DURHAM REGION HEALTH DEPARTMENT

IFSS Infant Feeding Surveillance System

Focused Report on…

Formula Introduction and Breastfeeding

January 2017

Highlights

- Between 2006 and 2015, 75%-86% of infants in Durham Region were given formula before six months of age.
- About half of the mothers reported that formula was introduced in hospital. For every 10 infants who were introduced formula before six months, seven were given formula in hospital.
- Introducing formula in hospital had a profound effect on breastfeeding duration:
  - Mothers whose babies **were not** introduced formula in hospital: 72% were still breastfeeding at six months, and breastfed for an average of 160 days.
  - Mothers whose babies **were** introduced formula in hospital: 38% were still breastfeeding at six months, and breastfed for an average of 100 days.
- Younger mothers, as well as those with lower education and household income were more likely to report formula introduction before six months.
- "Milk supply concerns/hungry baby" was the most common reason for formula introduction before six months. Other common reasons were baby/mother's medical issues and latching difficulties.
- Seventy-seven percent of mothers reported receiving free formula samples. The majority received the sample in the mail. Hospitals and physicians' offices were also frequently reported.
- Almost three out of four of those who received free formula samples used the samples before six months.
- Receiving free formula samples has been associated with higher formula introduction rate before six months and shorter any breastfeeding and exclusive breastfeeding duration.
- Formula introduction in hospital and receiving free formula sample are very common among Durham Region new mothers. Both have potential negative impact on breastfeeding duration and exclusivity, it is important for public health to address these issues.

Durham Region's Infant Feeding Surveillance System

The Durham Region Health Department (DRHD) developed the Infant Feeding Surveillance System (IFSS) to regularly assess infant feeding practices among new mothers.

The sample population for the IFSS are mothers who are Durham Region residents and who delivered live-born infants within the past six to seven months. For 2006 to 2008 birth years, IFSS data were collected in two phases. In Phase I, demographic information was extracted from a pre-existing health assessment conducted through the Healthy Babies Healthy Children (HBHC) Program. The HBHC assessment usually occurred within 48 hours of hospital discharge. Phase I was used as the sampling frame for Phase II, a telephone survey developed for the IFSS and conducted by DRHD staff at six to seven months postpartum. In 2009, record level data, including demographic information, became available to the DRHD from the Integrated Services for Children Information System (ISCIS). Because ISCIS provides more complete birth data, eligible mothers were selected from the ISCIS database for the 2009 birth year and onward.

Introduction

Definition

Infant Formula

A manufactured food designed and marketed for feeding infants under 12 months of age, usually prepared for bottle-feeding or cup-feeding from powder (mixed with water) or liquid (with or without additional water).

Breastfeeding is the optimal method of feeding infants and provides the best source for infant nutrition. Its benefits for general health, growth and development are well documented [1-4]. Although the nutrients are very similar between formula and breastmilk, the amount of each nutrient in formula varies significantly compared to breastmilk. Moreover, unlike breastmilk, formula does not contain innate immune boosters, such as immunoglobulins and living white cells nor does it change composition to response to a growing infant's nutritional needs.

Commercially prepared infant formula was first introduced in late 1800s. Since then, many commercial formulas have been developed. The use of infant formula has grown rapidly and has a profound negative impact on breastfeeding practices. Over the past century, especially before the1970s, aggressive marketing of formulas contributed to a global decline in breastfeeding [5-7].

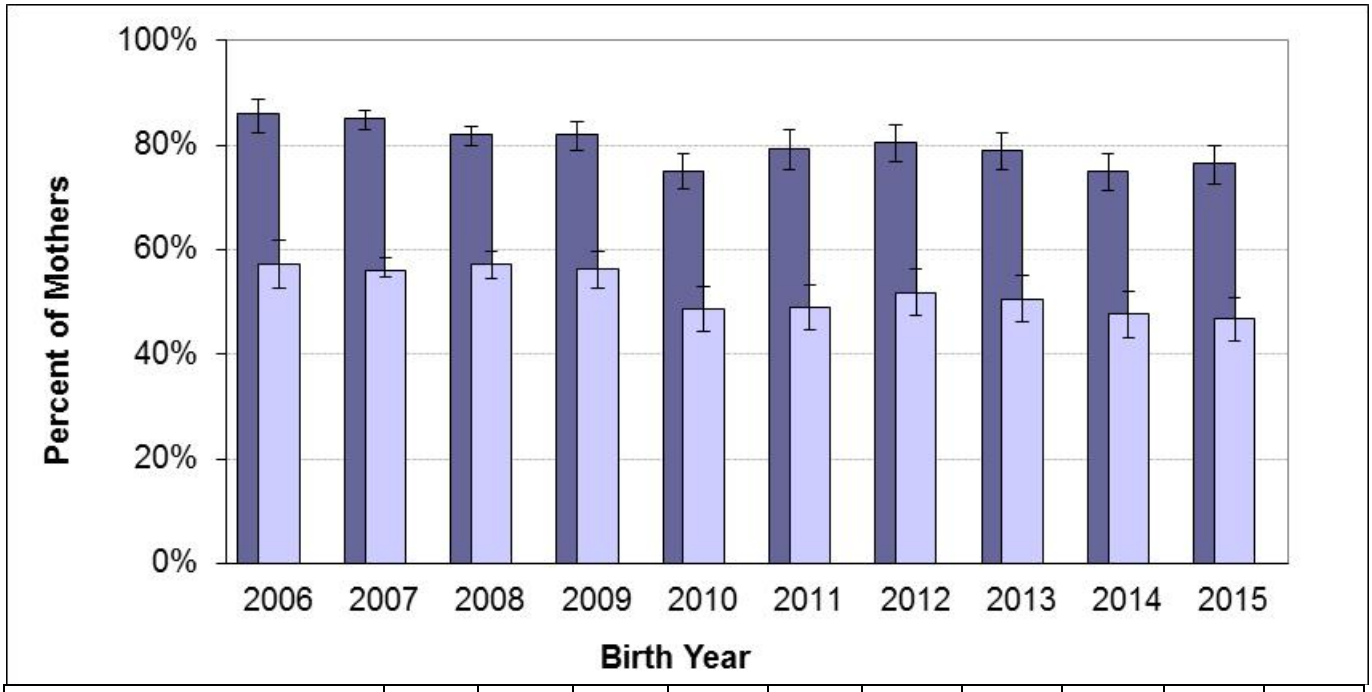
Compared to breastfed infants, formula-fed infants have higher risks of contracting infectious diseases in the first year of life [8-10]. Formula feeding has also been linked to some chronic diseases such as asthma, diabetes and childhood obesity [11-13].

This report examined formula introduction before six months (including formula introduction in hospital) and its impact on breastfeeding practices among Durham Region mothers. Data was collected through the Durham Region Infant Feeding Surveillance System (IFSS). From March 2007 to July 2016, 11,255 new mothers in Durham Region were contacted and 6,326 were surveyed at six to seven months postpartum with a response rate of 56%. Analysis was conducted by birth year (years when mothers gave birth) instead of survey year (years when the survey was completed between six and seven months after birth).

Formula Introduction before Six Months and Formula Introduction in Hospital

In 2015, three out of four babies were introduced formula before six months and almost half of those babies were given formula in the birth hospital. The rates of formula introduction before six months decreased from 86% in 2006 to 76% in 2015 with some fluctuations between years. A similar trend is observed in the rates of formulation introduction in birth hospitals. For every 10 infants who were introduced formula before six months, about seven of them were introduced in hospital (Figure 1).

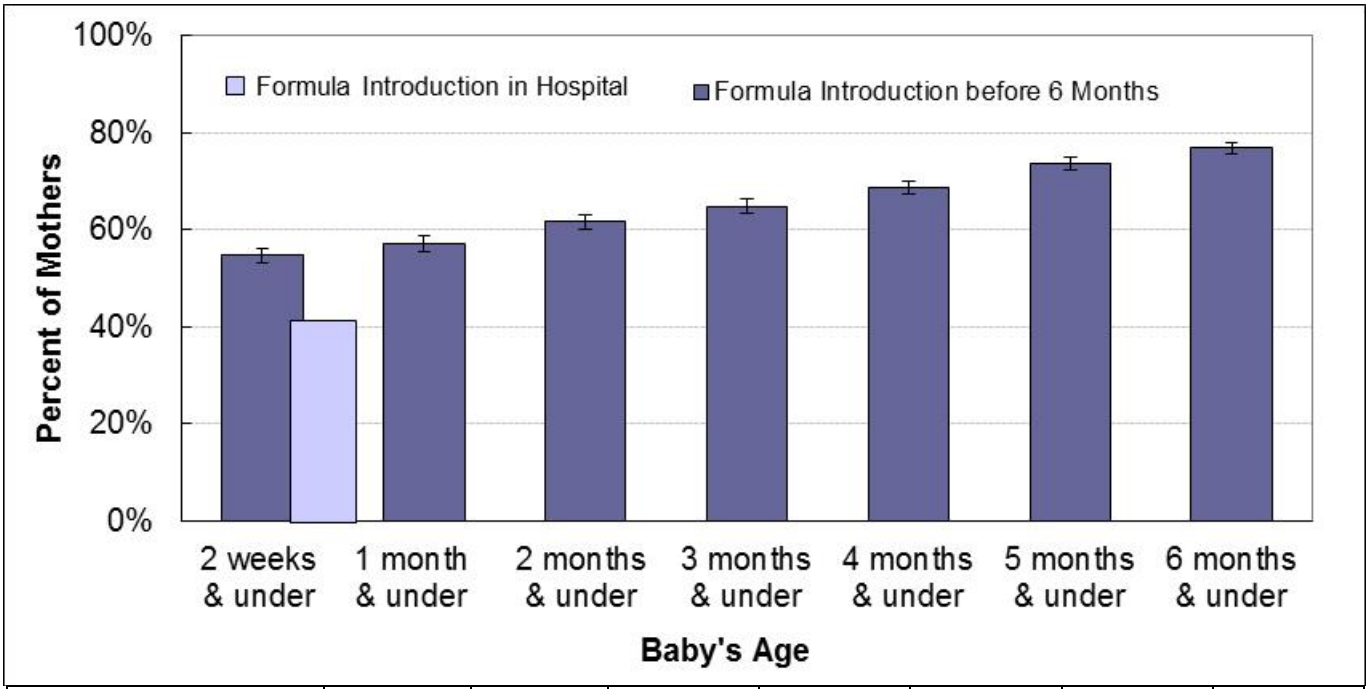
Figure 1: Formula Introduction over Time, Durham Region, 2006-2015



Indicator	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
A: Formula introduction before six months	86%	85%	82%	82%	75%	79%	81%	79%	75%	76%
B: Formula introduction in hospital	57%	56%	57%	56%	49%	49%	52%	51%	48%	47%
Ratio of B/A	7/10	7/10	7/10	7/10	6/10	6/10	6/10	6/10	6/10	6/10

Formula was most often introduced in the first two weeks, especially in the first few days in hospital. Fifty- five percent of mothers reported that their babies were given formula in the first two weeks. After two weeks, the rate increased by 2-5% each month. By six months, 77% of infants had been given formula. Figure 2 further demonstrates the impact of formula introduction in hospital on formula introduction before six months.

Figure 2: Formula Introduction before Six Months by Baby's Age, Durham Region, 2006-2015 Combined

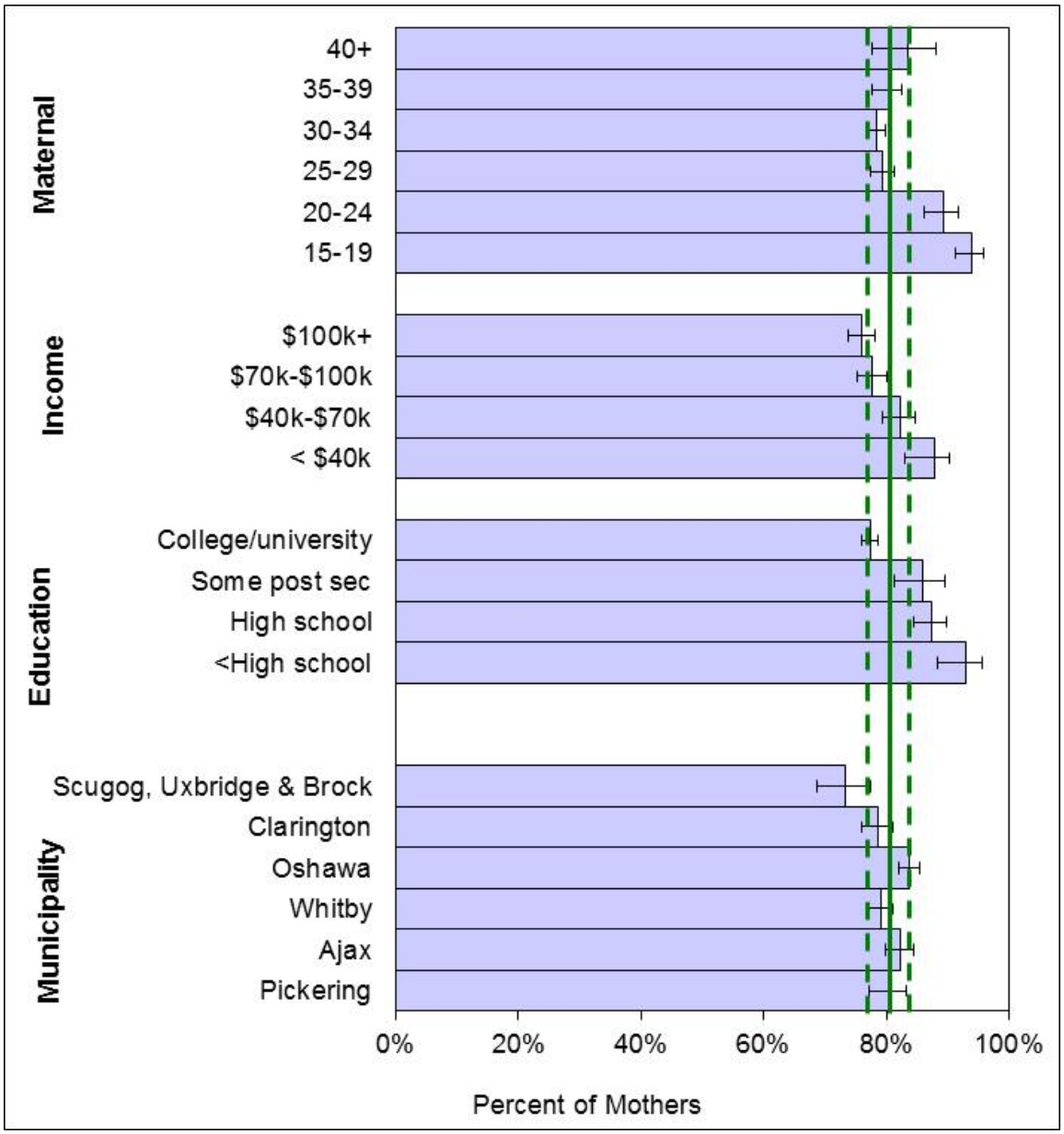


Indicator	2 weeks & under	1 month & under	2 months & under	3 months & under	4 months & under	5 months & under	6 months & under
Formula introduction before six months	55%	57%	62%	65%	69%	74%	77%
Formula introduction in hospital	53%						

Formula Introduction before Six Months among Priority Populations

Rates of formula introduction before six months were also compared among groups with different socioeconomic status. The associations between formula introduction before six months and the following socioeconomic factors were statistically significant: maternal age, household income, education and municipality of residence. Formula introduction rates tended to be higher among the following populations: mothers under 24 years, people with lower household income, those with lower education and residents in Oshawa and Ajax. No associations were found between formula introduction before six months and country of birth as well as years since coming to Canada. The findings are summarized in Figure 3 and Appendix 1. Similar results were also found for formula introduction in hospital (Appendix 2)

Figure 3: Formula Introduction before Six Months by Socioeconomic Status, Durham Region, 2006-2015 Combined

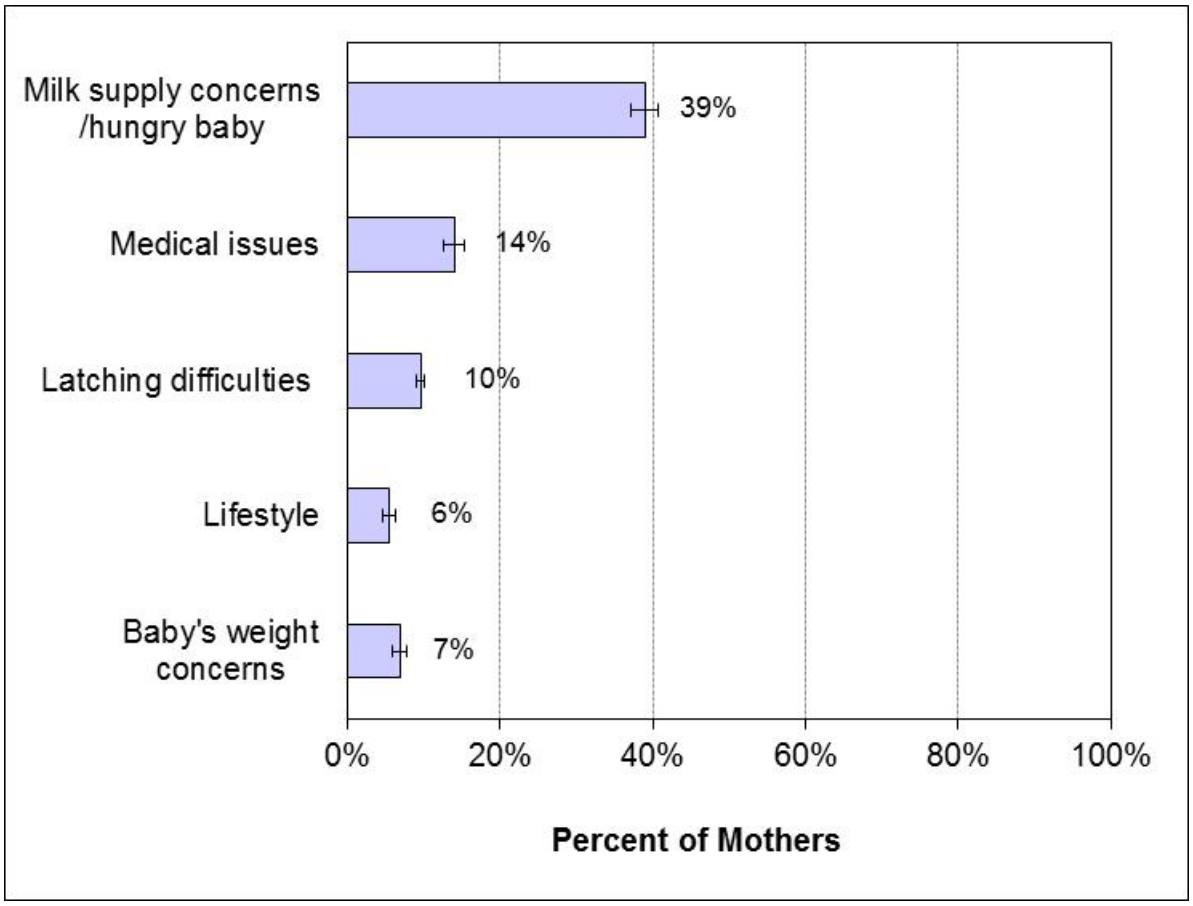


: Durham Region Average
: Upper and Lower 95% CI

Reasons for Formula Introduction before Six Months

The top five main reasons for introducing formula are listed in Figure 4. “Milk supply concerns/hungry baby” was the most common reason for introducing formula before six months, followed by baby/mother’s medical issues and latching difficulties. Lifestyle and baby’s weight concerns were also commonly reported reasons.

Figure 4: Top Five Reasons for Formula Introduction before Six Months, Durham Region, 2009-2015* Combined



*: Significant changes were made in 2009 and onward to the question asking for the main reasons for introducing formula. As a result, data were presented for 2009-2015 instead of 2006-2015 combined.

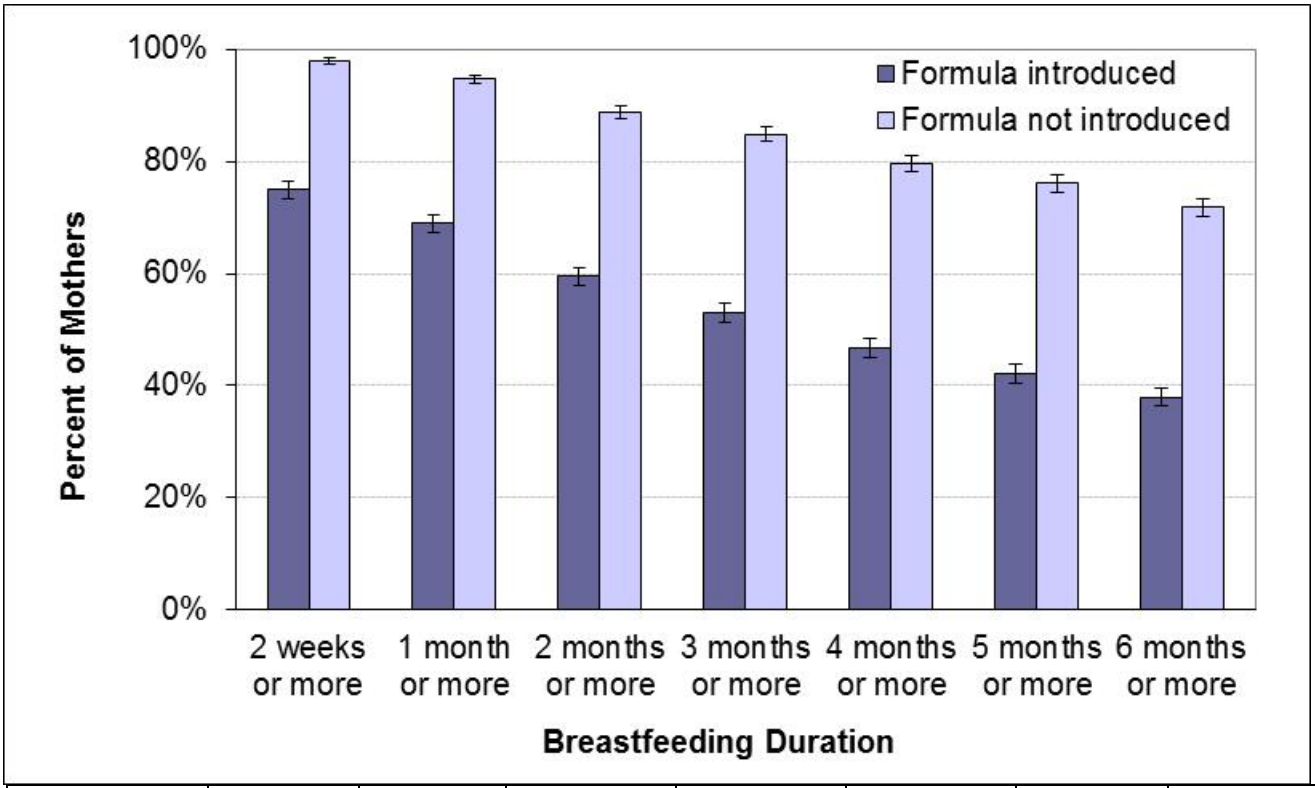
Impact of Formula Introduction in Hospital on Breastfeeding

Between 2006-2015, 93% of Durham Region mothers initiated breastfeeding, 54% continued to breastfeed at six months, and 6% exclusively breastfed at six months. Compared to the percent of mothers who initiated breastfeeding, fewer continued to breastfeed and even fewer exclusively breastfed. This section examines the impact of formula introduction in hospital on breastfeeding duration and exclusivity.

Impact of Formula Introduction in Hospital on Breastfeeding Duration

Formula introduction in hospital was more likely to lead to lower breastfeeding rates at various time points: 75% of mothers whose babies were introduced formula in hospital were breastfeeding at two weeks and by six months this rate dropped to 38%. In comparison, 98% of mothers whose babies were not introduced formula in hospital were breastfeeding at two weeks and 72% were breastfeeding at six months. The average breastfeeding duration among mothers whose babies were introduced to formula in hospital was 100 days compared to an average of 160 days among mothers whose babies were not introduced formula in hospital.

Figure 5: Breastfeeding Duration by Formula Introduction in Hospital, Durham Region, 2006-2015 Combined



	2 weeks or more	1 month or more	2 months or more	3 months or more	4 months or more	5 months or more	6 months or more
Formula introduced	75%	69%	59%	53%	47%	42%	38%
Formula not introduced	98%	95%	89%	85%	80%	76%	72%

Impact of Formula Introduction in Hospital on Exclusive Breastfeeding

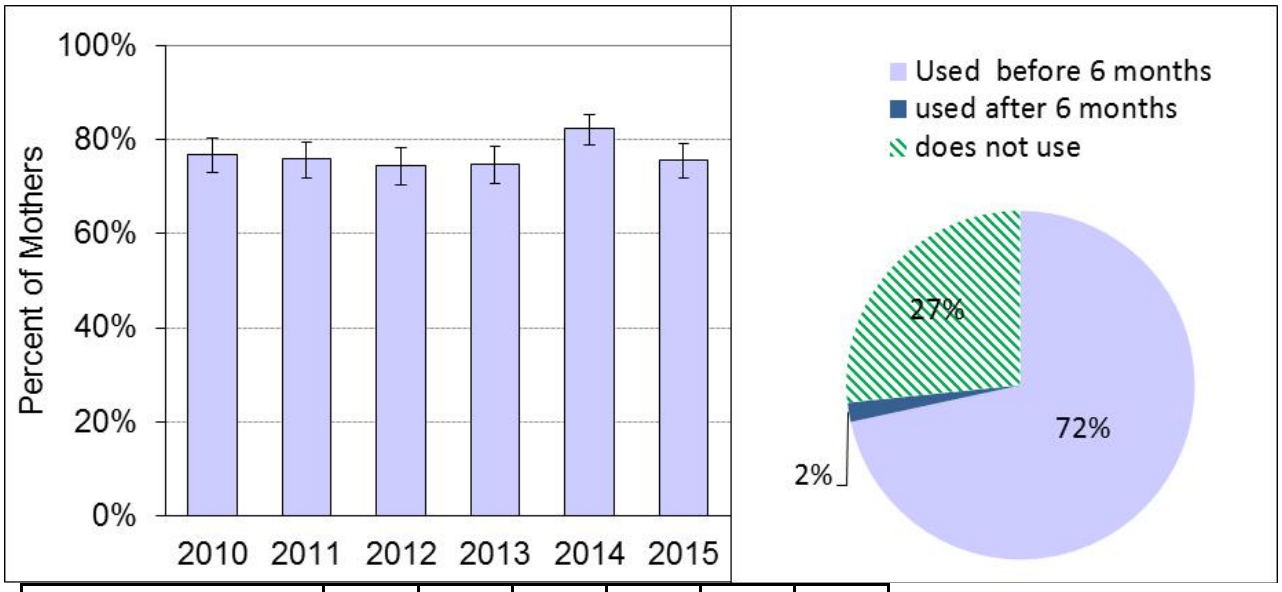
The World Health Organization and Health Canada recommend exclusive breastfeeding of infants for the first six months of life and continued breastfeeding to two years and beyond [2, 3]. Formula introduction in hospital has an impact on breastfeeding exclusivity. When infants are fed formula in hospital, they are no longer considered to be exclusively breastfed. In Durham Region, one out of two infants was given formula in hospital, and only 6% of infants were exclusively breastfed at six months. Had formula been not introduced in hospital to these infants, the exclusive breastfeeding rate at six months could have potentially doubled.

Receiving Free Formula Samples

Questions related to receiving free formula samples were added to IFSS for the 2010 birth year and onward and the question on use of free formula samples was added for the 2014 birth year and onward. For the purpose of this survey, free formula samples did not include formula given to infants in hospital.

In 2010-2015, an average of 77% of mothers reported receiving free formula samples, with a range of 75-82% (Figure 6). Among those who received free formula samples, 72% used them before six months, 2% used after six months and 27% had not used the samples at the time of the survey.

Figure 6: Receive and Use Free Formula Samples, Durham Region, 2010-2015



	2010	2011	2012	2013	2014	2015
Receive samples *	77%	76%	75%	75%	82%	76%

Used free samples before 6 months **	72%
Used free samples after 6 months **	2%
Does not use free samples **	27%

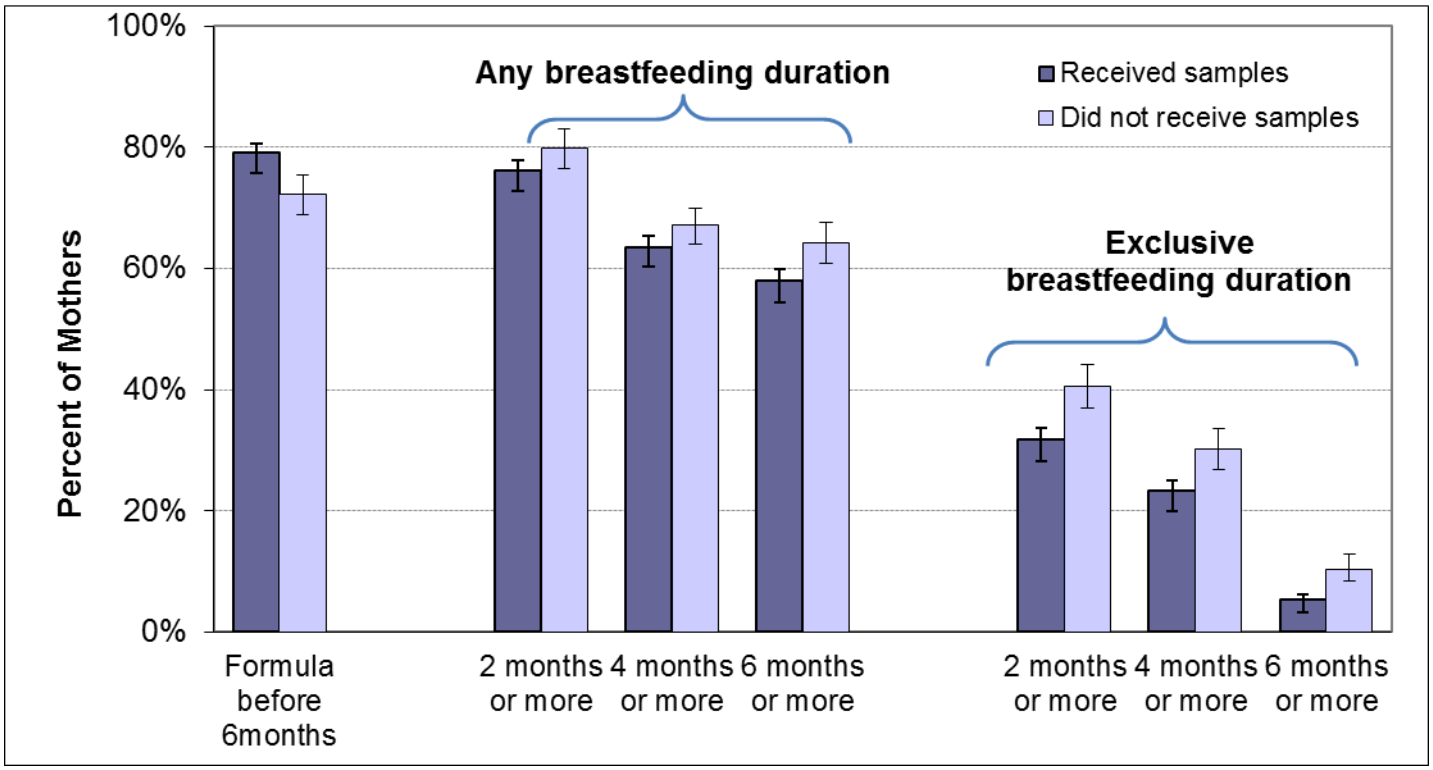
* Denominator is all the respondents.
** : Denominator is those who received free samples. Rates are 2014-2015 combined.

Among those who receive free formula samples:

- 91% of mothers received free formula samples from mail,
- 16% received from hospital,
- 16% received from a physician's office including family doctors, pediatricians and obstetricians
- 5% received from other sources such as baby show, family friends and maternal/kids stores.

Receiving free formula samples has been associated with higher formula introduction rate before six months, and lower breastfeeding and exclusive breastfeeding duration (Figure 7).

Figure 7: Formula Introduction before 6 Months and Breastfeeding Duration by Receiving Free Formula Samples



	Formula introduce before 6 months	Any breastfeeding			Exclusive breastfeeding		
		2 months or more	4 months or more	6 months or more	2 months or more	4 months or more	6 months or more
Receive Samples	79%	76%	63%	58%	32%	23%	5%
Did not receive samples	72%	80%	67%	64%	41%	30%	10%

BF: any breastfeeding; EBF: exclusive breastfeeding

*: Statistically significant difference in formula introduction and breastfeeding among the two groups, mothers who received free formula samples, and mother who did not receive formula samples, is based on *p* value of less than 0.05.

Discussion

In Durham Region, over 70% of the infants were given formula before six months; over half (53%) of them were given formula in hospital. In other Ontario health regions, about 40% (from 39 to 45%) of babies were introduced to formula in hospital [14-16].

Although formula is often introduced when breastfeeding is medically contraindicated, studies suggested that it is not necessary in cases ceases. An US study found that there was no clear medical need for introducing formula among 87% of the breastfed infants [17]. The reasons for formula introduction before six months among Durham Region mothers are consistent with the frequently cited reasons in the literature: physical discomforts of breastfeeding (e.g., sore nipples), concerns about the quality and quantity of breast milk, difficulty with breastfeeding technique (such as latching and position) and fatigue [14-18] .

Similar to studies done by other public health units in Ontario [15-16, 19-21], although breastfeeding initiation is generally high, significantly fewer mothers continue to breastfeed and even fewer exclusively breastfed at six months. This decline is partly due to the popularity of formula introduction before six months, especially formula introduction in hospital. Early supplementation interferes with the breast milk production and the infant's feeding technique, which is associated with early cessation of breastfeeding [22-26]. Reducing formula introduction in hospital could significantly improve breastfeeding duration and exclusivity.

Free formula sample distribution to new mothers was common in Durham Region. Mail was the most commonly reported source of free formula samples, followed by birth hospital and physician's office. Similar results were observed in other studies[14,15].

Many studies have found that receiving formula upon hospital discharge decrease exclusive breastfeeding, especially in the first few weeks postpartum [27-28]. The distribution of these formula samples to new mothers at hospitals is part of a longstanding marketing campaign by infant formula manufacturers and implies hospital and staff endorsement of infant formula [27]. Formula sample distribution should be reconsidered in light of its negative impact on exclusive breastfeeding.

Hospital-based distribution of industry sponsored formula to new mothers violates the World Health Organization's International Code of the Marketing of Breast-milk Substitutes, and is widely criticized by leading pediatric and preventive health care organizations [30,31]. In the past decades, trends indicate that increasing numbers of US and Canadian hospitals are eliminating formula sample packs from their maternity service [32, 33]. In 2007, 28% of the US hospitals [32]and 10% of Canadian hospitals[33] were sample-pack-free.

Program Implications

There have been numerous successful efforts to encourage breastfeeding, ranging from changes in hospital practices to the use of social supports, as well as educational efforts directed toward both health care providers and mothers. These may have contributed to the increased rate of breastfeeding since the1970s in industrialized countries [5].

The rates for both formula introduction before six months and formula introduction in hospital are high. They also have negative impact on breastfeeding duration and exclusivity. Therefore,

in addition to promote breastfeeding, it is also important for public health to address the issue of formula use before six months, and in hospital.

Based on the IFSS data, “milk supply concerns/hungry baby” was the most common reason for introducing formula before six months. Insufficient milk supply can be a real or perceived problem. It is important to provide first line support to breastfeeding mothers including encouraging skin-to-skin contact, unrestricted frequency and duration of breastfeeding sessions, assisting mother and baby to achieve an optimal latch and resolving any underlying breastfeeding issues.

Although breastfeeding rates have increased in the past few decades, an increase in formula feeding was also found at the same time [5]. This may indicate that although the general public is well aware of the benefits of breastfeeding, they may not be aware of the risk of formula feeding. A US national survey showed that 74% of respondents disagree with the statement: “infant formula is as good as breastmilk”, and just 24% agree with the statement: “feeding a baby formula instead of breast milk increases the chance the baby will get sick [34]. This reflects public perceptions of formula feeding: if breastfeeding is the best, then formula feeding is implicitly good or normal. Some researchers have suggested that addressing the “risk of not breastfeeding” through public health campaigns is a better approach than promoting the “benefits of breastfeeding” [5,35,36].

This study found higher rates of formula introduction before six months among younger parents with lower income and education levels. Cultural differences also play a role in infant feeding decisions [37]. Public health programs should be designed to address specific concerns and issues among those populations.

Lastly, this study highlighted the negative impact of receiving free formula sample on both breastfeeding duration and exclusivity rates. Our study found that hospitals and physicians’ offices are the common sources of free formula samples. Public health practitioners, hospitals and health care providers need to work together to encourage breastfeeding, to reduce or eliminate unnecessary supplemental feeding and formula discharge packs.

What is Durham Region Health Department Doing to Promote Breastfeeding?

Durham Region Health Department has achieved Baby Friendly Initiative (BFI) designation in 2015. BFI is a worldwide, evidence based program of the World Health Organization and UNICEF to protect, promote and support breastfeeding. It was established to ensure that pregnant women and mothers are supported to feed their babies in safe and nurturing ways; that all children have the best start in life regardless of their feeding method. The specific goals of BFI are to: 1) support all mothers and babies; 2) increase the number of women who start breastfeeding; 3) increase the length of time that women breastfeed; and 4) increase the number of women who offer only breastmilk to their baby in the first 6 months of the baby's life. The requirements of BFI help mothers and families to make informed infant feeding decisions, be prepared with good knowledge about breastfeeding, and feel supported as they initiate and continue breastfeeding.

The Health Department offers a variety of programs and resources to protect, promote and support breastfeeding, which include:

- Prenatal programs and resources help to increase awareness and knowledge about the importance and mechanics of breastfeeding.
- Public health nurses offer one to one support for complex breastfeeding issues at breastfeeding clinics.
- Other breastfeeding concerns can be addressed through multiple services including home visits, new mother support groups, and telephone support.
- Public health nurses also work with community partners, hospitals and coalitions to achieve the common goals related to supporting optimal health and delivering consistent and coordinated breastfeeding messages to new mothers.

Appendix 1: Formula Introduction before Six Months by Socioeconomic Status, Durham Region, IFSS, 2006-2015 Combined

SES	Category	Percent	95% CI	Significantly different*
Maternal Age	15-19	94%	91-96%	
	20-24	89%	86-92%	
	25-29	79%	77-81%	Yes
	30-34	78%	77-80%	
	35-39	80%	77-83%	
	40+	83%	78-88%	
Education	<High school	93%	88-96%	
	High school	87%	85-90%	Yes
	Some post secondary	86%	81-90%	
	College/university	77%	76-79%	
Income	< $40k	88%	85-90%	
	$40k-$70k	82%	79-85%	Yes
	$70k-$100k	78%	75-80%	
	$100k+	76%	74-78%	
Municipality	Pickering	80%	77-83%	
	Ajax	82%	80-84%	
	Whitby	79%	77-81%	Yes
	Oshawa	84%	82-86%	
	Clarington	79%	76-81%	
	Scugog, Uxbridge & Brock	73%	69-77%	
Country of Birth	Canada	79%	78-79%	
	Outside of Canada	82%	79-84%	No

*: Statistically significant association between each SES and formula introduction based on p value of less than 0.05.

Appendix 2: Formula Introduction in Hospital by Socioeconomic Status, Durham Region, IFSS, 2006-2015 Combined

SES	Category	Percent	95% CI	Significantly different*
Maternal Age	15-19	66%	60-71%	
	20-24	57%	52-61%	
		52%	49-54%	Yes
	30-34	50%	48-52%	
	35-39	54%	51-57%	
	40+	58%	51-64%	
Education	<High school	67%	61-73%	
	High school	57%	53-61%	Yes
	Some post secondary	54%	48-60%	
	College/university	50%	48-51%	
Income	< $40k	62%	58-65%	
	$40k-$70k	55%	51-58%	Yes
	$70k-$100k	51%	48-54%	
	$100k+	45%	43-48%	
Municipality	Pickering	51%	47-55%	
	Ajax	55%	52-58%	
	Whitby	50%	47-52%	Yes
	Oshawa	57%	55-59%	
	Clarington	53%	50-56%	
	Scugog, Uxbridge & Brock	39%	34-44%	
Country of Birth	Canada	50%	48-52%	
	Outside of Canada	58%	54-61%	Yes

*: Statistically significant association between each SES and formula introduction based on p value of less than 0.05.

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For more information on this report, contact Durham Region Health Department at 1-800-841-2729

Website: durham.ca