	12.2	107	10.1	144	12.9
College	92	20	275	25.9	294	26.3
University	212	46.1	454	42.8	456	40.9
Post-graduate	92	20	226	21.3	221	19.8
Refused	2	0.4	0	0	1	0.1
Missing	6	1.3	0	0	0	0
Household income						
<\$30K	49	10.7	81	7.6	87	7.7
\$30K - <\$70K	67	14.6	154	14.5	180	16.0
\$70K - <\$100K	90	19.6	149	14	164	14.6
>=\$100K	191	41.5	501	47	506	45.1
Don't know	20	4.3	58	5.4	72	6.4
Refused	37	8	119	11.2	107	9.5
Missing	6	1.3	3	0.3	7	0.6

K – Thousand.

Ottawa Public Health, Infant Feeding Surveillance System.

Table A1b. Birth characteristics of Ottawa mothers, 2012-2014.

	2012 %	2013 %	2014 %
Age categories			
<=20	2	2	1
20-29	33	33	32
30-34	38	39	38
>=35	26	26	26
Parity			
Primiparous	43	44	44
Multiparous	57	56	55
Mode of delivery			
Vaginal	72.1	72.6	72.0
C-section	27.9	27.4	28.0
Gestational Age			
Preterm	7	7	7
Full term	93	92	93
Birth			
Singleton	98	98	98
Multiple	2	2	2

Data are from the Better Outcomes Registry & Network (BORN Ontario). Extracted 8-September-2015

Table A2a. Socio-demographic and birth profile of breast milk feeding initiation, Ottawa birth cohorts 2012-2014.

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)		2012- 2014 (N=2648)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Age categories								
<=19	87.5	45.6 – 98.3	94.1	67.4 – 99.2	93.8	65.9 – 98.1	91.6	75.1 – 97.5
20-29	98.4	93.8 – 99.6	97.2	94.8 – 98.6	94.5	91.4 – 96.5	96.7	95.2 – 97.8
30-34	100		96.5	94.3 – 97.9	96.2	94.0 – 97.6	97.6	96.6 – 98.3
>=35	93.9	89.1 – 96.7	97.3	94.7 – 98.6	95.8	92.9 – 97.6	95.7	93.8 – 97.0
p-value	0.002		0.820		0.692		0.069	
Parity								
Primiparous	98.7	96.1 – 99.6	98.1	96.5 – 99.0	97.2	95.4 – 98.3	98.0	97.0 – 98.6
Multiparous	97.3	94.7 – 98.6	96.0	93.9 – 97.3	93.5	91.1 – 95.4	95.6	94.4 – 96.6
p-value	0.254		0.044		0.004		0.001	
Mode of delivery								
Vaginal	97.3	95.1 – 98.6	98.1	96.9 – 98.9	96.0	94.3 – 97.2	97.2	96.2 – 97.9
C-section	98.3	94.9 – 99.5	94.3	91.3 – 96.3	94.5	91.6 – 99.4	95.2	93.2 – 96.6
p-value	0.479		0.001		0.267		0.041	
Gestational Age								
Preterm	95.2	82.7 – 98.8	94.9	87.3 – 98.1	92.5	83.1 – 96.8	94.3	89.8 – 96.9
Full term	97.8	96.0 – 98.8	97.0	95.8 – 97.9	95.7	94.3 – 96.8	96.8	96.1 – 97.5
p-value	0.311		0.295		0.223		0.068	
Birth								
Singleton	98.1	96.4 – 99.0	97.1	95.8 – 97.9	95.4	94.0 – 96.5	96.9	96.1 – 97.5
Multiple	80.0	51.8 – 93.7	88.4	63.6 – 97.1	NR		87.6	72.9 – 94.8
p-value	0.000		0.039		--		0.001	
Birth country								
Canada	97.3	95.1 – 98.5	96.1	94.5 – 97.3	94.5	92.6 – 95.9	94.5	92.6 – 95.9
Other	99.4	96.0 – 99.9	99.3	97.1 – 99.8	98.1	95.8 – 99.2	98.1	95.8 – 99.2
p-value	0.097		0.009		0.009		0.009	
Mother tongue language								
English	97.4	95.0 – 98.6	97.0	95.4 – 98.0	94.8	92.8 – 96.1	96.4	95.4 – 97.2
French	96.5	87.2 – 99.1	92.5	85.8 – 96.2	93.6	88.1 – 96.6	94.1	90.9 – 96.3
Other	99.4	95.8 – 99.9	98.8	96.5 – 99.6	98.3	95.9 – 99.3	98.9	97.8 – 99.4
p-value	0.27		0.006		0.031		0.000	
Highest level of education								
High school or less	97.6	90.9 – 99.4	92.4	85.6 – 96.2	89.1	83.0 – 93.3	93.2	90.0 – 95.4
College or University	97.5	95.3 – 98.7	97.2	95.7 – 98.2	95.7	94.0 – 96.9	96.8	95.9 – 97.5
Post-graduate	99.2	94.3 – 99.9	98.7	96.0 – 99.6	99.1	96.5 – 99.8	99.0	97.7 – 99.6
p-value	0.558		0.006		0.000		0.000	

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)		2012- 2014 (N=2648)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Household income								
<\$30K	93.8	84.6 – 97.7	96.1	88.7 – 98.8	87.1	78.7 – 92.5	92.5	88.3 – 95.3
\$30K - <\$70K	98.9	92.6 – 99.9	97.0	93.0 – 98.7	92.4	87.6 – 95.5	96.0	93.8 – 97.4
\$70K - <\$100K	98.6	91.0 – 99.8	98.5	94.3 – 99.6	96.4	92.1 – 98.4	97.9	95.8 – 99.0
>=\$100K	97.9	95.1 – 99.1	96.9	95.0 – 98.1	98.4	96.9 – 99.2	97.7	96.7 – 98.4
p-value	0.182		0.698		0.000		0.000	

NR – Data are not reportable due to small sample size. K – Thousand. CI – Confidence Interval
Ottawa Public Health, Infant Feeding Surveillance System.

Table A2b. Multiple logistic regression: Mother socio-demographic and birth characteristics associated with breastfeeding initiation for first-time mothers, adjusted odds ratios (OR), Ottawa birth cohort 2012-2014.

July 2012- December 2014 (N=877)

	OR	95% CI	p-value
Gestational Age			
Preterm	1.0		
Full term	1.6	0.5 – 5.2	0.399
Mother tongue language			
English	1.0		
French	1.2	0.3 – 4.2	0.798
Other	-		
Household income			
<\$30K	1.0		
\$30K - <\$70K	2.0	0.5 – 8.4	0.340
\$70K - <\$100K	1.4	0.3 – 5.9	0.642
>=\$100K	5.0	1.2 – 20.2	0.023

OR – Odds ratio. CI – Confidence Interval. K – Thousand.
Ottawa Public Health, Infant Feeding Surveillance System.

Age, education, immigration, mode of delivery, and singleton/multiple delivery are not included in the model as they were not significant in the full model and the model fit better without them. Hosmer-Lemeshow goodness-of-fit test p=0.25.

Table A2c. Multiple logistic regression: Mother socio-demographic and birth characteristics associated with breastfeeding initiation for multiparous mothers, adjusted odds ratios (OR), Ottawa birth cohort 2012-2014.

July 2012- December 2014 (N=1092)

	OR	95% CI	p-value
Breastfed another child			
No	1.0		
Yes	17.7	8.3 – 37.7	0.000
Age categories			
<=19	--		
20-29	1.0		
30-34	0.5	0.1 – 1.7	0.252
>=35	0.2	0.1 – 0.6	0.008
Gestational Age			
Preterm	1.0		
Full term	3.6	1.1 – 11.8	0.035
Birth country			
Canada	1.0		
Other	5.9	1.2 – 29.0	0.030
Mother tongue language			
English	1.0		
French	0.3	0.1 – 0.7	0.004
Other	1.0	0.2 – 5.9	0.983
Highest level of education			
High school or less	1.0		
College or University	0.8	0.2 – 3.2	0.780
Post-graduate	2.5	0.4 – 15.7	0.331
Household income			
<\$30K	1.0		
\$30K - <\$70K	3.4	1.1 – 10.7	0.039
\$70K - <\$100K	22.1	3.8 – 126.8	0.001
>=\$100K	9.0	2.7 – 29.6	0.000

OR – Odds ratio. CI – Confidence Interval. K – Thousand.

Ottawa Public Health, Infant Feeding Surveillance System.

Mode of delivery and singleton/multiple delivery are not included in the model as they were not significant in the full model and the model fit better without them.

Hosmer-Lemeshow goodness-of-fit test p=0.000.

Table A3a. Mother socio-demographic and birth characteristics of any breast milk feeding at six months of age, Ottawa birth cohorts 2012-2014.

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)		July 2012 – Dec 2014 (N=2648)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Age categories								
<=19	NR		41.2*	20.8 – 65.1	37.5*	17.7 – 62.6	38.7*	24.1 – 55.7
20-29	61.6	52.8 – 69.7	66.7	61.4 – 71.6	59.5	54.1 – 64.7	62.6	58.7 – 66.3
30-34	78.4	71.4 – 84.1	75.3	71.0 – 79.2	73.0	68.8 – 76.8	75.6	72.6 – 78.3
>=35	64.2	56.6 – 71.2	74.6	69.3 – 79.2	74.0	68.8 – 78.5	70.9	67.3 – 74.1
p-value	0.002		0.001		0.000		0.000	
Parity								
Primiparous	60.0	53.3 – 66.2	70.4	66.3 – 74.2	67.7	63.7 – 71.4	65.9	63.0 – 68.7
Multiparous	77.8	72.0 – 82.7	73.1	69.2 – 76.6	68.9	64.8 – 72.6	73.3	70.7 – 75.8
p-value	0.000		0.333		0.671		0.000	
Mode of delivery								
Vaginal	70.0	64.8 – 74.7	73.9	70.6 – 77.0	70.2	66.9 – 73.3	71.3	69.0 – 73.6
C-section	63.9	55.3 – 71.7	67.3	62.2 – 72.0	64.1	59.1 – 68.9	65.2	61.6 – 68.6
p-value	0.210		0.024		0.042		0.004	
Gestational Age								
Preterm	51.5	34.0 – 68.7	64.2	53.0 – 74.0	60.7	48.8 – 71.4	58.9	50.6 – 66.6
Full term	69.1	64.5 – 73.3	72.1	69.2 – 74.8	68.8	65.9 – 71.5	70.0	68.0 – 71.9
p-value	0.049		0.139		0.161		0.006	
Birth								
Singleton	68.4	64.0 – 72.6	72.0	69.2 – 74.6	68.5	65.7 – 71.2	69.7	67.7 – 71.6
Multiple	59.3*	30.5 – 82.9	54.3*	31.9 – 75.1	50.9*	28.0 – 73.4	55.7	39.6 – 70.6
p-value	0.519		0.100		0.133		0.068	
Birth country								
Canada	65.9	60.5 – 70.9	70.6	67.3 – 73.7	64.7	59.4 – 68.9	67.1	64.8 – 69.4
Other	75.2	66.9 – 82.0	74.9	69.5 – 79.6	77.5	72.5 – 81.9	75.9	72.2 – 79.2
p-value	0.059		0.171		0.000		0.000	
Mother tongue language								
English	68.2	62.5 – 73.5	71.2	67.7 – 74.4	66.5	63.0 – 69.9	68.7	66.2 – 71.1
French	55.4	40.4 – 69.4	62.0	52.5 – 70.7	58.2	49.7 – 66.1	58.6	52.2 – 64.6
Other	73.2	64.5 – 80.3	78.2	72.8 – 82.9	78.2	72.8 – 82.7	76.4	72.5 – 79.8
p-value	0.104		0.005		0.000		0.000	
Highest level of education								
High school or less	53.0	39.8 – 65.7	49.6	40.2 – 59.0	37.8	30.3 – 46.0	46.6	40.5 – 52.9
College or University	69.2	63.7 – 74.2	70.3	66.8 – 73.5	71.0	67.6 – 74.2	70.1	67.7 – 72.4
Post-graduate	76.2	66.4 – 83.8	88.0	83.1 – 91.7	81.0	75.2 – 85.6	81.9	77.9 – 85.3
p-value	0.012		0.000		0.000		0.000	

	July – Dec 2012 (N=460)		Jan – Dec 2013 (N=1065)		Jan – Dec 2014 (N=1123)		July 2012 – Dec 2014 (N=2648)	
	%	95% CI	%	95% CI	%	95% CI	%	95% CI
Household income								
<\$30K	51.6	37.8 – 65.1	64.4	53.3 – 74.2	46.0	35.8 – 56.5	53.6	46.4 – 60.8
\$30K - <\$70K	66.7	54.4 – 77.0	62.6	54.7 – 69.9	63.7	56.3 – 70.4	64.3	59.0 – 69.2
\$70K - <\$100K	65.6	55.0 – 74.8	72.2	64.4 – 78.8	67.2	59.6 – 74.0	68.0	62.8 – 72.9
>=\$100K	77.2	70.7 – 82.6	78.6	74.8 – 81.9	74.9	70.9 – 78.5	76.9	74.3 – 79.4
p-value	0.004		0.000		0.000		0.000	

CI – Confidence Interval. K – Thousand. *Interpret with caution – high sampling variability
Ottawa Public Health, Infant Feeding Surveillance System.

Table A3b. Multiple logistic regression: Mother socio-demographic, birth and feeding characteristics associated with any breast milk feeding at six months for first-time mothers, adjusted odds ratios (OR), Ottawa birth cohorts 2012-2014.

July 2012- December 2014 (N=1086)

	OR	95% CI	p-value
Age			
<=19	0.7	0.3 – 2.0	0.522
20-29	1.0		
30-34	1.3	0.9 – 1.9	0.157
>=35	0.8	0.5 – 1.3	0.371
Mode of delivery			
Vaginal	1.0		
C-section	1.1	0.8 – 1.6	0.446
Gestational age			
Preterm	1.0		
Full term	1.5	0.8 – 2.6	0.202
Birth country			
Canada	1.0		
Other	1.8	1.0 – 3.6	0.070
Mother tongue language			
English	1.0		
French	0.5	0.3 – 0.8	0.003
Other	1.7	0.9 – 3.4	0.130
Education			
High school or less	1.0		
College or University	1.7	1.0 – 3.0	0.059
Post-graduate	2.3	1.2 – 4.5	0.014

	OR	95% CI	p-value
Household income			
<\$30K	1.0		
\$30K - <\$70K	1.3	0.7 – 2.3	0.468
\$70K - <\$100K	1.0	0.5 – 1.9	0.976
≥\$100K	1.8	0.9 – 3.3	0.075
Formula given in-hospital			
Yes	1.0		
No	4.8	3.4 – 6.9	0.000
Cereal given before 6 months of age			
Yes	1.0		
No	2.2	1.5 – 3.4	0.000
Other food given before 6 months of age			
Yes	1.0		
No	1.3	0.9 – 1.9	0.115

OR – Odds ratio. CI – Confidence Interval. K – Thousand.
Ottawa Public Health, Infant Feeding Surveillance System.
Hosmer-Lemeshow goodness-of-fit test p=0.501.

Table A4a. Mother socio-demographic and birth characteristics of exclusive breast milk feeding at six months of age, Ottawa birth cohorts 2012-2014.

July 2012- December 2014 (N=2645)

	%	95% CI
Age categories		
≤19	NR	
20-29	6.1	4.5 – 8.2
30-34	10.4	8.5 – 12.7
≥35	8.6	6.8 – 10.8
p-value	0.001	
Parity		
Primiparous	6.6	5.3 – 8.1
Multiparous	10.3	8.6 – 12.3
p-value	0.002	
Mode of delivery		
Vaginal	9.9	8.5 – 11.5
C-section	4.9	3.6 – 6.6
p-value	0.000	
Gestational Age		
Preterm	NR	
Full term	8.7	7.5 – 9.9
p-value	0.007	

	%	95% CI
Birth		
Singleton	8.5	7.4 – 9.7
Multiple	0	
p-value	0.062	
Birth country		
Canada	8.6	7.3 – 10.0
Other	7.9	5.9 – 10.4
p-value	0.605	
Mother tongue language		
English	8.4	7.0 – 9.9
French	9.6*	6.4 – 14.2
Other	7.7	5.7 – 10.3
p-value	0.658	
Highest level of education		
High school or less	4.3*	2.3 – 7.8
College or University	8.2	6.9 – 9.7
Post-graduate	11.7	9.0 – 15.0
p-value	0.004	
Household income		
<\$30K	5.7*	3.0 – 10.6
\$30K - <\$70K	6.2*	4.2 – 9.2
\$70K - <\$100K	9.1*	6.5 – 12.5
≥\$100K	10.3	8.6 – 12.3
p-value	0.055	

OR – Odds ratio. K – Thousand. CI – Confidence Interval. NR – Data are not reportable due to small sample size.

Ottawa Public Health, Infant Feeding Surveillance System.

Table A4b. Multiple logistic regression: Mother socio-demographic, birth and feeding characteristics associated with exclusive breast milk feeding at six months for first-time mothers, adjusted odds ratios (OR), Ottawa birth cohorts 2012-2014.

July 2012- December 2014 (N=1303)

	OR	95% CI	p-value
Gestational age			
Preterm	1.0		
Full term	2.4	0.8 – 6.6	0.128
Type of delivery			
C-section	1.0		
Vaginal	2.0	1.1 – 3.2	0.016
Mother tongue language			
English	1.0		
French	0.7	0.3 – 1.5	0.316
Other	0.6	0.3 – 1.1	0.092
Education			
High school or less	1.0		
College or University	3.5	1.2 – 10.1	0.019
Post-graduate	5.8	1.9 – 17.4	0.002

OR – Odds ratio. CI – Confidence Interval.

Ottawa Public Health, Infant Feeding Surveillance System.

Singleton/multiple delivery, age, immigration, and income are not included in the model as they were not significant in the full model and the model fit better without them

Hosmer-Lemeshow goodness-of-fit test p=0.257.

Table A5. Extended list of reasons for breastfeeding cessation before six months of age.

2012- 2014 (N=757)

Rank		%	Reasons included
1	Milk supply concerns	55.7	Decreased or low (perceived or real) milk supply, the inability to pump enough milk (perceived or real), insufficient weight gain, or having a breast reduction surgery.
2	Difficulty breast milk feeding	23.8	Problems latching, tongue ties, having sore or cracked nipples, engorgement or infection (including mastitis or yeast/thrush).
3	Medical condition of mother or infant	12.7	Mother or infant medical issues, illness, infant jaundice, maternal medications, maternal-infant separation due to medical reasons or mother mental health experiences such as post-partum mood disorder, anxiety and depression.
4	Inconvenience, fatigue, lack of time, breast milk feeding too demanding	8.6	Breast milk feeding being inconvenient, exhausting/tiring, overly demanding, having a lack of time to provide breast milk, needing to care for other children or having a fussy/colicky infant.
5	Baby was ready, preferred formula, or refused the breast	6.5	References to the infant preferring bottles or formula, losing interest in breastfeeding or breast milk, breast refusal or biting.
6	Lifestyle reasons	4.2	Reference to mother wanting to do things without baby such as shopping or playing sports, mother-infant separation due to travel or wanting to have family involved in feeding.
7	Return to work or school	3.0	Mother returning or planning to return to work or school.
8	Intolerance/allergy to breast milk	2.0	Reference to the infant being intolerant or allergic to breast milk (perceived or real).
9	Advice of health professional	1.4	Recommendation or advice to stop breast feeding from a health professional.
9	Mother planned to wean	1.4	Mother had planned to stop breastfeeding.

Ottawa Public Health, Infant Feeding Surveillance System.

Table A6. Extended list of reasons for introducing formula before six months of age.

2012- 2014 (N=2003)

Rank		%	Reasons included
1	Milk supply concerns	54.0	Decreased or low (perceived or real) milk supply, the inability to pump enough milk (perceived or real), insufficient weight gain, or having a breast reduction surgery.
2	Medical condition of mother or infant	17.7	Mother or infant medical issues, illness, infant jaundice, maternal medications, maternal-infant separation due to medical reasons or mother mental health experiences such as post-partum mood disorder, anxiety and depression.
3	Difficulty breast milk feeding	14.4	Problems latching, tongue ties, having sore or cracked nipples, engorgement or infection (including mastitis or yeast/thrush).
4	Lifestyle reasons	9.0	Reference to mother wanting to do things without baby such as shopping or playing sports, mother-infant separation due to travel or wanting to have family involved in feeding.
5	Inconvenience, fatigue, lack of time, breast milk feeding too demanding	6.4	Breast milk feeding being inconvenient, exhausting/tiring, overly demanding, needing mother or infant to sleep, having a lack of time to provide breast milk, needing to care for other children or having a fussy/colicky infant.
6	Mother planned to wean/introduce formula	4.5	References to planning to wean the infant from breast milk, wanting to introduce formula or a bottle, wanting to supplement or top-up, and wanting to mix formula with food such as cereal.
7	Return to work or school	2.8	Mother returning or planning to return to work or school.
8	Advice of health professional	2.4	Recommendation or advice to stop breast feeding from a health professional.
9	Baby was ready, preferred formula, or refused the breast	1.7*	References to the infant preferring bottles or formula, losing interest in breastfeeding or breast milk, breast refusal or biting

*Interpret with caution – high sampling variability.

Ottawa Public Health, Infant Feeding Surveillance System.

Table A7. Extended list of reasons for breastfeeding cessation between six and 12 months of age.

2012- 2014 (N=237)

Rank		%	Reasons included
1	Return to work or school	24.7	Mother returning or planning to return to work or school.
2	Milk supply concerns	22.4	Decreased or low (perceived or real) milk supply, the inability to pump enough milk (perceived or real), insufficient weight gain, or having a breast reduction surgery.
3	Difficulty breast milk feeding	11.0*	Problems latching, having sore or cracked nipples, engorgement or infection (including mastitis or yeast/thrush).
4	Baby was ready, preferred formula, or refused the breast	8.3*	References to the infant preferring bottles or formula, losing interest in breastfeeding or breast milk, breast refusal or biting.
5	Baby was too old or big enough	7.4*	References to the baby being too old or too big for breastfeeding.
6	Teething	7.2*	References to baby teething.
7	Started baby on alternate milk	6.9*	Providing formula, cow's milk, or other milk type instead of breast milk.
8	Mother did not want to provide breast milk anymore	5.7*	References to the mother being tired of breast milk feeding, not wanting to provide breast milk or being ready to stop breast milk feeding.

*Interpret with caution – high sampling variability.
Ottawa Public Health, Infant Feeding Surveillance System.

Table B1. Data table for Figure 1: Breastfeeding initiation among first-time and multiparous mothers.

Parity	2012	2013	2014
First-time	99%	97%	97%
Multiparous and breastfed other children	98%	97%	97%
Multiparous and did not breastfeed other children	77%	73%	60%

Table B2. Data table for Figure 2: Any breastfeeding by infant age.

Infant Age	2012	2013	2014
At birth	98%	97%	95%
Two weeks or older	94%	92%	91%
One month or older	91%	89%	89%
Two months or older	86%	86%	83%
Three months or older	82%	83%	80%
Four months or older	76%	78%	76%
Five months or older	73%	75%	72%
Six months or older	68%	72%	68%

Table B3. Data table for Figure 3: Exclusive breastfeeding by infant age.

Infant Age	2012	2013	2014
Leaving the hospital	61%	63%	60%
Two weeks or older	39%	37%	41%
One month or older	36%	35%	36%
Two months or older	33%	32%	31%
Three months or older	31%	30%	30%
Four months or older	27%	26%	26%
Five months or older	20%	20%	20%
Six months or older	8%	9%	8%