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Infants who gain weight rapidly during the first year of life are more likely to be overweight later in childhood. Suggested predictors of infant weight gain are: prepregnancy BMI, gestational weight gain (GWG), infant birth weight, and formula feeding. Recently, feeding human milk from a bottle has been suggested to contribute to rapid weight gain. When feeding at the breast, the pace and volume of intake are controlled by the infant. Shifting feeding control from infant to mother may affect the infant's ability to interpret satiety cues. Infants fed from a bottle, compared to those fed directly at the breast, consume more milk. This greater consumption of milk could potentially result in greater subsequent weight gain over time. Therefore, the objective of this study was to determine if mode of feeding human milk was related to infant growth in the first six months of life, controlling for prepregnancy BMI, GWG, and birth weight. Weight, length, and triceps and subscapular skinfolds were measured at 2, 4, and 6 months. Mothers reported birth weight and length and completed monthly questionnaires on infant feeding practices (e.g., number of human milk feedings by bottle or breast per day, age of introduction to complementary foods, and infant bottle-emptying behavior). Infants were divided into 2 groups based on their breastfeeding intensity across the first 6 months of life: Nursing Group (NG, n=34): infants fed human milk with more than 80% of the feeds fed directly at the breast and Bottle Group (BG, n=16): infants fed human milk from the bottle with less than 80% of the feeds fed directly at the breast. There was a significant difference between the groups average breastfeeding intensity from birth to

6 months (NG=91.1 \pm 7.2%, BG= 64.8 \pm 14.4%, $P < 0.001$). There were no significant differences between groups in maternal age (NG= 30.5 \pm 4.2 BG=29.6 \pm 3.1), income, education level, prepregnancy BMI (kg/m²) (NG= 24.9 \pm 3.8, BG= 24.0 \pm 3.3), GWG (kg) (NG= 17.6 \pm 5.6, BG= 15.8 \pm 4.2), and birth weight (kg) (NG= 3.70 \pm 0.5, BG=3.62 \pm 0.5). Infants fed human milk from the bottle finished the bottle “most or all of the time,” with a bottle size of 3 to 4 ounces at each feed. No infants were introduced to complementary foods before 4 months. There were no significant differences in triceps and subscapular skinfolds between groups at 2, 4, and 6 months. There was no significant difference between groups in change in weight for length Z score (WLZ) from birth to six months (NG=1.43 \pm 1.85, BG=2.29 \pm 2.04, $P = 0.14$). However, in multivariate regression analysis, prepregnancy BMI ($\beta = 0.086$), birth weight ($\beta = 0.938$), WLZ at birth ($\beta = -0.927$) and breastfeeding at a lower intensity ($\beta = 0.861$) significantly predicted change in WLZ from birth to 6 months ($R^2 = 0.61$, $P < 0.001$). There was not a significant difference between groups in weight gain velocity percentiles from birth to 6 months (NG=0.45 \pm 0.29, BG=0.53 \pm 0.29, $P = 0.35$). Birth weight ($\beta = -0.129$), prepregnancy BMI ($\beta = 0.035$), and breastfeeding at a lower intensity ($\beta = 0.108$) significantly predicted weight gain velocity from birth to 6 months ($R^2 = 0.17$, $P < 0.02$). These results suggest that among infants not receiving formula or complementary foods before four months, feeding human milk from the bottle more than 20% of the time may contribute to increased weight for length gain from birth to 6 months.

DETERMINANTS OF INFANT GROWTH WITHIN
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APPROVAL PAGE

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CHAPTER I

INTRODUCTION

America, like many nations, is facing an epidemic of overweight and obesity. From 2011 to 2012 more than one third of adults (36.5%) were obese ($\text{BMI} \geq 30$) and more than two-thirds were overweight ($\text{BMI}=25\text{-}29.9$) or obese (70.7%)(1). Additionally, women are more likely than men to be obese or morbidly obese in ages 20 and older (2). The epidemic of overweight and obesity is not restricted to the adult population and has extended to the adolescent and even pediatric populations. In 2010, the World Health Organization classified 42 million children under the age of five as overweight (3). In America, 17% of children and adolescents were classified as obese ($\geq 95^{\text{th}}$ percentile) in 2011-2014 (2). An estimated 10% of children less than 2 years of age have been classified as having high weight for length in America (2). The peril of childhood overweight and obesity is devastating health problems, such as asthma, high blood pressure, hyperlipidemia, type 2 diabetes mellitus, asthma, and sleep apnea (4–10).

In pursuit of determinants of childhood obesity, research endeavors have focused on early critical periods of growth and development. Rapid infant weight gain is defined as abnormal acceleration of growth across a specific time period (11). Infants who gain weight rapidly during the first 2 years of life are more likely to be overweight later in childhood and subsequently adulthood, posing serious health consequences (11,12).

Preventing rapid infant weight gain may serve as a critical point in the fight against obesity and subsequent comorbidities. Suggested predictors of rapid infant weight gain include: high maternal prepregnancy BMI, excess gestational weight gain, high infant weight at birth, feeding formula instead of human milk, and more recently, feeding mode (infants fed human milk predominately from the bottle instead of the breast).

There is a correlation between rapid growth in early infancy and subsequent obesity. This correlation may be elucidated by the postnatal growth acceleration hypothesis, which proposes rapid growth in early infancy programs the infant to be metabolically vulnerable to developing obesity (13,14). In addition, exposure to malnutrition in utero may program lifelong changes in the fetus that result in disease later in life(15,16). Fetal programming was observed in a cohort of women who were in utero during the Dutch famine (16). The cohort was inclined to be overweight with higher BMI and greater waist circumference measurements in their adult years, possibly as a result of in utero exposures to malnutrition (16).

The uterine environment effects infant outcomes, and may developmentally effect an infant's metabolic profile. Birth weight is a reflective outcome of infant exposures in utero. Infant weight at birth is linearly related to obesity risk in childhood, as well as adulthood, with increased risk of developing obesity with birth weight extremes (17–21). Additionally maternal prepregnancy BMI and gestational weight gain (GWG) are related to infant birth weight (22–26). A large systematic review and meta-analysis established that infants born to mothers with prepregnancy overweight or obesity were at an

increased risk of high birth weight and overweight or obesity later in life compared to infants born to mothers of a normal weight (27).

What (human milk vs. formula) and how (breast vs. bottle) an infant is fed impacts infant growth and subsequent obesity. In a meta-analysis of several observational studies, the length of time and intensity of breastfeeding was inversely related with childhood obesity (28). Other studies report the longer the duration of breastfeeding, the lower risk of childhood obesity (29–33). Each month an infant is predominantly breastfed corresponds to a reduction in the risk of subsequent obesity by 4% (31). In addition, breastfed and formula-fed infants display dissimilar weight gain and body composition trajectories across the first twelve months of life (34). A meta-analysis examining differences in body composition between breastfed and formula fed infants showed that breastfed infants had higher fat mass at three, four, and six months, compared to infants fed formula (35). This trend was inverted at 12 months with formula fed infants possessing higher fat mass compared to breastfed infants. Infants fed formula had higher levels of fat free mass during the first 12 months, compared to breastfed infants.

Research investigating the relationship between feeding mode (infants fed human milk from a bottle versus the breast) and infant growth is scarce. In the second Infant Feeding and Practices Study (IFPS II) a majority of mothers reported feeding infant's human milk by bottle (36). This is concerning as infants who were predominately bottle fed were twice as likely to empty their bottle, suggesting bottle feeding leads to a lack of self-regulation of milk intake (37). Notably, infants fed human milk by bottle gained 89 grams more per month compared to infants directly at the breast (36). Additionally

infants with breastfeeding intensity below 80% and infants who emptied their bottles were at increased risk to develop excess weight gain from 1-2 years of age (36,37).

Bartok et al. conducted a pilot study to observe the differences between infants fed human milk predominantly from the bottle or breast (38). Of infants fed human milk from a bottle 33% exceeded the 85th percentile for weight gain velocity for four to six month age interval compared to 10% of infants who were nursed at the breast. However, this finding was statistically insignificant and the study sample size was small (n=37).

The Feeding and Infant Growth (FIG) study was a prospective longitudinal observational study. It was originally designed to observe the differences of infant growth and adiposity between infants fed human milk predominately from the breast versus the bottle (39). This proposed thesis extended the FIG study by recruiting more participants and adding an additional research question: examining the relationship of mothers prepregnancy BMI and GWG, on the relationship of infant feeding mode (human milk in the bottle or from the breast) and infant weight gain. The information gained from the FIG study may be utilized to aid in the prevention of childhood overweight and obesity through refining existing feeding recommendations. Previous research has indicated intrauterine influences, maternal prepregnancy BMI, GWG, infant birth weight, and feeding mode, may play a role in infant growth across the first 6 months of life. However, there are no reports examining feeding mode with the other predictors of infant weight gain. Therefore the purpose of this research study was to examine the relationship of maternal prepregnancy BMI, GWG, infant birth weight and feeding mode of human milk on infant growth in the first six months of life.

Study Objective and Hypotheses

The objective of this study was to determine if mode of feeding human milk (breast and/or bottle) is related to infant growth in the first six months of life, controlling for maternal prepregnancy BMI, GWG, and infant birth weight. The researcher evaluated three growth indicators: infant weight gain velocity, change in weight-for-length Z-scores (WLZ), and change in infant BMI Z-scores (BAZ). We hypothesized that lower breastfeeding intensity (i.e. more human milk fed from the bottle) would predict greater weight gain velocity, greater change in WLZ, and greater change in BAZ in infants during the first six months of life, controlling for maternal prepregnancy BMI, GWG, and infant birth weight.

We also hypothesized that infants born to heavier mothers would have greater weight gain velocity, greater gain in WLZ, and greater gain in BAZ across the first six months compared to infants born to lower weight mothers. Our next hypothesis was that infants born to mothers with GWG in excess of the 2009 IOM recommendations would have greater weight gain velocity greater gain in WLZ, and greater gain in BAZ across the first six months compared to infants born to mothers with GWG within the 2009 IOM recommendations. Our final hypothesis was that infants with higher weight at birth would have greater infant weight gain, WLZ, and BAZ across the first six months of life, compared to infants born with lower weight.

CHAPTER II

REVIEW OF LITERATURE

Prevalence of Childhood Obesity

The prevalence of overweight (BMI ≥ 25) and obesity (BMI ≥ 30) among adults is increasing worldwide; with obesity alone increasing two fold in the past 30 years (1,40). The World Health Organization (WHO) estimated that 42 million children, ages 0-5 years, were overweight (85th-94th percentile) or obese ($\geq 95^{\text{th}}$ percentile) in 2013 (41). In America childhood obesity rates have tripled since 1980, with greater than one in three children and adolescents being overweight or obese (2,42). The Physical Activity Surveillance System reported in 2012 that 14.9% of children 2-4 years old were overweight and 14.5% were obese in North Carolina (43).

Childhood obesity has immediate health effects, for example increasing the risk of hypertension, hypercholesterolemia, and early atherosclerosis, all of which are risk factors for cardiovascular disease (44). Additionally, children with childhood obesity are at increased risk of developing endocrine dysfunction (insulin resistance, prediabetes, and Type II diabetes) compared to normal weight children (45,46). The effects of childhood obesity extend beyond that of observable effects on physical health to psychosocial effects. Childhood obesity is associated with increased anxiety, depression, substance abuse, behavioral problems, and low self-esteem (47–50).

There are also several long-term effects of childhood obesity. Obese children are more likely to develop endocrine dysfunction (45,51), cardiovascular disease (44), respiratory problems (52,53) as well as certain cancers (54) as they become adults, compared to normal weight children. Obese children are at increased risk of becoming obese adults, compared to normal weight children (55–57). Childhood obesity may diminish quality of life and decrease life expectancy (58,59).

To prevent childhood obesity, it is important to distinguish risk factors that are central to its occurrence. The potential factors associated with the rise in children's weight, and subsequent childhood obesity is multifactorial. It has been documented that offspring of overweight and obese mothers are at increased risk of becoming overweight (60,61), indicating an influence of maternal weight on infant growth. Infant birth weight, a clinical outcome that represents the in utero environment, is associated with the risk of obesity later in life (18–20). Rapid growth during early infancy is associated with later obesity, and may adversely program an infant to be susceptible to obesity (23,61). The mode of infant feeding (human milk vs. formula) affects childhood obesity and weight gain early in life (34,62). Breastfeeding is protective against obesity in childhood (32,33). The determinants of childhood obesity are multifactorial, however, this study examined the relationship of maternal weight and infant feeding practices on infant growth in the first six months of life.

Childhood Obesity and Maternal Weight

Yu et al. conducted a systematic review and meta-analysis of 45 studies to examine the association of prepregnancy BMI with birth weight and the occurrence of

overweight and obesity in offspring (27). Prepregnancy BMI was defined differently between the studies including classifications by: WHO, IOM, Asian Pacific standard, and by the Working Group on Obesity in China. Overweight and obesity of offspring was defined according to CDC recommendations, International Obesity Task Force recommendations, and by WHO classifications. It was concluded that mothers with prepregnancy overweight or obesity correspond to an increased risk of high weight of infant at birth, when compared to mothers of a normal BMI (OR, 1.53; 95% CI, 1.44–1.63; and OR, 2.00; 95% CI, 1.84–2.18. Compared to mothers of a normal BMI, mothers with prepregnancy overweight or obesity corresponded to an increased risk of offspring overweight and obesity later in life (OR, 1.95; 95% CI, 1.77–2.13; and OR, 3.06; 95% CI, 2.68–3.49). The meta-analysis by Yu et al. was limited by various studies assessment and classification methods in measuring prepregnancy BMI and offspring birth weight and subsequent BMI.

De Hoog et al. examined prenatal and postnatal influences on the occurrence of overweight at two years of age in a multi-ethnic cohort (63). Upon enrollment mothers completed a questionnaire detailing ethnicity, education, income, dietary status, and maternal anthropometrics. Weight and height of singleton infants were measured at from birth to four years to determine BMI. Child overweight was defined by the age and sex specific BMI guidelines of the International Obesity Task Force. Researchers discovered that Turkish and Moroccan children were at higher risk (2.68 and 2.12 respectively) for developing overweight at 2 years than that of Danish or African children. Additionally early weight gain (>100 g/month) during the first six months of life, prepregnancy BMI,

and birth weight corresponded to increased risk (Odds ratio 1.82, 1.07, 2.55 respectively 95% CI) of child overweight at 2 years of age. This study features the prevalence of overweight between children of different ethnicities while displaying the influence of early weight gain, and prepregnancy BMI on increased risk of overweight at two years of age.

A study by Oken et al. (2007) observed the relationship of gestational weight gain and child adiposity at 3 years of age (64). Mother infant dyads were excluded if information was missing on prepregnancy weight, gestational weight gain, parental BMI, or infant birth weight, or who did not have a weight recorded within 4 weeks preceding delivery. At 6 months infant weight and length was measured. At 3 years of age researchers measured child height and weight, skinfold thickness, and blood pressure. For each 5 kg increase in gestational weight gain above the IOM recommendations, there was a 30% increased risk of child overweight ($> 85^{\text{th}}$ percentile) (OR 1.30 (95% CI 1.04, 1.62 for each 5 kg). The odds ratio was reinforced by adjustment for parental BMI (OR 1.66, 95% CI 1.31, 2.12). Additionally, gestational weight gain corresponded to an increase in child BMI z score and sum skinfold thickness at 3 years of age (OR 0.13 units, 0.26 mm respectively 95% CI , 0.08-0.19, 0.02-0.51). Child adiposity at three years (BMI, skinfold thickness) was higher in mothers with elevated gestational weight gain.

Robinson et al. conducted a secondary data analysis to observe the relationship of maternal weight (pregnancy, gestational weight gain, and postpartum weight retention) on childhood overweight ($\text{BMI} \geq 85^{\text{th}} < 95^{\text{th}}$) and obesity ($\text{BMI} \geq 95^{\text{th}}$ percentile) (65). Mothers from the National Longitudinal survey of youth with singleton

births, reported maternal weights, completed follow up survey of child at 4-5 years, and gestational age between 23-43 weeks were included. Maternal prepregnancy weight, weight before delivery, and postpartum weight was reported by mothers. Children's birth weight collected in questionnaire, and children's height and weight was measured at 4-5 years of age. Compared to normal weight mothers, those with overweight and obesity had a statistically significant odds ratio of 1.48 and 1.78 respectively, corresponding to the risk of overweight in preschoolers. Compared to children of mothers with adequate gestational weight gain, children of mothers with excessive gestational weight gain outside of the 2009 IOM recommendations had a statistically significant odds ratio of 1.29 corresponding to preschooler overweight. Notably a 5 kilogram increase in gestational weight gain above IOM recommendations and maternal delivery weight corresponded to a statistically significant increase (1.08 and 1.12 respectively) in the risk of overweight in preschool children. Greater maternal weight prepregnancy, during pregnancy, or after pregnancy corresponded to the manifestation of overweight in preschool age children.

Sridhar et al. examined the relationship between gestational weight gain according to the 2009 Institute of Medicine recommendations and the occurrence of childhood overweight ($BMI \geq 85^{th} < 95^{th}$) or obesity ($BMI \geq 95^{th}$ percentile) between 2 and 5 years (66). Mother infant dyads were selected from the Kaiser Permanente North California health plan with live singleton birth, complete height and weight measurements at birth, 13+ months, recorded gestational weight gain, gestational age at delivery, prepregnancy weight, maternal BMI. Mothers who exceeded the 2009 IOM

recommendations had infants that were heavier at birth compared to mothers at or below the recommended guidelines ($P < 0.01$). Mothers who exceeded the 2009 IOM recommendations had more infants that were macrosomic at birth compared to mothers at or below the recommended guidelines (15%, 8.3%, 6.2% respectively). Mothers with gestational weight gain above the 2009 recommendations had more overweight or obese children at 2-5 years ($P < 0.01$). Children of mothers with gestational weight gain above the 2009 recommendations were at increased risk of overweight or obesity at 2-5 years (OR 1.51, 95% CI), compared to mothers who gained within or below the 2009 IOM recommendations. Gestational weight gain above 2009 IOM recommendations corresponds to an increased risk of overweight or obesity at 2-5 years of age.

Diesel et al. investigated the relationship between excess GWG and infant growth (67). Maternal prepregnancy BMI and GWG was calculated based on self-reported prepregnancy weight, height, and weight gained across pregnancy. Infants were measured for weight and recumbent length at birth, 8, 18, and 36 months by trained study nurses. Infants born to mothers with excess GWG demonstrated greater average WAZ and BAZ at 0, 8, 36 months, compared to infants born to mothers with normal GWG, these results were statistically insignificant. Overall the majority of women included in the study had normal prepregnancy BMI, which may account for the lack of significance results present in the study.

Rapid Infant Weight Gain and Overweight/Obesity

The present obesity epidemic spans many age ranges with its effects even documented in young children and even infants. Recent studies suggest rapid weight gain

in infancy is associated with the development of obesity in childhood as well as adulthood.

In a case-cohort study Anderson et al. examined infant weight gain across the first 9 months and the occurrence of childhood obesity (68). Health records for children of singleton birth with complete variables required for analysis that lack health issues effecting growth, were included (N=1376). Cases of obese children ($\geq 95^{\text{th}}$ percentile, N=954) were selected from the cohort. Infant weight was categorized by age and sex, then separated into groups: ($<33^{\text{th}}$, $33^{\text{th}}-65^{\text{th}}$, $\geq 66^{\text{th}}$). Infant weight, and weight gain across the first 9 months was compared. Children who were obese later in life possessed higher weights at each time point from birth to 9 months compared to non-obese children. This was true for both sexes. Children with weight $\geq 66^{\text{th}}$ percentile at birth had a 1.36 (95% CI, 1.10-1.69) odds ratio for obesity compared to children with birth weight between the 33^{rd} - 65^{th} percentiles. This odds ratio increased to 1.72 (95% CI, 1.36-2.18) by 9 months. The odds ratio for obesity of movement to a higher percentile group was 1.54 from 2 months to 9 months. This value was higher than the 1.27 odds ratio for obesity for movement to a higher percentile group from 2 weeks to 1 month of age. These results indicate children with weight $\geq 66^{\text{th}}$ percentile possess a higher risk of developing childhood obesity, and this risk increases across the first 9 months if infants remain in this percentile group. Additionally, movement to a higher percentile group across the first 9 months corresponded with a significant increase in the risk for developing obesity during childhood.

Taveras et al. conducted a prospective cohort study to observe the relationship between weight-for-length measures at birth and 6 months with the subsequent development of obesity at 3 years (69). At initial visit mothers filled out a questionnaire reporting maternal and paternal height and weight, smoking status, ethnicity, income, education, breastfeeding duration, and maternal prepregnancy weight. Weight and length of participants (N=559) were measured at birth, 6 months, and 3 years. Skinfold thickness was measured at 3 years. Researchers used US national reference data to determine age and sex specific weight-for-length and BMI z scores. After adjusting for cofounders researchers found an odds ratio of 1.58 (95% CI 0.99– 2.53) between weight-for-length at birth and the occurrence of obesity at 3 years. Researchers found an odds ratio of 6.84 (95% CI 3.84–12.19) between weight-for-length at 6 months and the occurrence of obesity at 3 years, after adjusting for cofounders. This study highlights that rapid infant growth from birth to 6 months, indicated by greater weight-for-length and skinfold thickness scores, corresponded to increased risk of obesity and adiposity at 3 years.

In another study Taveras et al. examined the ascendant movement across growth percentiles for comparison with the risk of developing obesity during childhood (70). From birth to 2 years ascendant movement across ≥ 2 weight-for-length percentiles had an odds ratio of 2.08 (95% CI 1.84-2.34) and 1.75 (95% CI 1.53-2.00) respectively for increased risk of obesity at age 5 and 10 years. Additionally, ascendant movement across ≥ 2 weight-for-length percentiles in the first 6 months was associated with an elevated risk of obesity at 5 and 10 years of age, compared to ascendant movement across ≥ 2 weight-for-length percentiles after the first 6 months of life. This study is unique in that

it compared the strengths of the relationship across different time intervals of infancy, and found crossing 2 or more weight-for-length percentiles in the first 6 months was associated with a significantly higher risk of obesity compared to any other time in the first 2 years.

Sacco et al. conducted a cross sectional study to examine the association between rapid infant weight gain, birth weight, and childhood overweight and obesity (71). In addition Sacco et al. evaluated rapid infant weight gain under various definitions ($>+0.67$, $>+1$, $>+2$ SDS) between birth and one of 8 time points measured within the first two years of life. Five-year-old children, in first grade were invited to participate in the study. Participants (N=98) were required to have birth weight and 8 measured weights across infancy, obtained from health records, be full term, and free of diseases or conditions that would affect growth. Caretakers completed questionnaires on socioeconomic status, income, education, breastfeeding history, family obesity, and child's physical activity level. Over half the mothers had 8 years or less of education, and 17% were obese (self-report). On average mothers exclusively breastfed for 4 months, but continued for 13.5 months. Rapid infant weight gain was seen in 61.2% using $>+0.67$ standard deviation as a cutoff, where as 51% and 21.4% was seen using $>+1$ and $>+2$ SDS respectively. Approximately 14% of 5 year olds were overweight and 9% were obese using World Health Organizations BAZ scores. Across all models of multiple linear regression birth weight, rapid infant weight gain, and maternal obesity status were significantly and positively associated with childhood overweight and obesity markers (BMI, waist circumference, fat mass percentage).

Stettler et al. conducted a multi-center prospective cohort study examining the relationship between rapid infant weight gain and manifestation of overweight at 7 years of age (72). Participants chosen from the collaborative perinatal project were eligible if born full term (> 37 weeks). Offspring weight was measured at birth, 4 months, 1 year, and 7 years of age. Upon enrollment maternal data was collected including race, education and prepregnancy weight. Approximately 70% of participants ($N=27,889$) had complete measurements. After adjusting for cofounders researchers found an odds ratio of 1.38 (95% CI 1.32–1.44) between rapid infant weight gain and the occurrence of obesity at 7 years of age. Each increase in 100 grams from birth to 4 months raised the risk for overweight at age 7 by 38%. Results indicate rapid infant weight gain increases the risk of overweight in childhood.

Druet et al. conducted a meta-analysis of 10 cohort studies across America and Europe to examine the relationship between infant weight gain and later obesity (73). Infant weight gain was defined as change in weight standard deviation scores between birth and 12 months of age. Childhood obesity was defined by the International Obesity Task Force's criteria that are analogous with an adult BMI greater than or equal to 30. The International Obesity Task Force provides international BMI thresholds by age and sex from 2 to 18 years of age. Results show that infant weight gain was positively associated with subsequent childhood obesity risk, each one unit WAZ increase in the first 12 months resulted in a two-fold higher risk of childhood obesity with an OR 1.97 (95% CI 1.83 - 2.12). This supports the premise that early infant weight gain across the first 12 months is associated with subsequent childhood obesity.

A recent study by Salgin et al. observed 2,352 South African children to observe the relationship between temporary rapid infant weight gain and BMI across 18 years (74). Children of singleton birth were enrolled in the study regardless of birth weight or gestational age. Measurements of children's weight and height were taken at birth, 1, 2, 4, 5, 8, 13, 15, and 18 years. Mid upper arm circumference measurements were taken at 8 years, and body composition was measured by dual energy x-ray absorptiometry at 18. Children with temporary rapid infant weight gain had significantly higher skinfold thickness ($P=0.048$) and mid upper arm circumference ($P=0.04$) compared to children without temporary rapid infant weight gain after adjusting for cofounders at 8 years. Young adults with rapid infant weight gain had significantly higher BMI ($P=0.001$) and weight ($P<0.001$) compared to those without temporary rapid infant weight gain before and after adjusting for cofounders at 18 years. This study highlights the effects that even temporary rapid infant weight gain may have later in life.

Maternal Weight and Infant Growth

Childhood obesity is rising rapidly and has the potential to result in serious health consequences later in life; therefore it is important to understand early causes of obesity that will then be instrumental in creating obesity prevention strategies and techniques. Recent research has focused on maternal factors such as weight that may influence offspring growth.

Gomez-Lopez et al. observed whether maternal and paternal body mass index influenced the relationship between infant birth weight and infant growth velocity on subsequent childhood adiposity at 8-10 years of age (75). Caucasian children born at

term, with birth weight to length percentile within normal limits, and at least 1 obese parent ($\text{BMI} \geq 30 \text{ kg/m}^2$) were recruited to participate ($n=423$). Parent and child height, weight, and waist circumference were measured at child's 8-10 year visit. Additionally child's body composition was measured with DEXA at this time. Infant weight and length measurements recorded across the first two years of life were used to construct predicted rate of growth slopes in body mass index and weight. Researchers reported that the relationship between infant growth velocity and subsequent adiposity at 8-10 years was strengthened with elevated maternal body mass index, but not with elevated paternal body mass index. The majority of studies examine parental measurements as direct risk factors for rapid infant growth and subsequent childhood adiposity, whereas this study uniquely examines parental measurements as a modifier on this relationship.

Linaberry et al. examined the relationship of maternal and paternal obesity on growth across infancy, specifically BMI from birth to 3.5 years of age (76). Weight and length of approximately 900 Caucasian infants were recorded from birth to 3.5 years. Additionally, parental height and weight was collected to calculate BMI. Parental questionnaires collected data on smoking history, ages, and number of children. Infant and parental height and weight measurements were taken at consecutive time points from birth to 3.5 years to calculate BMI. Researchers constructed growth curve models from consecutive infant height and weight anthropometrics, as well as BMI. The growth curve models were used to determine the strength the relationship of maternal and paternal BMI and child growth. Researchers found obese mother bore children with significantly higher weight and body mass index at birth and from 1.5-3.5 years of age, compared to normal

and overweight mothers. Maternal body mass index was a better predictor of infant weight and body mass index growth trajectories across the first 3.5 years, than paternal body mass index.

Brune et al. conducted a retrospective longitudinal study to explore when during the first 6 years children are predisposed to develop overweight or obesity, through examining rapid rise in BMI (77). Researchers examined children who tracked at the 90th or 10th percentile consistently, or children who dramatically shifted from one percentile to the other from birth to 6 years. Children who were consistently measured at the 50th percentile across 6 years served as controls. Measurements of weight and length were taken at birth, 1 month, 3 months, 1 year, 2, years, 4 years, 5 years, and 6 years. Maternal and paternal height and weight were obtained from medical records. In addition questionnaires were collected on duration of breastfeeding, income, social status, as well as a food frequency questionnaire at pregnancy and again at 6 years. After graphing BMI for each study group and controls from birth to six years old, researchers discovered 4 periods of growth with 2 critical time periods defined by rapid elevation of BMI: between 6-18 months, and 5-6 years of age. Notably by the age of 24 months the trend in BMI was fixed across all groups. On average, children who are overweight from birth to six years and children whose postnatal BMI shows an extreme increase have mothers who are also overweight or obese.

In a prospective pregnancy cohort, Deierlein et al. examined the effects of prepregnancy BMI and GWG on offspring anthropometric outcome measures (WAZ , WLZ, LAZ) and rapid infant weight gain (defined as WAZ change > 0.67 between birth

weight and 6 month weight) (78). Infant weight and length were measured at birth, 3, and 6 months then used to calculate WAZ, WLZ, LAZ of infants. Prepregnancy BMI was calculated through self-reported prepregnancy weight and measured height. GWG was calculated by subtracting reported prepregnancy weight from the last weight measurement before delivery. Excess GWG was defined as weight gain outside of the 2009 IOM recommendations. Excess GWG was further divided as class I $\text{GWG} \leq 199\%$ of the 2009 IOM recommendations and class II $\text{GWG} \geq 200\%$ of the recommended 2009 IOM guidelines. While no associations were found to be statistically significant, prepregnancy overweight, prepregnancy obesity, and excessive GWG were associated with increased WAZ. Also statistically insignificant was the association of increased rapid infant weight gain with increased excessive GWG. Approximately 30% of the women in the study were overweight or obese, this does not reflect prevalence rates across the country, indicating the study may not be applicable to the population as a whole. This may account for the insignificance of results. The sample size of the study ($N=363$) may have been too small, leading to decreased power, to detect an interaction between mothers prepregnancy BMI, GWG, and infant anthropometric outcomes.

Heerman et al. utilized a retrospective cohort to examine the interaction between maternal prepregnancy body mass index, gestational weight gain, and infant growth trajectories (79). Infants with height and weight measurements before and after six months as well as after 15 months were included. Additionally mothers were required to be over 18 years of age, have height and weight documented within a year of conception, have a singleton birth, and no known condition that would affect infant growth.

Approximately 500 mother infant dyads were included in the cohort. Infant length and weight from electronic medical records were extrapolated to construct infant growth trajectories using weight-for-length percentiles. Researchers reported that greater prepregnancy body mass index was significantly ($P < 0.001$) correlated with increased infant growth trajectory across 12 months. Whereas greater gestational weight gain is correlated with greater infant growth trajectory across 12 months, it failed to achieve statistical significance ($P = 0.38$). Notably the interaction between prepregnancy body mass index and gestational weight gain significantly ($P = 0.01$) predicted infant growth trajectory across 12 months. Additionally, morbidly obese mothers with a gestational weight gain above the institute of medicine's recommended weight gain (5-9 kg) resulted in rapid infant weight gain in early infancy, and an altered growth trajectory compared to infants born to normal weight mothers.

Li et al. examined the relationship between prepregnancy body mass index and gestational weight gain on infant growth in a Chinese population (80). They specifically examined infant anthropometrics of weight for age, weight for length, and length for age z scores based on World Health Organizations growth reference. Data was collected from the electronic health records on births between June 2009 and May 2011. Approximately 38,500 mother-infant dyads with all variables required for analysis, of singleton birth, and a gestational age ≥ 37 weeks were included in the study. Infant weight and length were measured at birth and every 3 months till a year of age. Maternal body mass index was categorized by the Chinese BMI Classification Standard, which is a better predictor of comorbidities in Asian populations. Prepregnancy body mass index was determined by

first prenatal visit measurements. Gestational weight gain was determined by weight at first prenatal visit subtracted from delivery weight. Gestational weight gain was further categorized by a combination of The Chinese BMI Classification Standard and the 2009 IOM recommendations for gestational weight gain. Compared to mothers with normal prepregnancy weight, mother's with obesity or gestation weight gain exceeding the 2009 IOM recommendations had offspring with increased WAZ and LAZ at birth 3,6,9, and 12 months. Compared to mothers with normal prepregnancy weight mother's with obesity or gestation weight gain exceeding the 2009 IOM recommendations had offspring with the highest weight gain from birth to 3 months, 3-6 months, 6-12 months. Compared to mothers with adequate gestational weight gain mothers with excessive gestational weight gain had offspring with an increased risk of obesity (OR 1.31, 95% CI 1.22-1.38) at 12 months. Researchers concluded that maternal prepregnancy weight status and weight gain across pregnancy were associated with increased weight gain in infants.

A study by Jin et al., examined the relationship between maternal weight (prepregnancy BMI and GWG) and infant growth from birth to three years (82). Infants anthropometrics were measured every three months for the first year and every six months for the following two years till 3 years of age. Infants of overweight or obese mothers were significantly heavier at 3 months ($P = 0.044$), 1 year ($P = 0.042$), and 2 years ($P = 0.026$), than infants whose mothers prepregnancy weight was normal or underweight. Infants of mothers with excessive GWG demonstrated higher WAZ ($P < 0.01$) and BAZ ($P < 0.05$) from birth to 3 years of age, when compared to infants born to mothers with normal or underweight prepregnancy weight status. Researchers concluded

that mothers prepregnancy BMI and excess GWG was associated with greater weight, WAZ, and BAZ during the first 3 years of life.

Breastfeeding and Obesity

It is recommended that mothers exclusively breastfeed their infants for the first 6 months of life (83). The 2014 CDC Breastfeeding report card showed the majority of mothers in America fell short of this recommendation. The national average of mothers breastfeeding at 6 months is 49% with only 19% of mothers exclusively breastfeeding at 6 months (84). But why is breastfeeding important? Several studies have suggested that breastfeeding provides a protective effect against subsequent disease risk later in life, one of which is obesity.

Owen et al. conducted a meta-analysis on studies from 1970-2004, examining the association of breastfeeding and subsequent obesity (29). In all, 28 studies were included in the meta-analysis. Researchers analyzed odds ratios of the incidence obesity among different infant feeding groups. Results of the pooled odds ratio indicated breastfeeding is related to a decreased risk of childhood obesity, as compared to formula feeding with an odds ratio of 0.87 (95% CI: 0.85– 0.89). A pooled adjusted odds ratio for 6 of the studies showed an attenuated effect of breastfeeding on childhood obesity with an odds ratio of 0.93 (95% CI: 0.88-0.99). These six studies were adjusted for socioeconomic status, parental BMI, and maternal smoking. Researchers determined breastfeeding provided a small protective effect against childhood obesity.

Arenz et al. conducted a meta-analysis on studies from 1997-2003, examining the association of breastfeeding and subsequent obesity (32). Researchers incorporated strict

criteria for studies to be included: population based cohort, case-control study or cross sectional design, report relative risks or odds ratio, control for a minimum of three cofounders, provide feeding mode, have a participant follow up for 5-18 years, and a stringent definition of obesity using one of three BMI percentiles cutoffs. Nine different studies were included in the meta-analysis after meeting inclusion criteria. It was concluded that breastfeeding significantly reduced the risk of obesity in children with an adjusted odds ratio of 0.78, (95% CI: 0.71, 0.85). Notably, four of the studies found a dose-dependent effect of breast-feeding duration on the prevalence of obesity. Researchers determined breastfeeding provided a protective effect against childhood obesity.

Harder et al. conducted a meta-analysis on studies from 1979-2003, examining the association of breastfeeding and subsequent obesity (28). This meta-analysis unlike the others required studies to report the odds ratios of the duration of breastfeeding. Results indicated the risk for being overweight was reduced by 4% for each month of breastfeeding up to nine months, odds ratio of .96 for each month breastfeeding (95% CI: 0.94-0.98). Researchers concluded breastfeeding provides a protective effect against childhood overweight and obesity.

Several studies have suggested that breastfeeding provides a protective effect against subsequent risk of obesity later in life, but the mechanisms driving this protective effect are not well defined (85-91). One-way human milk may reduce the risk of childhood obesity is through its unique factors, which are not found in formula; for example: adiponectin, ghrelin, leptin, PYY, resistin, GLP-1 (85-91). It is hypothesized

that appetite hormones present in human milk may play a role in the regulation of appetite in infants, infant growth, and programming later in life. Adiponectin, a hormone involved in metabolism regulation, has been correlated inversely with infant weight and BMI, leading researchers to believe its presence in human milk may aid to reduced prevalence of obesity (89). Leptin, a hormone involved in the regulation of food intake and energy expenditure, in the breast milk of normal weight mothers at 1 month postpartum was negatively correlated with BMI at 18 and 24 months of age (85, 87). This suggests leptin present in breastmilk may regulate infant weight gain during the first months of life. In theory appetite hormones present in breastmilk are transferred to the infant during feeding, thus potentially altering appetite, satiety, self-regulation, metabolism and body composition of the infant. These same effects would not be demonstrated in formula fed infants, as formula lacks biologically active factors such as appetite hormones. Formula fed infants would theoretically lack exposure to appetite hormones and demonstrate an inability to self regulate, compared to breastfed infants, placing them at an increased risk for rapid infant weight gain and subsequent childhood obesity. Early exposure to appetite hormones and other biologically active factors in breastmilk may be protective against childhood obesity through regulation of appetite, satiety, and metabolism of the breastfed infant. Nevertheless, additional research is required to determine the validity of these theories.

Rapid Weight Gain and Bottle-feeding

Infancy is a period characterized by rapid growth and developmental plasticity. Therefore it may be the period when obesity prevention may be most effective.

Counteracting excess energy intake and rapid weight gain during infancy may be effective in preventing childhood obesity. The mode of infant feeding (suckled directly at the breast or via a bottle) may affect infant growth patterns. When feeding at the breast, the pace and volume of intake are controlled solely by the infant. In contrast, with bottle-feeding, the mother maintains more control (81). Infants fed from a bottle, compared to those fed directly at the breast, consume not only more human milk, but protein, and energy (92–94); It is thought that this over consumption of milk could potentially result in greater subsequent weight gain overtime(92,95,96). Shifting feeding control from the infant to the mother may affect the infant's ability to interpret satiety cues. This may lead to a different pattern of self-regulation and food intake within infants that are bottle fed human milk (97–100). These mechanisms are postulated to occur regardless of what is in the bottle (human milk vs. formula).

Li et al. conducted an analysis on data gathered from the second Infant Feeding and Practices Study (IFPS II). They examined the influence of feeding mode and milk type fed during early infancy on self-regulation during late infancy (6 to 12 months old) (37). Researchers defined self-regulation of milk intake as whether or not infants emptied the milk in the bottle offered to them from 6 to 12 months. Researchers hypothesized that infants bottle fed in early infancy (0 to 6 months), compared with direct breastfed infants, are more likely to empty the bottle in late infancy. Additionally, researchers hypothesized that using a bottle, not the milk type in the bottle, was essential to impairing infants ability to self-regulate the intake of milk. Results indicate that approximately 27% of infants exclusively breastfed during early infancy emptied their bottle during late infancy.

Approximately 47% of infants who were breast and bottle fed during early infancy emptied their bottle during late infancy. Lastly approximately 67% of infants solely bottle fed during early infancy emptied their bottle during late infancy. Notably similar results were seen independent of type of milk. These results verified researchers hypotheses that infants bottle fed in early infancy, are more likely to empty the bottle in late infancy, compared to directly breastfed infants; and that the use of a bottle was crucial in reducing infants' ability to self-regulate the intake of milk.

A second study by Li et al. compared infant weight gain by both milk type (human vs. nonhuman milk) and feeding mode (breast vs. bottle) (36). Researchers hypothesized that bottle-fed infants (regardless of milk type) would gain weight more rapidly than those fed at the breast during the first year. Researchers found that bottle fed human milk infants gained 71 g ($P < .001$) and bottle fed nonhuman milk gain 89 g ($P = .02$) more in weight, when compared to directly breastfed infants. Infants fed predominantly by bottle and fed predominately breast milk ($>66\%$ of feedings) gained 8 g more each month for each 10% increase in proportion of total bottle feeds. In all infants a 10% increase in proportion of total bottle feeds correlated with a 4.1 g ($P = .05$) gain in weight each month. Within infants fed human milk only by bottle and breast, monthly weight gain increased from 729 g when few feedings were by bottle ($< 33\%$), to 780 g when most feedings ($>66\%$) were by bottle, this finding was not stated as significant or insignificant. Researchers determined that bottle feeding effects weight gain in infants differently than directly breastfeeding; weight gain of infants fed

predominately human milk was positively associated with an increased proportion of bottle feedings.

Bartok et al. conducted a pilot study to observe the differences between infants fed human milk predominantly from the bottle or breast (38). Of infants fed human milk from a bottle 33% exceeded the 85th percentile for weight gain velocity for four to six month age interval compared to 10% of infants who were nursed at the breast. However, this finding was statistically insignificant, a larger sample size was necessary for the results to reach statistical significance (n=37). This small pilot study showed that infants bottle fed human milk were more likely to experience rapid growth at four to six months than those that were nursed at the breast only.

A study conducted by Wood et al., examined the relationship of feeding large bottles (≥ 6 ounces) in early infancy with changes in weight, WLZ, and WAZ from two to six months(101). At two months participants visited the clinic and answered a questionnaire. At the clinic visit infants weight and recumbent length were measured and parents were asked the kind of milk their child was fed, and what bottle size their child used to consume formula. At two months almost half the study population was exclusively formula fed with 44% of infants fed from a large sized bottle. Infants fed from a large bottle at two months had greater change in infant weight (0.21 kg higher, 95% CI: 0.05 - 0.37, $P = .01$), WLZ (0.31 units higher, 95% CI: 0.08 - 0.54, $P = .01$), and WAZ (0.24 units higher, 95% CI: 0.07 - 0.41, $P = .006$) from two to six months, compared to infants from a regular size bottle (< 6 ounces). This study showed that a

population of exclusively formula fed infants was more likely to experience greater growth when fed from a large bottle compared to infants fed a regular size bottle.

In summary, there are limited studies that examine the influence of feeding mode (breast and/or bottle feeding human milk) on rapid infant weight gain, while controlling for maternal weight. In the IFPS II Li et al. determined infants bottle fed in early infancy, are more likely to empty the bottle in late infancy, compared to directly breastfed infants; and that the use of a bottle was crucial in reducing infants' ability to self-regulate the intake of milk. Additionally, Li et al. found that bottle feeding effects weight gain in infants differently than directly breastfeeding; the weight gain of infants fed predominately human milk was positively associated with an increased proportion of bottle feedings. Bartok's pilot study showed that infants bottle fed human milk were more likely to experience rapid growth at four to six months than those that were nursed at the breast only. Bartok's pilot study required a larger sample size for the results to reach statistical significance. Additional research addressing not only the role of bottle feeding, but that of maternal weight and gestational weight gain is needed to clarify the relationship between bottle-feeding and infant growth controlling for the influence of maternal weight.

CHAPTER III

ARTICLE FOR PUBLICATION

Introduction

Worldwide rates of overweight and obesity are increasing at an alarming pace (1,2); this epidemic is not restricted to adults alone and is now demonstrated in a pediatric population (3). The National Nutrition and Health Examination Survey (NHANES) reported the prevalence of obesity ($> 95^{\text{th}}$ percentile) in children ages 2-19 almost 18% in 2011-2014; with 10% of infants and toddlers exhibiting high weight-for-recumbent length (2,102). Childhood obesity has direct health and psychosocial consequences such as an increased risk of hypertension, hypercholesterolemia, early atherosclerosis, endocrine dysfunction (insulin resistance, prediabetes, T2DM), anxiety, depression, low self-esteem, behavioral problems, and substance abuse issues (44–50). Compared to normal weight children obese children are at an increased risk of becoming obese adults (55–57). Long-term health effects of childhood obesity include an increased risk for developing endocrine dysfunction, cardiovascular disease, respiratory problems, and certain cancers compared to normal weight children(44,45,51–54).

These alarming trends in obesity express a need for research examining the factors that contribute to childhood obesity. Research endeavors investigating the determinants of childhood obesity have focused on early critical periods of growth and development, specifically rapid growth during infancy. In the literature rapid weight gain

may be defined as an increase in 1-unit Z score (commonly WAZ, BAZ, or WLZ, above 0.67 SD) from birth to baseline assessment; this may be interpreted clinically as crossing centile lines on a growth chart. There is a correlation between rapid growth in early infancy and subsequent obesity. This correlation indicates prevention of rapid infant weight gain as a means of prevention to developing childhood obesity. This correlation may be explained by the postnatal growth acceleration hypothesis that proposes rapid growth in early infancy will program the infant to be metabolically vulnerable to developing obesity later in life (13,16,17). Within the literature there are numerous factors that are suggested to contribute to rapid infant growth such as macronutrient differences between formula and human milk, bioactive components found in human milk (but not formula), and time of introduction of complementary foods (12,13,16–21).

What (human milk vs. formula) and how (breast vs. bottle) an infant is fed impacts infant growth and subsequent obesity. In a meta-analysis of several observational studies, the length of time and intensity of breastfeeding was inversely related with childhood obesity (29–31). Another study demonstrated that each month an infant is predominantly breastfed corresponded to a reduction in the risk of subsequent obesity by 4% (31). This led to the theory that breastfeeding provides a protective effect against the development of childhood obesity.

Several studies have suggested that breastfeeding provides a protective effect against subsequent risk of obesity later in life, but the mechanisms driving this protective effect are not well defined (85-91). One-way human milk may reduce the risk of childhood obesity is through its unique factors, which are not found in formula; for

example: adiponectin, ghrelin, leptin, PYY, resistin, GLP-1 (85-91). It is hypothesized that appetite hormones present in human milk may play a role in the regulation of appetite in infants, infant growth, and programming later in life. Adiponectin, a hormone involved in metabolism regulation, has been correlated inversely with infant weight and BMI, leading researchers to believe its presence in human milk may aid to reduced prevalence of obesity (89). Leptin, a hormone involved in the regulation of food intake and energy expenditure, in the breast milk of normal weight mothers at 1 month postpartum was negatively correlated with BMI at 18 and 24 months of age (85, 87). This suggests leptin present in breast milk may regulate infant weight gain during the first months of life. In theory appetite hormones present in breast milk are transferred to the infant during feeding, thus potentially altering appetite, satiety, self-regulation, metabolism and body composition of the infant. These same effects would not be demonstrated in formula fed infants, as formula lacks biologically active factors such as appetite hormones.

A meta-analysis by Hester et al. found that formula contained a higher energy content than breast milk, and that formula fed infants consumed more milk by volume per day than formula fed infants (62). These results suggest that infants that consume formula may lack self regulation compared to infants fed breast milk.

Research investigating the relationship between feeding mode (infants fed human milk from a bottle versus the breast) and infant growth is scarce. In the second Infant Feeding and Practices Study (IFPS II) a majority of mothers reported feeding infant's human milk by bottle (36). This is concerning as infants who were predominately bottle

fed were twice as likely to empty their bottle, suggesting bottle feeding leads to a lack of self-regulation of milk intake (37). Infants with breastfeeding intensity below 80% and infants who emptied their bottles were at increased risk to develop excess weight gain from 1-2 years of age (36,37).

Bartok et al. conducted a pilot study to observe the differences between infants fed human milk predominantly from the bottle or breast (38). Of infants fed human milk from a bottle 33% exceeded the 85th percentile for weight gain velocity for the four to six month age interval compared to 10% of infants who were nursed at the breast. However, this finding was statistically insignificant possibly due to the small study sample size (n=37).

Within the literature there is a scarcity of studies examining the relationship of mothers prepregnancy BMI and GWG, on the relationship of infant feeding mode (human milk in the bottle or from the breast) and infant growth. It is well established that the uterine environment effects infant outcomes, and may developmentally effect infant growth. Birth weight is one such outcome that reflects infant exposures in utero and birth weight is linearly related to obesity risk in childhood and adulthood (18–21). Mothers prepregnancy BMI and GWG may effect infant exposures in utero, and have been associated infant birth weight (22–26). A large systematic review and meta-analysis established that infants born to mothers with prepregnancy overweight or obesity were at an increased risk of high birth weight and overweight or obesity later in life compared to infants born to mothers of a normal weight (27).

Previous research has indicated intrauterine influences, maternal prepregnancy BMI, GWG, infant birth weight, and feeding mode, may play a role in infant growth across the first 6 months of life. Therefore, the objective of this study was to determine if mode of feeding human milk (breast and/or bottle) is related to infant growth in the first six months of life, controlling for maternal prepregnancy BMI, GWG, and infant birth weight. The researcher evaluated three growth indicators: infant weight gain velocity, change in weight-for-length Z-scores (WLZ), and change in infant BMI Z-scores (BAZ). We hypothesized that infants born to heavier mothers would have greater weight gain velocity, greater gain in WLZ, and greater gain in BAZ across the first six months compared to infants born to lower weight mothers.

Our second hypothesis was that infants born to mothers with gestational weight gain in excess of the 2009 IOM recommendations would have greater weight gain velocity, greater gain in WLZ, and greater gain in BAZ across the first six months compared to infants born to mothers with gestational weight gain within the 2009 IOM recommendations. The third hypothesis was that infants with higher weight at birth would have greater infant weight gain velocity, greater gain in WLZ, and greater gain in BAZ across the first six months of life, compared to infants born with lower weight.

Our final hypothesis was that lower breastfeeding intensity (i.e. more human milk fed from the bottle) would predict greater weight gain velocity, greater change in WLZ, and greater change in BAZ in infants during the first six months of life, controlling for maternal prepregnancy BMI, GWG and infant birth weight.

Methods and Study Design

Subjects

Recruitment of participants occurred through the distribution of fliers and presentations. Fliers were distributed at yoga studios, pediatrician offices, community centers, and at the health department. Presentations by researchers were conducted to recruit mothers from classes at Cone Health Women's Hospital Education Center. During the presentations researchers distributed fliers, and described the FIG study to mothers. The FIG study was approved to recruit women through snowball sampling, in which participants were allowed to distribute an electronic version of the flier to interested parties. See Appendix for flyer.

Potential participants answered questions to determine mother/infant eligibility for the FIG study. Mothers were required to be 18 years of age or older, speak English, disclose any medical conditions, plan to feed their infant breast milk, and report prepregnancy weight and infant birth weight. Infants were required to be at least 35 weeks gestation, have a birth weight of at least 2495 grams, born singleton, and lack any serious medical condition that could impact growth.

Study Design

The study was conducted using a longitudinal observational design, which was approved by the Institutional Review Board at the University of North Carolina at Greensboro. Data was collected from October 2013 to January 2016. The Feeding and Infant Growth Study was designed with 2 components: monthly questionnaires and bimonthly direct anthropometric measurements. The researcher scheduled home visit

appointments by email, phone call, or text message. Across the six month study period four home visit appointments were scheduled. The home visits were scheduled within +/- 1 week of the infant's monthly birthday. The first home visit was schedule less than two months of age, with the remaining home visits scheduled at two, four, and six months of age. Before the first home visit, written consent was obtained from study participants (see Appendix for the consent form). During the home visits at two, four, and six months the main researcher and research assistant took mother and infant measurements. At home visits, researchers measured: mother's height, weight and waist circumference and infant's weight, length, subscapular skinfold thickness, and triceps skinfold thickness.

Each month, for six months, participants filled out an infant feeding questionnaire (See Appendix for questionnaires). The questionnaires were mailed with an addressed and stamped return envelope. Questionnaires took approximately 20 minutes to complete. The neonatal questionnaire was completed before or at the first home visit. The five remaining questionnaires were mailed prior to the home visits when the infant was two months, three months, four months, five months, and six months old. Questionnaires collected information on infant feeding practices, demographic characteristics, medical history, smoking history, childcare status, and employment status.

Participants received four small thank you gifts for their contribution to the study. A gift was given at the end of each home visit. The gifts were bath toys, teething rings, bibs, receiving blankets, and hats. At the completion of the study mothers received a booklet detailing their child's growth across the first six months of life.

To assess rapid infant growth we examined change in WLZ from birth to six months, BAZ from birth to six months, and weight gain velocity from birth to six months. WLZ and BAZ provide an indicator for levels of adiposity, and are quick and easy to calculate. Instead of using fixed BMI values to classify individuals (as used for adults), BAZ is classified using thresholds that vary to take into account a child's age, sex, growth patterns as they mature, relative to a reference distribution, which in this study was the WHO child growth standards from the WHO Multicenter Growth Reference Study. This reference group was comprised of infants that were exclusively breastfed for four to six months, born full term, healthy, received all of their immunizations, and their mothers did not smoke. In addition to BAZ and WLZ, we assessed weight gain velocity, an innovative method of assessment recommended by the WHO. Weight gain velocity is defined as the change in infant weight values expressed per unit time. Weight gain velocity is considered more appropriate as it allows for earlier detection of rapid or attenuated infant weight gain than just assessment of weight alone.

Infant Feeding Practices

Researchers administered questionnaires modified from Infant Feeding Practices Study II (103,104) to determine infant feeding practices. Questionnaires included questions pertaining to: breastfeeding, termination of breastfeeding, milk expression, complementary feeding, formula feeding, mixed feeding (breast milk mixed with formula). Mothers were asked:

On average, in the past seven days:

1. How many times was your baby fed breast milk (daily and weekly totals)?

2. How many times was your baby fed pumped breast milk?
3. How many ounces of pumped breast milk were in the bottle?
4. How many ounces of pumped breast milk did your baby drink at each feeding?
5. How often does your baby drink all of his or her bottle?
6. How often is your baby encouraged to finish a bottle if he or she stops drinking before the pumped breast milk is gone?

Breastfeeding intensity was calculated each month, across the first six months of life. Breastfeeding intensity was defined as the total percent of feeds fed directly at the breast from zero to six months of age. Breastfeeding intensity during the first six months was determined by first calculating the total number of human milk feedings from zero to six months, then the total human milk bottle feedings from zero to six months. By subtracting the number of total human milk feedings by bottle per day from the total human milk feedings per day the number of total direct breastfeeds was determined. Total direct breastfeeds per day was then divided by the total number of feedings per day and multiplied by 100. Breastfeeding intensity was determined by asking two questions in our questionnaire:

1. “In the Past 7 days how often was your baby fed breast milk? Include feedings by everyone who feeds the baby.”
2. “How many times in the past 7 days was your baby fed pumped breast milk to drink? Include feedings by everyone who feeds the baby.”

This reflection on the infant feeding behaviors of the past week, were used as an indicator of infant feeding behaviors for the past month, allowing for the assessment of breastfeeding intensity.

Nursing or Bottle Feeding Group Assignments

Breastfeeding intensity from birth to six months was calculated from reported mode of feeding. Based on breastfeeding intensity from birth to six months, participants were categorized into one of two groups: nursing group (NG) and bottle fed human milk group (BG). Nursing group was composed of infants fed predominately at the breast with less than 20 percent of the feeds from a bottle. Bottle fed human milk group consumed human milk from the bottle more than 20 percent of the feeds. All infants were fed predominately human milk.

Measurements

Direct anthropometric measurements were obtained at two, four, and six months home visits. In the first neonatal questionnaire participants reported infant weight and length at birth. Bimonthly measurements comprised: mothers height (cm), mothers weight (kg), mothers waist circumference (cm), and infants nude weight (kg), infants recumbent length (cm), infants triceps skinfold thickness (mm), and infants subscapular skinfold thickness (mm). Procedures followed the World Health Organization standard techniques (105,106). Harpenden calipers were used to measure skinfold thickness of triceps and subscapular site on infant's right side. The triceps skin fold is a vertical fold, taken on the posterior midline of the upper arm. It is measured halfway between the acromion and olecranon processes while the arm is held freely to the side of the body. The subscapular fold is a diagonal fold, located 1 cm below the inferior angle of the scapula, at the bottom of the shoulder blade. Researchers attempted to minimize discomfort with gentle but precise measurement techniques.

Infant's recumbent length was measured within the nearest 1mm using an infant measuring board from Perspectives Enterprises, Portage, MI. The research assistant held the infants head to the headboard and ensured the infant head was placed in the Frankfort horizontal plane. The lead researcher positioned the infant's body in line with the infant measuring board, extended infant legs, and brought the footboard to rest against infant heels. Infant's nude weight was measured to the nearest gram using a calibrated pediatric scale made by Seca Medical Sales, in Hamburg Germany. Each measurement was duplicated for accuracy and a third measurement was obtained if the first two measurements differed by more than 3%.

Maternal weight was assessed without shoes and in light minimal clothing at each study visit by researchers with a calibrated digital adult scale (Tanita BWB-800s, Arlington Heights, IL). A Gulick tape was used to measure mother's waist circumference. Maternal height was measured barefoot, with back in a straight position, and with head in a Frankfort plane, using a portable stadiometer at the first study visit (Charder HM-200P). Maternal usual body weight before pregnancy was self-reported on the screening form or at the first research visit. Maternal prepregnancy BMI was calculated by self-reported prepregnancy weight divided by height squared [weight (kg)/height (M)²]. Total gestational weight gain was self-reported in the first questionnaire.

The same equipment was used for all home visits to ensure accuracy. Infant weight for length, subscapular and triceps skinfold thickness, and weight velocity data

was compared to the WHO standardized growth charts (107). See Appendix for measurement procedures.

Statistical Analysis

All statistical analyses were conducted using the software SPSS version 23. We used independent student T-tests and Chi squared analysis for comparisons between characteristics and infant growth data of the two groups (NG, BG). Bivariate associations between maternal weight (prepregnancy BMI, GWG), infant weight at birth, breastfeeding intensity group (NG vs BG) and weight gain velocity from birth to six months, change in weight-for-length Z-score from birth to six months, and change in BMI Z-score from birth to six months, were conducted.

To examine whether infant growth (weight gain velocity, change in weight-for-length Z-score, change in BMI Z-score) within the first six months could be predicted based on feeding mode (breastfeeding intensity group NG vs BG), multiple regression analysis was conducted controlling for maternal prepregnancy BMI, maternal GWG, infant's birth weight, BMI z-score at birth, and weight for length Z-score at birth. Statistical significance of effects was determined by $P < 0.05$ in bivariate analysis and $P < 0.10$ in multivariate analysis.

Results

Fifty-two mother infant dyads were recruited, of those, 50 remained in the study. Two mother infant dyads were eliminated from the study, due to one transitioning to complete formula feeding and the other not able to schedule measurements in accordance with FIG timeline protocol. Mother infant dyads were categorized by reported feeding

mode from birth to six months. Participants were categorized into one of two groups based on total breastfeeding intensity from birth to six months: 1) nursing group (NG), composed of infants fed predominantly at the breast with less than 20 percent of the feeds from a bottle and 2) the bottle feeding human milk group (BG), composed of infants fed human milk from the bottle more than or equal to 20 percent of the feeds. Thirty-four mother infant dyads were categorized as NG and 16 of mother infant dyads were categorized as BG. General characteristics of the participants are presented in Table 1., maternal anthropometric characteristics are presented in Table 2. There were no significant differences in maternal age, income, education levels, mom's prepregnancy BMI, GWG, infant weight at birth, or when mothers returned to work between groups.

Breastfeeding Intensity

NG infants were fed an average of 91% of human milk feeds directly at the breast (range of 80-100%), while BG infants were fed an average of 64% (range of 25-76%) during the first six months. Ten mothers had a breastfeeding intensity of 100% from birth to six months. Table 3 and Figure 1, show the breastfeeding intensity by group for each month. For the first month there was no significant difference between the two groups for breastfeeding intensity, but at two months a significant difference between the two groups emerged, and continued the following four months. Two infants in the BG were given formula to supplement their diet. One infant received one bottle of formula daily at five and six months. The other infant received one bottle of formula per day from birth to four months, and 3 bottles of formula daily at 5 and 6 months of age. However, breastfeeding intensity calculations did not include formula feedings, only human milk

feedings. The average frequency of feedings of human milk per day did not differ between the two groups (Table 4).

Milk Expression

The majority of mothers reported that they expressed milk and fed their infant from a bottle so that another person could feed their infant while they were at work. These mothers worked in an establishment that was not their home, and were unable to feed their child while at work. The second most common reason mothers reported that they expressed milk was to have an emergency supply. The third most common reason to express milk was to increase milk supply.

Infant Growth

Infant growth during the first six months is shown in Table 5, Table 12 and Figure 2, 3 4, 5, 6. Infant gain in weight and length from birth to six months was similar in NG and BG groups. Additionally, infant BMI, skinfold thickness measurements (triceps and subscapular), skinfold thickness Z-scores were similar in both groups at all time points. Weight-for-length Z-scores (WLZ), BMI-for-age Z-scores (BAZ), and weight gain velocity percentile between the two groups was similar across all time points. However, change in BAZ was significantly different between the two groups from two to four months, two to six months, and from birth to six months. Change in WLZ was significantly different between the two groups from two to six months.

Bivariate relationships are shown in Table 6. Prepregnancy BMI was significantly associated with weight gain velocity from birth to six months WLZ at birth and BAZ at birth GWG was significantly associated with greater weight at birth ($P= 0.027$). Infant

birth weight was negatively associated with change WLZ from birth to six months and change BAZ from birth to six months

There was no significant difference between groups in change in WLZ from birth to six months. However, in a multivariable regression analysis (Table 7) mom's prepregnancy BMI, infant birth weight, WLZ at birth and breastfeeding intensity group significantly predicted change in WLZ from birth to six months (adjusted $R^2 = 0.62$, $P < 0.001$). Each unit increase in mothers prepregnancy BMI increased the change in WLZ from birth to six months by 0.086, and each unit increase in birth weight increased the change in WLZ from birth to six months by 0.938; however, each increase in WLZ at birth decreased the change in WLZ from birth to six months by 0.927. The lower intensity breastfeeding group increased the change in WLZ from birth to six months by 0.861. Mothers gestational weight gain was not included in the model as it was statistically insignificant ($\beta=0.004$, $P= 0.915$), removal from the model did not affect overall adjusted R^2 and beta coefficients. Weight at birth and WLZ at birth were correlated ($r= 0.58$). However, we included both in the model as they each account for different factors, WLZ at birth accounts for adiposity whereas birth weight accounts solely for weight. The regression model was run with and without infant birth weight and the results were similar (data not shown).

There was not a significant difference between the two groups in weight gain velocity percentiles from birth to six months. However, a multiple regression analysis (Table 8) showed infant birth weight, moms prepregnancy BMI, and grouping significantly predicted weight gain velocity from birth to six months (adjusted $R^2 =$

0.166, $P < 0.015$). Each unit increase in mothers prepregnancy BMI increased weight gain velocity from birth to six months by 0.035, however each unit increase in birth weight decreased weight gain velocity from birth to six months by 0.126. The lower intensity breastfeeding group increased weight gain velocity from birth to six months by 0.107. Mothers gestational weight gain was not included in the model as it was statistically insignificant ($\beta=0.001$, $P= 0.892$), removal from the model did not affect overall adjusted R^2 and beta coefficients.

There was a significant difference between the two groups in change BMI for age Z-scores (BAZ) from birth to six months. In addition, a multiple regression analysis (Table 9) showed infant birth weight, moms prepregnancy BMI, and breastfeeding intensity significantly predicted change in BAZ from birth to six months (adjusted $R^2 = 0.595$, $P < 0.001$). Each unit increase in mothers prepregnancy BMI increased the change in BAZ from birth to six months by 0.102, each unit increase in birth weight increased the change in BAZ from birth to six months by 0.878; however, each increase in BAZ at birth decreased the change in BAZ from birth to six months by 0.926. The lower intensity breastfeeding group increased the change in BAZ from birth to six months by 0.896. Mothers gestational weight gain was not included in the model as it was statistically insignificant ($\beta= -0.004$, $P= 0.901$), removal from the model did not affect overall adjusted R^2 and beta coefficients. Birth weight and WLZ at birth were correlated ($r= 0.59$). However we included both in the model as they each account for different factors, WLZ at birth accounts for adiposity whereas birth weight accounts solely for weight. The

regression model was run with and without infant birth weight and the results were similar (data not shown).

Bottle Emptying Behavior

Bottle emptying behavior of BG infants is reported in Table 10. Mother's reported BG infants, fed human milk from the bottle finished the bottle "most of the time" or "all of the time," with an average bottle size of three to four ounces reported at each feed. Total volume of milk in bottles fed to BG infants is displayed in Table 10. The majority of mothers reported filling bottles three to four ounces, with some bottles being filled seven to eight ounces at five and six months. In addition, the majority of mothers reported "Never" or "rarely" to encouraging their child to finish the bottle.

Complementary Feeding

Complimentary feeding behaviors are reported in Table 11. No infants were introduced to complementary foods before four months. Three infants were introduced to complementary foods at four months, 13 at five months, and 9 at 6 months. 28 infants were not introduced to complementary foods by six months of age.

Discussion

These results suggest that feeding human milk from the bottle for more than 20% of the feeds may promote increased gain in infant weight for length, BMI, and weight gain velocity during the first six months of life. Overall, infants born to mothers with higher prepregnancy BMI exhibited greater weight gain velocity percentiles from birth to six months compared to infants born to mothers with lower prepregnancy BMI. However,

mothers prepregnancy BMI was not significantly associated with change in WLZ from birth to six months or change in BAZ from birth to six months.

Within the literature there are prospective studies that demonstrate a relationship between maternal prepregnancy BMI and the incidence of overweight/ obesity later in childhood (27,63,65,77), increased infant anthropometrics outcomes (75–81), and rapid infant weight gain (79). Mothers average prepregnancy BMI was within a normal range for both groups, with a small proportion of obese mothers (<15%) in the study. The FIG study may have lacked mothers with excessive BMI statuses to illicit an effect on measures of infant adiposity (BAZ, WLZ), as opposed to say a measure of infant weight (weight gain velocity). Due to a small sample size, it is possible that there was not enough power to detect a difference in WLZ and BAZ as they are both measures of adiposity, whereas weight gain velocity is just a measure of weight gain across the first 6 months. Additionally, the infants did gain weight across the first six months of life but they also proportionally gained length as well- and length is not accounted for in weight gain velocity.

While GWG was positively related to infant birth weight, there was not a relationship between GWG and infant growth (weight gain velocity 0-6, change in WLZ 0-6, change in BAZ 0-6) despite the majority of mothers in each group demonstrating excessive GWG outside the 2009 IOM recommendations. This is contrary to several prospective studies that highlight a relationship between excess GWG and childhood overweight or obesity (64–66,79) greater infant anthropometric outcomes (64,66,78–80) and increased adiposity (65,78). However, a study by Deierlein et al. examined the

effects of maternal weight (prepregnancy BMI and GWG) on infant growth (78). While excessive GWG was positively associated with increased WAZ and rapid infant weight gain, results were not significant. The influence of GWG on infant growth may vary with prepregnancy BMI status. Heerman et al. found a pooled effect between mothers excess GWG and prepregnancy BMI status of obesity on greater birth weight and rapid weight gain from birth to 3 months of life, this persisted through the first year of life (79). In this study mothers average prepregnancy BMI was within a normal range, there was a small proportion of obese mothers (<9%) in each group, and over half of each group gained excess GWG. Due to a small sample size, we were unable to examine if mothers BMI status elicited a pooled effect with excess GWG on infant growth.

In our study infants with higher weight at birth had a smaller change in WLZ from birth to six months, and change in BAZ from birth to six months, compared to infants with lower weight at birth. Other studies have shown similar results with infants with higher weight at birth demonstrating a lower WAZ and WLZ compared to infants with lower weight at birth demonstrating a greater WAZ and WLZ (108–110). Karaolis-Danckert et al. reported a greater BMI at birth was protective against a child's risk of gaining weight rapidly. There is evidence for a relationship between low birth weight and greater infant weight gain (11,111,112). This relationship may be elucidated by the catch-up growth hypothesis, which proposes rapid weight catch-up may lead to overweight or obesity later in life (111–113).

Change in BAZ and WLZ was significantly different between the two groups from two to six months. This corresponds to the time when mothers began to decrease

their breastfeeding intensity, suggesting that bottle feeding may increase weight gain in early infancy.

Multiple regression analyses showed breastfeeding intensity significantly predicted weight gain velocity from birth to six months (adjusted $R^2 = 0.166$, $P < 0.015$), change in WLZ from birth to six months (adjusted $R^2 = 0.62$, $P < 0.001$), and change in BAZ from birth to six months (adjusted $R^2 = 0.595$, $P < 0.001$), controlling for infant birth weight, moms prepregnancy BMI, BAZ z-score at birth, and WLZ-score at birth.

Within the literature rapid infant weight gain may be defined as an increase in 1 unit standard deviation of a Z-score (commonly greater than an increase of 0.67 SD in WAZ, WLZ, BAZ). Change in WLZ from two to six months was on average 1.22 in the BG group, which qualifies as rapid infant weight gain. Whereas the NG change in WLZ from two to six months was 0.38, a normal gain. Change in BAZ from two to six months was on average 1.43 in the BG group, which qualifies as rapid infant weight gain, compared to the NG change in WLZ from two to six months of 0.51, a normal gain. The bottle feeding group gained more weight relative to length from two to six months compared to the nursing group. This difference in speed of growth from two to six months between the two group (NG vs. BG) may have developed as two months is the time in which a significant difference between the groups in breastfeeding intensity occurred. While weight for length gain was high in the BG infants, weight gain velocity percentiles (Table 5, Figure 5) from two to six months in both groups are close to the WHO reference population average or 50th percentile.

In a study conducted by Bartok, infants in the NG received 98% of milk at the breast and infants in the BG received 22% of feeding from the bottle at one month and advanced to feeding 60% from the bottle at six months (38). NG and BG infants in Bartok's study demonstrated similar growth in weight, WLZ, BAZ from birth to six months. In the FIG study, NG group infants received an average of 91% of human milk feeds at the breast, while the infants in the BG group received approximately 65% of their human milk feedings at the breast across six months. NG and BG infants in our study demonstrated comparable weight, length, weight gain velocity, WLZ, BAZ at all time points (birth, 2, 4, and 6 months). However, after comparing their growth, change in WLZ from birth to six months, and change in BAZ from birth to six months between NG and BG infants a dissimilar pattern of growth between the groups emerged. BG infants grew more rapidly than NG infants between two to four months BAZ, birth to six months BAZ, two to six months BAZ, and two to six months WLZ. Bartok's study did not report the change in BAZ or change in WLZ across the first 6 months of life. Differences may not have been detected in the Bartok study because the sample size was too small to see an effect.

The study by Bartok did not control for the effect of mother's weight (prepregnancy BMI and GWG), despite the relationship between greater prepregnancy weight and a shortened duration of breastfeeding (114–117). This is an important consideration as infants fed with longer durations of breastfeeding weigh less and are shorter in length at 1 year, compared to infants fed with a shorter duration of breastfeeding (34). Present-day samples, composed of a majority of overweight or obese

women, may misconstrue the effect of breastfeeding if mothers prepregnancy BMI and GWG are not controlled for; This may be due to the fact that mothers weight (pregnancy BMI and GWG) may account for some of the variance in infant weight gain across the first 6 months of life, that is also explained by breastfeeding. Maternal age and BMI of women in the Bartok study was similar to those of the FIG study, mothers average BMI were within normal range in both groups and mothers average gestational weight gain across pregnancy was similar as well. Again, differences may not have been detected in the Bartok study because the sample size was too small to see an effect of bottle feeding human milk.

Utilizing data from the infant feeding practices study II (IFPS II), Li et al. found that among infants fed human milk only by both bottle and breast, monthly weight gain increased from 729 g when few feedings were by bottle, to 780 g when most feedings were by bottle (36). Li et al. considered bottle-emptying behavior a method of self-regulation. Additionally, Li et al. found two distinct groups of infants in the IFPS II, infants with high and low bottle emptying behavior. Researchers reported that regardless of bottle contents, infants who emptied their bottles often in early infancy had increased likelihoods (69%) of having excess weight in late infancy, when compared to infants who rarely emptied their bottles (37). Results from IFPS II substantiate the notion that bottle feeding may modify infant self-regulation.

Mothers of BG infants in the FIG study reported that infants finished the bottle “most of the time” or “always,” thus demonstrating high bottle emptying behavior (Table 10). This is unlike infants from the IFPS II which demonstrated two distinct bottle

emptying behaviors. We may have seen an absence of low bottle emptying behavior as our sample size (n=50) was much smaller than that of the IFPS II (n=1250). The majority of mothers reported filling bottles between three to four ounces from two to six months (Table 10) this may be why infants demonstrated high bottle emptying behavior. IFPS II did not inquire about the volume of milk that was fed to infants, or how this volume may change across infancy. The FIG study not only inquired about the volume of milk fed to infants, but inquired how this amount varied across the first six months of life accounting for volume changes across early infancy. In addition, the majority of FIG mothers reported “Never” or “rarely” encouraging their child to finish the bottle, this may be due to the fact that the infants emptied their bottle the majority of the time.

A study conducted by Wood et al. examined the effect of bottle size on infant growth in exclusively formula fed infants (101). Infants fed formula from a large bottle (≥ 6 ounces) at two months demonstrated higher weight gain, WAZ, and WLZ at 6 months compared to infants fed formula from a regular size bottle (< 6 ounces). Research staff asked volume of formula fed to infants at the two month study visit, and asked parents to show the bottle and volume used to feed the infant formula. Similar to IFPS II, Wood et al. did not inquire how bottle size volume changed across infancy from two months to six months. Additionally Wood et al. did not enquire into bottle emptying behavior of formula fed infants. The FIG study accounted for volume changes across early infancy, as well as bottle emptying behaviors). In the FIG study the majority of mothers reported filling bottles between three to four ounces from two to six months

(Table 10), this regular bottle size may be why we observed a small difference between the groups.

Results from IFPS II suggest that breastfed infants are being fed a significant amount of human milk from the bottle, with a quarter expressing milk on a regular schedule. Motives for expressing milk include more working mothers and greater availability of quality breast pumps. Feeding mode, human milk delivered from the bottle may contribute to rapid infant growth. It is hypothesized that infants fed directly at the breast have a better sense of self-regulation. It is possible that breastfeeding mothers may be more aware of infants' satiety cues and less concerned with the amount of milk an infant is consuming; as they are unable to physically see how much milk is in a bottle; whereas bottle feeding mothers may be more likely to encourage infants to finish the bottle, thereby disrupting infants mechanism of self regulation. Within the FIG study we observed that infants fed human milk from the bottle for more than 20% of the feeds possessed greater gain in infant weight, WLZ, and BAZ during the first six months of life, controlling for infant weight at birth and maternal weight. These results suggest that mode of milk delivery (bottle feeding human milk) may increase infant growth across early infancy.

It has been documented that women are more likely to breastfeed when maternity leave is taken, and a longer maternity leave increases both the incidence and duration of breastfeeding (118). It is well documented that breastfeeding improves bonding between mothers and their infants but also provides important health benefits and can even reduce the risk of health problems such as diarrheal disease, respiratory illnesses, ear infections,

obesity, endocrine dysfunction, and certain cancers (119). Results from this study indicate that feeding human milk in a bottle may increase infant growth across early infancy. These results imply a need for a change in recommended infant feeding practices to predominantly feeding infants human milk at the breast, across early infancy. Yet, mothers who work full-time have no option but to bottle feed their infant human milk as The United States does not mandate paid maternity leave. Lack of paid maternity leave forces many women to choose between working and nursing their child. Additionally many households are unable to afford unpaid time off from work. A change in policy advocating for paid maternity leave, and subsequently allowing for nursing one's infant directly at the breast would be best.

The mothers in the FIG study were Caucasian, well educated, with mean annual household incomes totaling greater than > \$60,000. While the mothers in the FIG study possessed demographic characteristics similar to those that participated in the Bartok study, they are a homogenous sample and are not representative of The United States population.

Strengths of this study include reliable direct measurements of infants, study design, and high retention rate of participants. The study had a retention rate of 96%. This was due to several factors. The mothers that were included in our study were educated mothers who wanted to participate and were also willing to recommend others to participate in the study via snowball sampling. Additionally, in screening mothers were asked "what is your preferred method of contact?" and mothers were predominately contacted via this method for the entirety of the study. Home visits were scheduled ahead

of time, with a reminder provided by researchers the day before the home visit. Researchers had a unique opportunity to develop a relationship with clients through attending breastfeeding support groups weekly, this allowed for researchers to develop a report that possibly lead to a high retention rate. Another strength of the study was evaluation of infant growth by three different measures: weight gain velocity, change in WLZ, and change in BAZ. A notable strength of the study was the inclusion and control for maternal weight characteristics (prepregnancy BMI and GWG). One limitation of this study is that the primary researcher did not directly observe total volume of human milk in bottles, ounces of human milk consumed at each feeding, or bottle emptying behaviors; these were reported by mothers in monthly questionnaire. Furthermore, there was a lack of measurement of the amount of human milk consumed each feeding by NG infants.

Future research endeavors should aim to include larger sample sizes, a more diverse study population, and mixed feeding methods, within a longitudinal study designed to follow participants from infancy into childhood.

Conclusion

This study found that among infants not receiving formula or complementary foods before four months, feeding human milk from the bottle more than 20% of the time may contribute to increased weight for length gain from birth to 6 months. This is noteworthy as an independent contribution as mother's weight and infant birth weight were controlled for within the regression model. Weight gain velocity percentiles in both groups (NG vs. BG), was close to the WHO reference population average or within

normal limits, suggesting an absence of rapid infant weight gain. However bottle fed human milk group infants gained significantly more weight for length (WLZ, BAZ), more rapidly, from two to six months compared to the nursing group. Results suggest this rapid gain in weight for length indicates a rapid increase in adiposity, for which WLZ and BAZ are a measure. This difference in speed of growth from two to six months between the two groups (NG vs. BG) may have developed as two months is the time in which a significant difference between the groups in breastfeeding intensity occurred.

CHAPTER IV

EPILOGUE

Previous to my first semester in graduate school I began to work with Dr. Lovelady and Kelsey Wilson in the Feeding and Infant Growth (FIG) study. The exploratory FIG study endeavored to examine whether the mode of infant feeding significantly impacted infant growth in the first six months of life. After being involved in data collection and entry, as well as working closely with mother infant dyads I realized not only my appreciation but interest in research. Through my exploration of the literature and working closely with Dr. Lovelady and Kelsey Wilson, I began to see a gap within the literature. Research studies were examining breastfeeding patterns, feeding mode, and infant growth outcomes without addressing or controlling for the factor of maternal weight (prepregnancy BMI, gestational weight gain). I proposed to continue Kelsey Wilson's work under Dr. Lovelady's guidance, exploring the relationship of a lower breastfeeding intensity (i.e. more human milk fed from the bottle) and infant growth during the first six months of life, controlling for maternal weight.

Overall the results of this study found that feeding human milk from the bottle may promote increased gain in infant weight for length and BMI during the first six months of life. The study was strengthened by control for the impact of maternal weight, direct measurements of infants, and a design that assessed how infant feeding mode

(breast vs bottle) and practices (complementary feeding) changed across the first six months of life. However, this study was limited by a small sample size.

In future studies I would like to work with a larger, more diverse sample size. This may be possible by recruiting beyond a women's hospital, by forming additional partnerships with agencies and programs similar to The Supplemental Nutrition Program for Women Infants and Children (WIC). A partnership with WIC would allow for a larger and more diverse ethnic and socioeconomic recruitment foundation. As many participants within the WIC program do not exclusively breastfeed the study could be expanded to include formula feeding, and mixed feeding. Additionally, I would like to conduct a study examining infant growth across the whole of infancy (birth to 24 months), with IRB approval to follow up in childhood (3-5 years of age). A longitudinal study design would allow for the development and further understanding of the impact of infant feeding mode and practices on infant growth and subsequently child growth while controlling for important factors such as maternal weight status.

Results of this study are of practical importance, especially for any working mother who is considering how to best feed her child. As results from this study indicate that feeding human milk in a bottle may increase infant growth across early infancy; they imply a need for a change in recommended infant feeding practices to predominantly feeding infants human milk at the breast, across the first six months of life. As our country does not mandate paid maternity leave mothers who work full-time have no option but to bottle feed their infant human milk, possibly to the detriment of their child's obesity risk. Results of this study indicate a need in policy change, promoting a country

wide mandated paid maternity leave, which would allow for nursing one's infant directly at the breast.

My immersion in applied nutrition research has enlightened me to an entirely new appreciation of nutrition, and a love of working with mothers and infants. I have learned valuable skills ranging from database entry, statistical analysis, technical skills such as anthropometric measurements, to soft skills important in recruiting and retaining participants. Without the opportunity to work closely with this population I would never have discovered my area of interest nor the direction of my future work in the field of nutrition. Through working with this population I have learned to become more adaptable, creative, and compassionate ultimately improving my character for future work as a scholar and a dietitian.

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APPENDIX A

TABLES AND FIGURES

Table 1. Characteristics of Participants by Group		
	Nursing Group (n=34)	Bottle feeding Group (n=16)
Maternal		
Age (yr., Mean, SD)	30.55 ± 4.15	29.63 ± 3.10
Education		
High School Degree	18 (53%)	7 (44%)
College Degree	16 (47%)	9 (56%)
Return to Work (yes)	19 (56%)	13 (81%)
Weeks Postpartum (Mean, SD)	4.63 ± 4.84	6.87 ± 4.32
At 3 Months Postpartum		
Not Working	15 (44%)	3 (19%)
Part-Time	14 (41%)	7 (44%)
Full Time	5 (15%)	6 (37%)
Childcare at 3 Months		
I Care for Child	13 (33%)	4 (25%)
Family Member	7 (21%)	6 (38%)
Non-Family Member	4 (12%)	4 (25%)
Keep Child at Work, Work From Home	3 (9%)	1 (6%)

Keep Child at Work	0 (0%)	1 (6%)
More than One of These	7 (20%)	0 (0%)
Income		
Less than \$60,000	14 (41%)	4 (25%)
Greater than \$60,000	20 (59%)	12 (75%)
Parity		
Primiparous	11 (32%)	7 (44%)
Multiparous	23 (68%)	9 (56%)
Infant Birth Weight (kg, Mean, SD)	3.70 ± 0.50	3.63 ± 0.47
Infant Gender		
Female	15 (44%)	9 (56%)
Male	19 (56%)	7 (44%)

Table 2. Maternal Anthropometric Characteristics by Group		
	Nursing Group (n=34)	Bottle feeding Group (n=16)
Height (cm)	164.84 ± 6.68	163.18 ± 5.64
Prepregnancy Weight (kg)	67.66 ± 9.32	63.72 ± 7.40
Prepregnancy BMI		
Prepregnancy BMI	24.98 ± 3.81	24.02 ± 3.34
Normal Weight	17 (50%)	10 (62.5%)
Overweight	14 (41.2%)	5 (31.3%)
Obese	4 (8.8%)	1 (6.3%)
Gestational Weight Gain		
GWG (kg)	17.61 ± 5.58	15.76 ± 4.17
% Adequate Gain	11 (32.4%)	5 (31.3%)
% Excessive Gain	23 (67.6%)	11 (68.8%)
Postpartum Weight (kg)		
2 Months	77.34 ± 11.81	76.66 ± 9.35
4 Months	76.01 ± 12.42	76.15 ± 9.41
6 Months	75.06 ± 12.85	75.12 ± 9.98
Waist Circumference (cm)		
2 Months	84.83 ± 11.84	88.86 ± 9.51
4 Months	82.80 ± 11.96	86.43 ± 10.48
6 Months	81.30 ± 12.28	85.39 ± 10.79

Table 3. Breastfeeding Intensity by Group*			
	Nursing Group (n=34)	Bottle feeding Group (n=16)	
Breastfeeding Intensity			
At 1 Month	98.36 ± 4.07	95.69 ± 7.24	P= 0.101
At 2 Months	96.86 ± 5.15	78.35 ± 23.23	P < .001
At 3 Months	92.59 ± 10.88	65.08 ± 28.32	P < .001
At 4 Months	91.80 ± 10.07	48.06 ± 17.08	P < .001
At 5 Months	82.69 ± 16.38	46.80 ± 17.79	P < .001
At 6 Months	79.02 ± 22.95	45.29 ± 19.65	P < .001
Total Breastfeeding Intensity 0-6 Months*	91.05 ± 7.23	64.75 ± 14.44	P < .001

*Mean, SD

Breastfeeding intensity was defined as the total percent of feeds fed directly at the breast. The number of total direct breastfeeds per day was determined by subtracting the human milk feedings by bottle from the total human milk feedings. Then the total number of direct breast feeds per day was divided by the total number feedings per day and multiplied by 100.

Table 4. Average Frequency of Feedings per Day by Month*		
	Nursing Group (n=34)	Bottle Feeding Group (n=16)
Feedings per Day		
At 1 Month	10.91 ± 2.08	10.47 ± 1.68
At 2 Months	9.75 ± 1.97	9.53 ± 2.32
At 3 Months	9.18 ± 1.98	9.09 ± 2.39
At 4 Months	8.97 ± 1.99	8.88 ± 2.55
At 5 Months	9.01 ± 2.22	9.06 ± 2.49
At 6 Months	8.58 ± 2.64	8.81 ± 2.81

*Mean, SD

Table 5. Infant Growth During the First Six Months ⁺			
	Nursing Group (n=34)	Bottle-feeding Group (n=16)	
Weight (kg)			
Birth	3.70 ± 0.50	3.63 ± 0.47	
2 Months	5.39 ± 0.65	5.32 ± 0.67	
4 Months	6.80 ± 0.81	6.84 ± 0.51	
6 Months	7.92 ± 0.90	8.06 ± 0.76	
Length (cm)			
Birth	52.16 ± 2.53	52.62 ± 3.59	
2 Months	56.98 ± 2.08	57.38 ± 3.21	
4 Months	61.89 ± 3.00	61.53 ± 2.53	
6 Months	65.00 ± 3.06	64.21 ± 2.51	
BMI (kg/m ²)			
Birth	13.71 ± 2.12	13.34 ± 2.80	
2 Months	16.52 ± 2.45	16.19 ± 1.86	
4 Months	17.41 ± 1.91	17.98 ± 1.71	
6 Months	17.77 ± 1.61	18.95 ± 2.16	
BMI Z Scores			
Birth	0.01 ± 1.58	-0.46 ± 2.15	
2 Months	0.34 ± 1.51	0.12 ± 1.42	
4 Months	0.49 ± 1.37	0.90 ± 1.06	

6 Months	0.85 ± 1.30	1.55 ± 1.34	
Change BMI Z Scores			
Birth- 2 Months	0.33 ± 1.67	0.58 ± 2.37	
2 - 4 Months	0.15 ± 0.98	0.78 ± 0.69	P= 0.025
2 - 6 Months	0.51 ± 1.19	1.43 ± 1.21	P= 0.015
4 - 6 Months	0.36 ± 0.60	0.64 ± 0.79	
0 - 4 Months	0.47 ± 1.65	1.36 ± 2.11	
0 - 6 Months	0.84 ± 1.53	2.01 ± 2.10	P= 0.030
Weight-for-Length Z-Scores			
Birth	-0.50 ± 1.83	-0.67 ± 2.18	
2 Months	0.53 ± 1.67	0.39 ± 1.82	
4 Months	0.63 ± 1.44	0.97 ± 1.15	
6 Months	0.93 ± 1.32	1.68 ± 1.43	
Change Weight for Length Z-Scores			
Birth - 2 Months	1.03 ± 2.18	1.07 ± 2.24	
2 - 4 Months	0.07 ± 1.18	0.58 ± 1.12	
2 - 6 Months	0.38 ± 1.36	1.22 ± 1.32	P= 0.045
4 - 6 Months	0.31 ± 0.62	0.71 ± 0.93	
0 - 4 Months	1.13 ± 1.99	1.65 ± 2.19	
0 - 6 Months	1.43 ± 1.85	2.29 ± 2.04	

Weight Gain Velocity Percentile			
Birth - 2 Months	0.28 ± 0.29	0.31 ± 0.36	
2 - 4 Months	0.51 ± 0.31	0.63 ± 0.27	
4 - 6 Months	0.57 ± 0.31	0.61 ± 0.36	
0 - 4 Months	0.38 ± 0.26	0.39 ± 0.31	
0 - 6 Months	0.45 ± 0.29	0.53 ± 0.29	
2 - 6 Months	0.51 ± 0.33	0.55 ± 0.32	
Triceps Skinfold Thickness (mm)			
2 Months	8.93 ± 1.10	8.97 ± 1.15	
4 Months	10.08 ± 1.49	10.93 ± 1.64	
6 Months	10.95 ± 1.69	11.82 ± 1.33	
Subscapular Skinfold Thickness (mm)			
2 Months	7.96 ± 1.01	7.97 ± 1.07	
4 Months	8.59 ± 1.26	8.82 ± 1.25	
6 Months	9.21 ± 1.30	9.65 ± 1.56	

	Table 6. Bivariate Correlations									
	BW	GWG	PP BMI	Total BFI 0-6 Mo.	WLZ at Birth	BAZ At Birth	BFI Group	Change WLZ 0-6 Mo.	Weight Gain Velocity 0-6 Mo.	Change BMI 0-6 Mo.
BW	1.0	.314 0.027	0.153 0.288	0.118 0.415	0.582 .000	0.696 0.000	-0.074 0.608	-0.294 0.039	-0.160 0.268	-0.383 0.006
GWG	0.314 0.027	1.0	0.106 0.466	0.079 0.584	-0.066 0.649	0.058 0.690	-0.167 0.246	0.126 0.382	-0.033 0.821	-0.006 0.970
PP BMI	0.153 0.288	0.106 0.466	1.0	0.239 0.094	0.326 0.021	0.286 0.044	-0.124 0.390	-0.131 0.365	0.393 0.005	-0.046 0.752
Total BFI 0-6Mo.	0.118 0.415	0.079 0.584	0.239 0.094	1.0	0.098 0.498	0.110 0.447	-0.780 0.000	-0.125 0.387	-0.102 0.479	-0.132 0.360
WLZ at Birth	0.582 0.000	-0.066 0.649	0.326 0.021	0.098 0.498	1.0	0.937 0.000	-0.043 0.768	-0.747 0.000	0.031 0.833	-0.652 0.000
BAZ at Birth	0.696 0.000	0.058 0.690	0.286 0.044	0.110 0.447	0.937 0.000	1.0	-0.126 0.383	-0.685 0.000	-0.039 0.786	-0.718 0.000
BFI Group	-0.074 0.608	-0.167 0.246	-0.124 0.390	-0.780 0.000	-0.043 0.768	-.0126 0.383	1.0	0.211 0.141	0.136 0.347	0.307 0.030
Change WLZ 0-6 Mo.	-0.294 0.039	0.126 0.382	-0.131 0.365	-0.125 0.387	-0.747 0.000	-0.685 0.000	0.211 0.141	1.0	0.273 0.055	0.925 0.000
Weight Gain Velocity 0-6 Mo.	-0.160 0.268	-0.033 0.821	0.393 0.005	-0.102 0.479	0.031 0.833	-0.039 0.786	0.136 0.347	0.273 0.055	1.0	0.382 0.006
Change BMI 0-6 Mo.	-0.383 0.006	-0.006 0.970	-0.046 0.752	-0.132 0.360	-0.652 0.000	-0.718 0.000	0.307 0.030	0.925 0.000	0.382 0.006	1.0

* P < .05

+Mean, Standard Deviation

BW= Birth Weight

PP BMI= Prepregnancy BMI

BFI= Breastfeeding Intensity

Table 7. Multiple Regression Model of Predictors of Change WLZ 0-6 Months. $R^2 = 0.62$				
	Effect Size	Standard Error	95% Confidence Interval	P Value
Birth weight	0.938	0.432	(0.069, 1.807)	.035
Mom's PP BMI	0.086	0.050	(-0.015, 0.186)	0.093
Breastfeeding Intensity group	0.861	0.368	(0.120, 1.601)	0.024
WLZ at Birth	-0.932	0.114	(-1.162, -0.702)	<0.001

Table 8. Multiple Regression Model of Predictors of Weight Gain Velocity 0-6 Months. $R^2 = 0.166$				
	Effect Size	Standard Error	95% Confidence Interval	P Value
Birth weight	-0.126	0.077	(-0.280, 0.028)	0.107
Mom's PP BMI	0.035	0.010	(0.014, 0.056)	.001
Breastfeeding Intensity group	0.107	0.079	(-0.053, 0.267)	0.185

Table 9. Multiple Regression Model of Predictors of Change BAZ 0-6 Months. $R^2 = 0.595$				
	Effect Size	Standard Error	95% Confidence Interval	P Value
Birth weight	0.878	0.465	(-0.059, 1.816)	0.066
Mom's PP BMI	0.102	0.047	(0.008, 0.196)	0.035
Breastfeeding Intensity group	0.896	0.351	(0.190, 1.603)	.014
BAZ at Birth	-0.926	0.133	(-1.194, -0.658)	<0.001

Table 10. Bottle Emptying Behavior of BG Infants by Month					
	2 Months	3 Months	4 Months	5 Months	6 Months
Bottle Emptying Behavior					
Number Reporting High	5	11	13	13	15
Number Reporting Low	11	5	3	3	1
Total Volume of Milk in Bottles Fed					
1-2 ounces	2	1		1	
3-4 ounces	10	10	11	6	6
5-6 ounces	1	2	2	3	5
7-8 ounces				2	1
More than 8 ounces				1	1

High bottle emptying behavior = mother reported infant emptied bottle “most of the time” or “all of the time”. Low bottle emptying behavior= mother reported infant emptied bottle “Never”, “rarely”, or “sometimes”.

Table 11. Complementary Feeding per Day by Group		
Number of complementary feedings per day	Nursing Group (n=34)	Bottle Feeding Group (n=16)
At 1 Month	0	0
At 2 Months	0	0
At 3 Months	0	0
At 4 Months		
Infant Cereal	2	1
Fruits	1	1
Veggies	2	1
At 5 Months		
Infant Cereal	10	6
Other Cereal	1	1
Fruits	9	4
Veggies	7	6
Sweets	1	0
Dairy	1	0
At 6 Months		
Infant Cereal	16	6
Other Cereal	2	1
Fruits	14	7
Veggies	12	8
Sweets	1	0

Dairy	2	1
Meat	1	1
Juice	1	0

Table 12. Triceps and Subscapular Skinfold Thickness Z Scores

	Nursing Group N= 34	Bottle Group N=16
Triceps (mm, Mean, SD)		
4 Months	0.25 ± 0.82	0.62 ±0.85
6 Months	0.88 ± 0.86	1.21 ± 0.68
Subscapular (mm, Mean, SD)		
4 Months	0.65 ± 0.78	0.87 ± 1.04
6 Months	1.25 ± 0.75	1.49 ± 0.84

Figure 1. Breastfeeding Intensity By Group

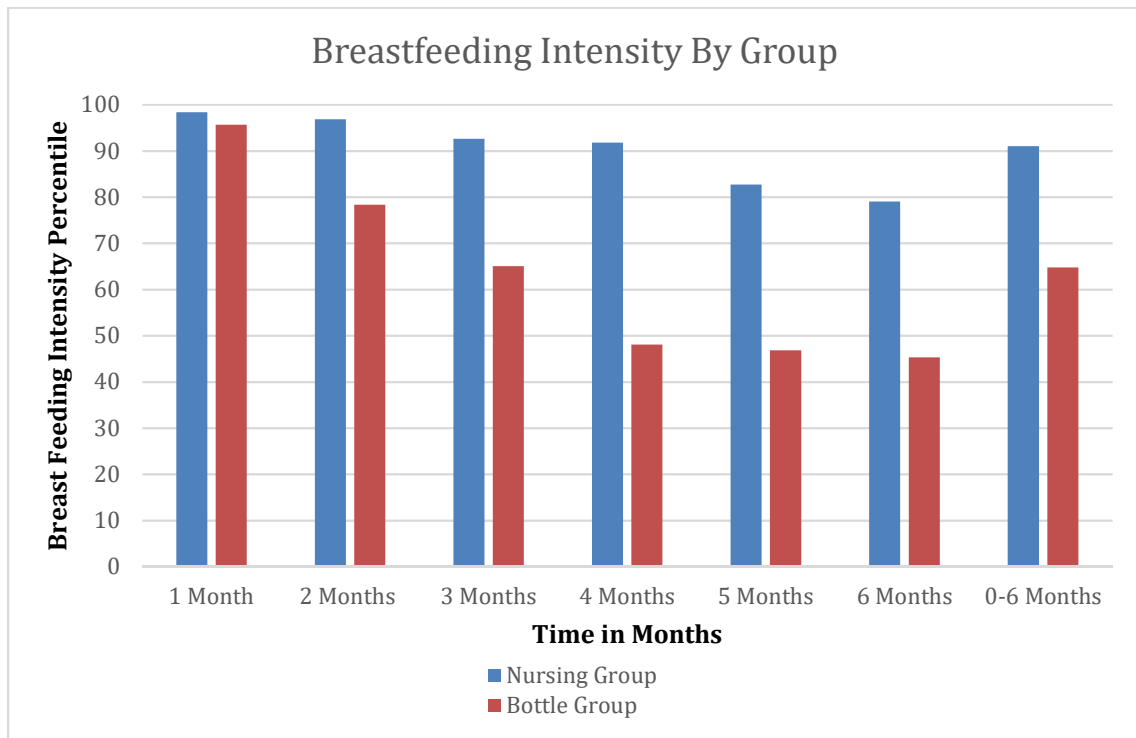


Figure 2. Infant Weight From Birth To Six Months By Group

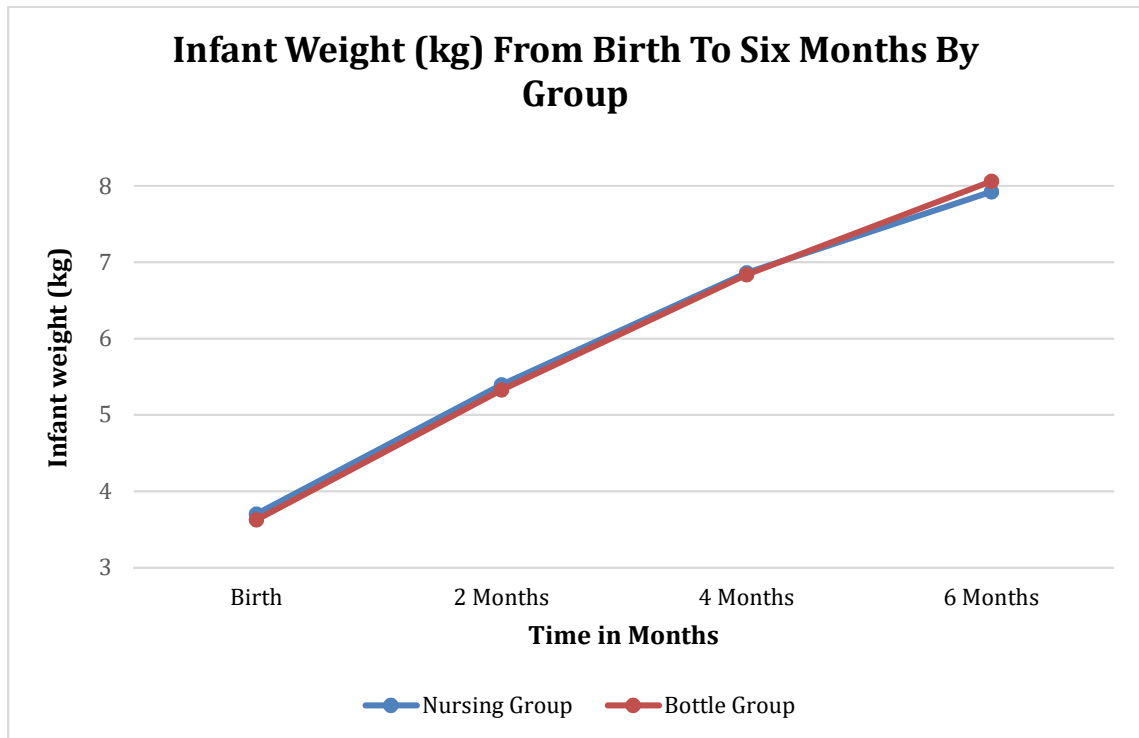


Figure 3. Weight For Length Z Score From Birth To Six Months By Group

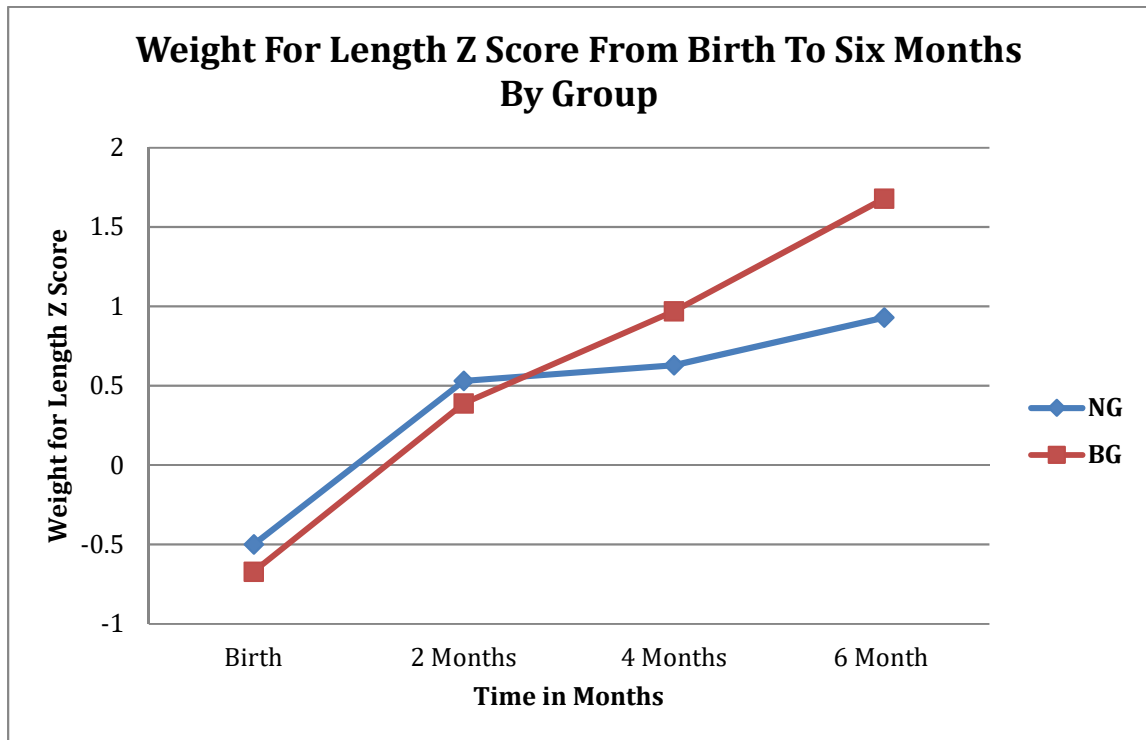


Figure 4. Weight Gain Velocity Percentile Birth To Six Months

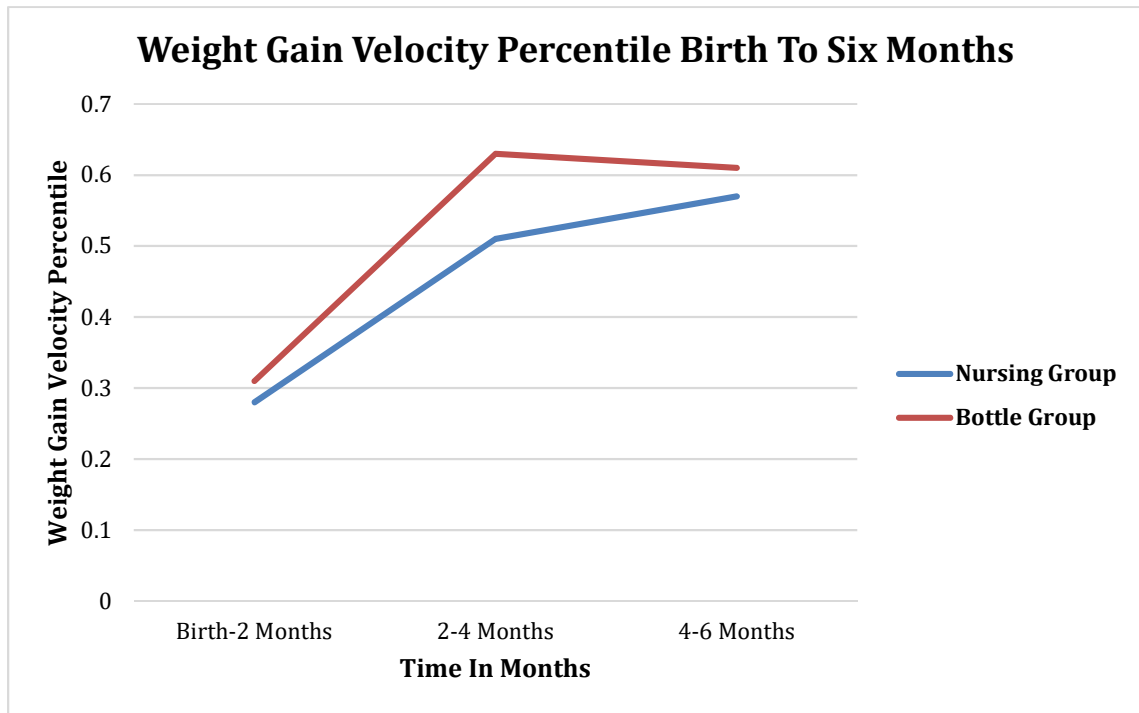


Figure 5. Weight Gain Velocity Birth To Six Months

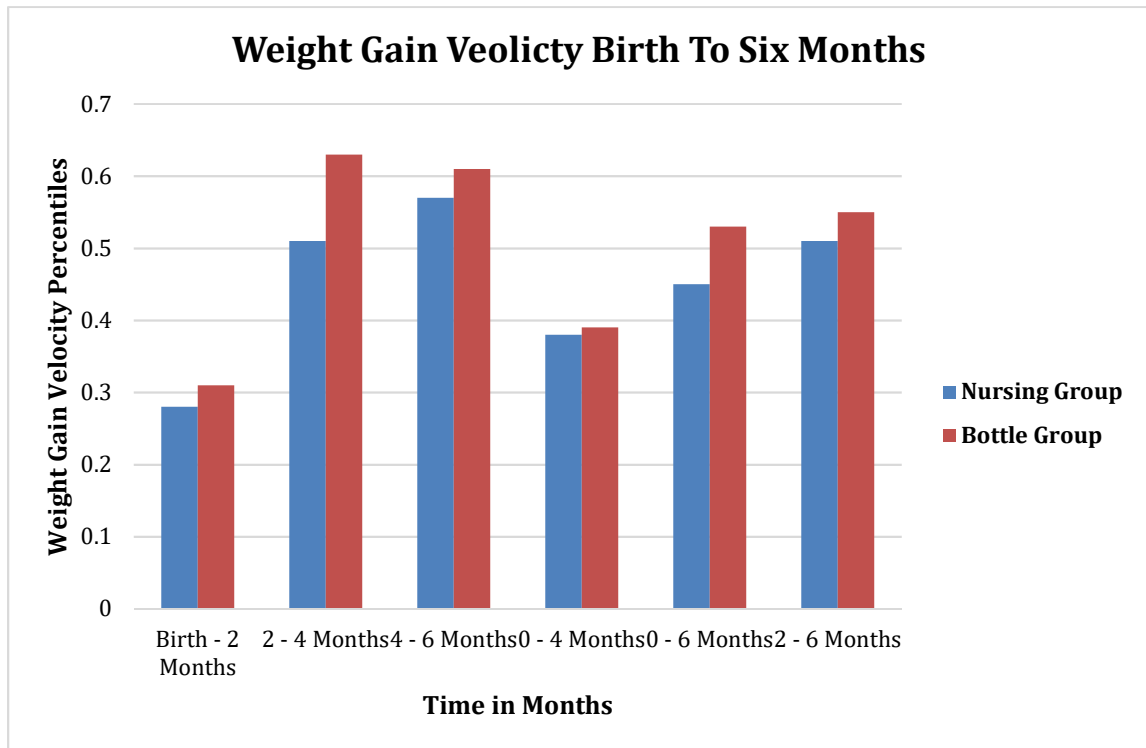
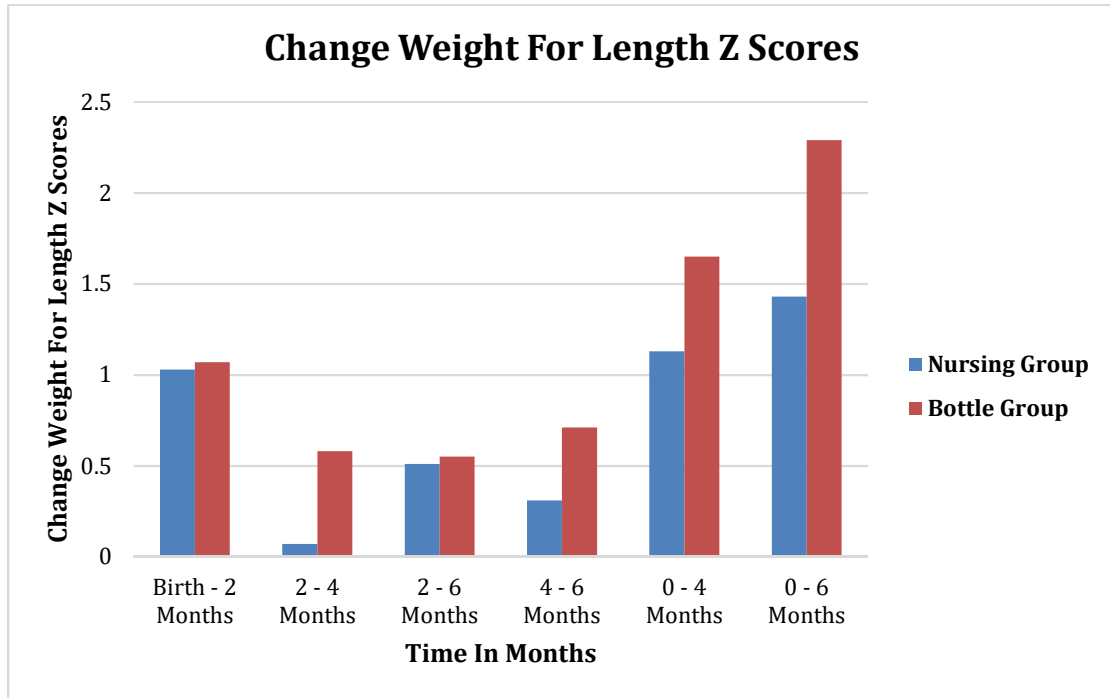


Figure 6. Change Weight For Length Z Scores



APPENDIX B

FLYER

HOW WILL YOUR BABY GROW IN THE FIRST SIX MONTHS?

Are you fascinated with how your baby will grow?

Are you looking for a way to track your baby's growth?

Are you interested in participating in a research study at the University of North Carolina at Greensboro?

The purpose of the Feeding & Infant Growth (FIG) study is to learn more about infant feeding practices and their effect on growth during the first 6 months of life.

WHO IS ELIGIBLE?

Women who are...

- 18 years or older
- Free of long term medical conditions
- English speaking

AND have a child that is...

- Less than 2 months of age
- A singleton (not a twin, triplet, etc.)
- Not premature
- More than 5.5 pounds at birth
- Free of any serious medical conditions

WHAT IS REQUIRED?

If eligible, you will be asked to take part in 4 home visits over the first 6 months of your child's life. The visits will take approximately 1 hour. During each visit researchers will take measurements of your baby including weight, length, and skinfold thickness. In addition, you will be asked to complete 1 questionnaire each month on how you feed your baby. After each home visit you will receive a small gift for your family like a small toy, bib, or recipe book. After the last home visit you will receive a complete record of information about your child's growth for the first 6 months of his or her life.

FOR MORE INFORMATION, PLEASE CONTACT:

Dr. Cheryl Lovelady or Aubrey Burklin
at 336-256-1090 or email: aiburkli@uncg.edu
University of North Carolina at Greensboro
Human Nutrition Laboratory



APPENDIX C

CONSENT FORM

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT



Project Title: Feeding and Infant Growth (FIG)

Principal Investigator and Research Assistant: Cheryl Lovelady and Aubrey Burklin

Participant's Name: _____

What is the study about?

This is a research project studying the effects of infant feeding practices on the growth of infants during the first six months of life. Your participation in this study is voluntary.

Why are you asking me?

We are recruiting both women and their babies to be involved in this study. Women who are 18 years or older, up to 2 months postpartum, and free of any long-term medical conditions are eligible. Babies must be singletons (not a twin, triplet, etc.), born after 35 weeks gestation, weigh at least 5.5 lbs at birth, and free of any serious medical conditions.

What will you ask me to do if I agree to be in the study?

This study will begin in the first month after your baby is born and continue for the next 6 months.

If you consent to participate, you will be asked to:

1. Schedule 4 home visits; each will be approximately 1 hour in length. You will be asked to schedule these visits with the researcher via your preference of phone or email. Researchers will email or call to remind you within 1 week before your next visit.

During the first home visit when your baby is less than 2 months old you will be asked to complete the first questionnaire on infant feeding. No measurements will be taken during this visit.

The 3 remaining home visits will occur when your baby is approximately 2 months old, 4 months old, and 6 months old. Several measurements will be taken to include:

- **Baby's weight and length:** For accuracy purposes you will be asked to remove your infant's clothing and diaper before your baby is weighed. Babies will be weighed on a scale and measured on a length board. These measurements are taken similarly at your doctor's office.
- **Baby's skinfold thickness:** The skinfold thickness measurements are useful indicators of growth and body fat. A skinfold consists of a double fold of skin and the layer of fat that lies just beneath the skin, not including the muscle.

In this study we will measure your baby's skinfold thickness at 2 different sites: the mid

point of your baby's upper arm and below the shoulder on your baby's back. The skinfold thickness measurements may cause minimal discomfort at the time of the measurement. However, researchers are trained to grasp the skinfold gently to avoid causing unnecessary discomfort. The measurement involves the researcher grasping a double fold of your baby's skin and placing caliper tips on either side of the fold. Researchers then release the caliper handles allowing the tips of the caliper to slowly close on the double fold of skin for 2 seconds before taking the measurement reading. To make sure the measurement is correct researchers will take at least 2 measurements at each of the 2 skinfold sites. Researchers will stop the measurement if at any time your baby becomes upset, appears to be in pain, or at your request.

- **Mother's weight and height:** You will be asked to wear light clothing for this measurement. You will be asked to remove shoes, any heavy clothing or jewelry before being weighed. A scale will measure weight and a portable **stadiometer** will be used to measure height.
- **Mother's waist circumference:** You will be asked to wear light clothing for this measurement. You may be asked to remove clothing or belts that may interfere with the measurement. A tape measure will be used to measure the smallest part of your waist.

2. Complete 1 questionnaire approximately every month on how you feed your baby. The first questionnaire will be completed during your first home visit. All other questionnaires will be mailed to you with a pre-paid return envelope enclosed. Each questionnaire will take approximately 20 minutes to complete. There will be a total of 6 questionnaires over the period of 6 months.

What are the risks to me?

The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants.

Measurements: Measurements taken may make you feel uncomfortable, but will be conducted in a private setting. In addition, your baby may experience temporary, minimal discomfort during skinfold thickness measurements. Researchers will stop the measurement if at any time your baby becomes upset, appears to be in pain, or at your request.

Questionnaires: If any questions on the questionnaires make you feel uncomfortable, you may choose to skip those questions.

If you have questions, want more information or have suggestions, please contact Dr. Cheryl Lovelady who may be reached at (336) 256-0310 or calovela@uncg.edu.

If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Integrity at UNCG toll-free at (855)-251-2351.

Are there any benefits to society as a result of me taking part in this research?

The results of this study may be used to improve infant feeding recommendations for the first six months of life and guide future research on infant feeding.

Are there any benefits to me for taking part in this research study?

There are no direct benefits for participating in this study. However, at the end of the study you will receive a detailed record of your baby's growth over the first 6 months of his or her life at no cost.

Will I get paid for being in the study? Will it cost me anything?

There are no costs to you or payments made for participating in this study. However, you will receive 1 small family gift (recipe book, picture frame, small toy, bib, etc) for each home visit that is completed (totaling up to 4 small gifts).

How will you keep my information confidential?

All information obtained in this study is strictly confidential unless disclosure is required by law. Your name will be removed from documents and replaced with codes. All information will be stored in a locked file cabinet in the Human Nutrition Lab. The list connecting your name to the code will be stored separately from the other data. Only authorized researchers will have access to the records. Any report of this research that is made available to the public will not include your name or any other individual information by which you could be identified. Any identifiable information will be destroyed 3 years after completion of the study.

However, if researchers suspect neglect or abuse of your child they are legally obligated to report it to the appropriate authorities.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected, be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by _____.

Signature: _____ Date: _____

By signing this consent form, you are agreeing that you have read it or it has been read to you, you fully understand the contents of this document and consent to your child taking part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are the legal parent or guardian of the child who wishes to participate in this study described to you by _____.

Participant's Parent/Legal Guardian's Signature Date: _____

APPENDIX D

QUESTIONNAIRES

Infant Feeding Questionnaire: Neonatal Feeding and Infant Growth (FIG) Study



If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: YOUR NEW BABY'S BIRTH

1. Is your baby a boy or a girl? Boy..... ☐ Girl..... ☐
2. What is your baby's date of birth? MONTH _____ DAY _____ YEAR _____
3. What was your baby's weight at birth? _____ POUNDS _____ OUNCES
4. What was your baby's length at birth? _____ INCHES
5. How much weight did you gain during this pregnancy? _____ POUNDS
6. What is your current weight? _____ POUNDS
7. What is your current height? _____ FEET _____ INCHES
8. What is the baby's father's current weight? _____ POUNDS
9. What is the baby's father's current height? _____ FEET _____ INCHES
10. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) (PLEASE "X" ALL THAT APPLY)
Yes, I was enrolled or got WIC food for myself..... ☐
Yes, my baby was enrolled or got WIC formula or food ☐
No..... ☐

SECTION 2: YOU AND YOUR BABY IN THE FIRST FEW WEEKS

11. As best you know, what is the recommended number of months to exclusively breastfeed a baby, meaning the baby is fed only breast milk?
_____ MONTHS
12. Did you ever breastfeed or try to breastfeed your baby, either in the hospital or birth center, or after you went home?
Yes..... ☐ → (GO TO QUESTION 14) No..... ☐

**Infant Feeding Questionnaire: Neonatal
Feeding and Infant Growth (FIG) Study**



IF YOU NEVER BREASTFED AT ALL, GO TO SECTION 3 ON PAGE 6. ALL OTHERS PLEASE CONTINUE.

14. About how long after your delivery did you breastfeed or try to breastfeed your baby for the very first time?

Less than 30 min	<input type="checkbox"/>	3 to 6 hours	<input type="checkbox"/>	1 day	<input type="checkbox"/>
30 to 60 min	<input type="checkbox"/>	7 to 12 hours	<input type="checkbox"/>	2 days	<input type="checkbox"/>
1 to 2 hours	<input type="checkbox"/>	13 to 24 hours	<input type="checkbox"/>	More than 2 days	<input type="checkbox"/>

15. While you were in the hospital for delivery of your baby, did anyone help you with breastfeeding by showing you how or talking to you about breastfeeding?

Yes.....☐ No.....☐

16. How many hours after the baby's birth did you first get help with breastfeeding?

Less than 30 min	<input type="checkbox"/>	3 to 6 hours	<input type="checkbox"/>	1 day	<input type="checkbox"/>
30 to 60 min	<input type="checkbox"/>	7 to 12 hours	<input type="checkbox"/>	2 days	<input type="checkbox"/>
1 to 2 hours	<input type="checkbox"/>	13 to 24 hours	<input type="checkbox"/>	More than 2 days	<input type="checkbox"/>

17. Who helped you with breastfeeding? (PLEASE "X" ALL THAT APPLY)

Doctor	<input type="checkbox"/>	Lactation consultant	<input type="checkbox"/>	Friend(s)	<input type="checkbox"/>
Midwife	<input type="checkbox"/>	Peer counselor	<input type="checkbox"/>	Breastfeeding support group member	<input type="checkbox"/>
Nurse	<input type="checkbox"/>	Family member(s)	<input type="checkbox"/>	Someone else	<input type="checkbox"/>

18. Using 1 to mean "Not at all helpful" and 5 to mean "Very helpful," how helpful was the breastfeeding help you received from a doctor, midwife, nurse, or lactation consultant? If you did not receive help from one of these, go to **QUESTION 19.**

<u>NOT AT ALL HELPFUL</u>					<u>VERY HELPFUL</u>
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

19. While you were in the hospital or birth center, did your baby stay in your room day and night, except for doctor visits, bathing, or other treatments?

Yes, all the time ☐ → **GO TO QUESTION 21** Yes, some nights but not all ☐ No ☐

20. Was your baby brought to you for feeding during the night?

Yes.....☐ No.....☐

21. When your baby was not in your room, how did the staff decide when to feed the baby or to bring him or her to you for feeding? (PLEASE "X" ALL THAT APPLY)

Whenever he or she cried or seemed hungry	<input type="checkbox"/>
On a schedule determined by the nurses or doctors	<input type="checkbox"/>
Whenever you asked or went to get him or her	<input type="checkbox"/>
Baby not out of room for significant amount of time	<input type="checkbox"/>
Don't know	<input type="checkbox"/>

**Infant Feeding Questionnaire: Neonatal
Feeding and Infant Growth (FIG) Study**



22. During the first few days after your baby was born, did you feed him or her...

- Whenever he or she cried or seemed hungry ☐
 On a schedule or routine ☐
 Sometimes on a schedule AND sometimes when he or she cried or seemed hungry ☐

23. While you were in the hospital or birth center, was your baby fed water, formula, or sugar water at any time?

- | | Yes | No | Don't Know |
|-------------|--------------------------|--------------------------|--------------------------|
| Water | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Formula | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Sugar water | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

24. How long did it take for your milk to come in?

- 1 day or less ☐ 2 days ☐ 3 days ☐ 4 days ☐ More than 4 days ☐

25. Using 1 to mean "Disliked Very Much" and five to mean "Liked Very Much," how would you say you felt about breastfeeding during the first week you were breastfeeding?

- | DISLIKED VERY MUCH | | | | | LIKED VERY MUCH |
|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| (1) | (2) | (3) | (4) | (5) | |
| <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

26. Were you given information about any breastfeeding support groups or services before you went home from the hospital or birth center?

- Yes..... ☐ No..... ☐

27. When you left the hospital or birth center, how were you feeding your baby?

- Breastfeeding only ☐ Formula feeding only ☐ Both breast and formula feeding ☐

28. Did you have any pain while breastfeeding at any time in the first 2 weeks?

- Yes..... ☐ No..... ☐ → (GO TO QUESTION 30)

29. Using 0 to mean "No pain at all" and 10 to mean "The worst possible pain," how much pain, if any were you in when you were breastfeeding during the following time periods? (If you were not breastfeeding in some of the time periods, mark "NA" for Not Applicable).

- | | NO PAIN | (0) | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | WORST POSSIBLE PAIN | (10) | NA |
|----------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|--------------------------|
| 1 st day | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 1 st week | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2 nd week | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

**Infant Feeding Questionnaire: Neonatal
Feeding and Infant Growth (FIG) Study**



30. Did you have any of the following problems breastfeeding your baby during your first 2 weeks of breastfeeding?
(PLEASE "X" ALL THAT APPLY)

My baby had trouble sucking or latching on	<input type="checkbox"/>	I didn't have enough milk	<input type="checkbox"/>
My baby choked	<input type="checkbox"/>	My nipples were sore, cracked, or bleeding	<input type="checkbox"/>
My baby wouldn't wake up to nurse regularly enough	<input type="checkbox"/>	My breasts were overfull (engorged)	<input type="checkbox"/>
My baby was not interested in nursing	<input type="checkbox"/>	I had a yeast infection of the breast	<input type="checkbox"/>
My baby got distracted	<input type="checkbox"/>	I had a clogged milk duct	<input type="checkbox"/>
My baby nursed too often	<input type="checkbox"/>	My breasts were infected or abscessed	<input type="checkbox"/>
It took too long for my milk to come in	<input type="checkbox"/>	My breasts leaked too much	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	I had some other problem	<input type="checkbox"/>
My baby didn't gain enough weight or lost too much weight	<input type="checkbox"/>	I had no problems	<input type="checkbox"/>

→ (GO TO SECTION 3 ON PAGE 6)

31. Did you ask for help with these problems from a health professional (a doctor, midwife, or nurse), a lactation consultant, or a breastfeeding support group?

Yes..... ☐ No..... ☐

32. Did you get any help with these problems from a health professional, a lactation consultant, or a breastfeeding support group?

Yes..... ☐ No..... ☐ → (GO TO SECTION 3 ON PAGE 6)

33. Did the help you received solve the problem(s) or make them better?

<u>NO, NOT AT ALL</u>				<u>YES, VERY MUCH</u>
(1) <input type="checkbox"/>	(2) <input type="checkbox"/>	(3) <input type="checkbox"/>	(4) <input type="checkbox"/>	(5) <input type="checkbox"/>

CONTINUE TO THE NEXT PAGE →

**Infant Feeding Questionnaire: Neonatal
Feeding and Infant Growth (FIG) Study**



SECTION 3: FEEDING YOUR BABY

34. In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.

If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Water	_____	_____
Sugar water	_____	_____
Cow's milk or any other milk (rice, soy, goat, or other)	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks (juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc)	_____	_____
Baby cereal	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

35. How old was your baby when he or she was first fed formula?

1 day or less ☐ 7 to 13 days ☐ More than 20 days ☐
 2 to 6 days ☐ 14 to 20 days ☐ Never fed formula ☐

36. What type of baby cereal was your baby fed in the past 7 days? (PLEASE "X" ALL THAT APPLY)

Baby was not fed baby cereal ☐ Dry cereal that you add liquid to ☐ Cereal in a jar already mixed ☐

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO QUESTION 46 ON PAGE 8.

37. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

38. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. (PLEASE "X" ALL THAT APPLY)

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

**Infant Feeding Questionnaire: Neonatal
Feeding and Infant Growth (FIG) Study**



39. What type of infant formula was your baby fed? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|--------------------|--------------------------|---|--------------------------|
| Ready to feed | <input type="checkbox"/> | Powder from can that makes more than one bottle | <input type="checkbox"/> |
| Liquid concentrate | <input type="checkbox"/> | Powder from single serving packs | <input type="checkbox"/> |

40. Which of the following describes the iron content of the formula you usually use?

- | | | | |
|-----------|--------------------------|----------|--------------------------|
| With iron | <input type="checkbox"/> | Low iron | <input type="checkbox"/> |
|-----------|--------------------------|----------|--------------------------|

41. How did you decide to use the formula you fed your baby in the past 7 days? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|---|--------------------------|---|--------------------------|
| A doctor or other health professional recommended the formula | <input type="checkbox"/> | I chose a formula labeled as useful for a problem my baby had | <input type="checkbox"/> |
| I chose the same formula fed to my baby at the hospital | <input type="checkbox"/> | I use the formula given by WIC | <input type="checkbox"/> |
| I heard that the formula is better for my baby in some way | <input type="checkbox"/> | I chose the same formula I fed an older child | <input type="checkbox"/> |
| I chose the formula I received samples or coupons for | <input type="checkbox"/> | Friends or relatives recommended the formula | <input type="checkbox"/> |
| I saw an advertisement for the formula and wanted to buy it | <input type="checkbox"/> | I chose a formula based on low price | <input type="checkbox"/> |

42. Did you discuss your choice of formula with the baby's doctor?

- | | | | |
|----------|--------------------------|---------|--------------------------|
| Yes..... | <input type="checkbox"/> | No..... | <input type="checkbox"/> |
|----------|--------------------------|---------|--------------------------|

43. During the past 2 weeks, how many times have you switched the formula you feed your baby?

- | | | | | | | | | | | | | |
|------|--------------------------|---------------------------------------|---|--------------------------|---|--------------------------|---|--------------------------|---|--------------------------|-----------|--------------------------|
| None | <input type="checkbox"/> | → GO TO INSTRUCTION ABOVE QUESTION 46 | 1 | <input type="checkbox"/> | 2 | <input type="checkbox"/> | 3 | <input type="checkbox"/> | 4 | <input type="checkbox"/> | 5 or more | <input type="checkbox"/> |
|------|--------------------------|---------------------------------------|---|--------------------------|---|--------------------------|---|--------------------------|---|--------------------------|-----------|--------------------------|

44. Did you switch formulas because your baby had a problem with the formula you were using?

- | | | | | |
|----------|--------------------------|---------|--------------------------|---|
| Yes..... | <input type="checkbox"/> | No..... | <input type="checkbox"/> | → (GO TO INSTRUCTION ABOVE QUESTION 46) |
|----------|--------------------------|---------|--------------------------|---|

45. What type of problem did your baby have with the formula(s)? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|-------------------------------------|--------------------------|---------------------------------------|--------------------------|
| An allergic reaction or intolerance | <input type="checkbox"/> | Too much gas | <input type="checkbox"/> |
| Constipation | <input type="checkbox"/> | Too much spit up | <input type="checkbox"/> |
| Diarrhea | <input type="checkbox"/> | Vomiting | <input type="checkbox"/> |
| Too much mucus | <input type="checkbox"/> | Other problems (Please specify _____) | <input type="checkbox"/> |

CONTINUE TO THE NEXT PAGE →

**Infant Feeding Questionnaire: Neonatal
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IF YOUR BABY WAS BREASTFED AT ALL IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 4 ON PAGE 10.

46. Since your baby was born, have you attended a breastfeeding class or breastfeeding support group?

Yes..... ☐ No..... ☐

47. Does your baby usually feed from both breasts at each feeding?

Yes ☐ No ☐ Baby is fed only ☐ → (GO TO QUESTION 50)
pumped milk

48. Does your baby usually let go of the breast him or herself?

Yes, both ☐ Yes, first ☐ Yes, second ☐ No ☐
breasts breast only breast only

49. About how long does an average breastfeeding last?

Less than 10 minutes ☐ 20 to 29 minutes ☐ 40 to 49 minutes ☐
10 to 19 minutes ☐ 30 to 39 minutes ☐ 50 or more minutes ☐

50. Using 1 to mean "Very Uncomfortable" and 5 to mean "Very Comfortable," how comfortable would you be in the following situations?

	VERY UNCOMFORTABLE				VERY COMFORTABLE
	(1)	(2)	(3)	(4)	(5)
Nursing your baby in the presence of close women friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are not close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

51. In an average 24-hour period what is the **LONGEST** time for you, the mother, between breastfeeding or expressing? Please count the time from the start of one breastfeeding or expressing session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. **(WRITE IN THE NUMBER OF HOURS AND MINUTES)**

_____ HOURS **AND** _____ MINUTES

52. How many times in the **past 7 days** was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. *(Write in 0 if your baby was not fed expressed or pumped milk to drink and skip to 57)*

_____ TIMES (IF 0, GO TO QUESTION 57)

53. On average in the **past 7 days** how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

1 ounce or less ☐ 3 to 4 ounces ☐ 7 to 8 ounces ☐
2 ounces..... ☐ 5 to 6 ounces ☐ More than 8 ounces ☐

**Infant Feeding Questionnaire: Neonatal
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54. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

55. How often does your baby drink all of his or her cup or bottle of pumped milk?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

56. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

57. How old do you think your baby will be when you completely stop breastfeeding?

_____ MONTHS

58. Using 1 to mean "Not at all Confident" and 5 to mean "Very Confident," how confident are you that you will be able to breastfeed until the baby is the age you marked in Question 57?

NOT AT ALL CONFIDENT					VERY CONFIDENT
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

59. Using 1 to mean "Dislike Very Much" and 5 to mean "Like Very Much," how would you say you feel about breastfeeding now that your baby is several weeks old?

DISLIKE VERY MUCH				LIKE VERY MUCH
(1)	(2)	(3)	(4)	(5)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

60. Using 1 to mean "Never" and 5 to mean "Always," please choose the answer for each of the following statements that best describe how you feel about breastfeeding your new baby.

	Never				Always
	(1)	(2)	(3)	(4)	(5)
I feel that I can find out what I need to know about breastfeeding my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel that breastfeeding takes too much time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel that my baby gets enough breast milk at each feeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel I can breastfeed my baby whether it hurts or not	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I feel that my family supports my decision to breastfeed my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: Neonatal
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SECTION 4: OTHER INFORMATION

61. Has your baby had jaundice at any time since he or she was born?

Yes..... ☐

No..... ☐ → (GO TO QUESTION 63)

62. How was the jaundice treated? (PLEASE "X" ALL THAT APPLY)

- | | |
|---|--------------------------|
| I fed formula in addition to breastfeeding for a while | <input type="checkbox"/> |
| I stopped breastfeeding for a while | <input type="checkbox"/> |
| I stopped breastfeeding and did not begin breastfeeding again | <input type="checkbox"/> |
| My baby was placed under a lamp (phototherapy) | <input type="checkbox"/> |
| My baby received an exchange transfusion | <input type="checkbox"/> |
| My baby received some other treatment | <input type="checkbox"/> |
| No treatment was given | <input type="checkbox"/> |

63. Since the time your baby was discharged from the hospital after birth, has he or she been hospitalized for any reason or has your baby been taken to the hospital for any outpatient procedure or surgery?

Yes..... ☐

No..... ☐ → (GO TO QUESTION 65)

64. How many nights was your baby in the hospital for the most recent problem since discharge after birth? (Write in 0 if your baby did not stay overnight.) _____ NIGHTS

65. Does your baby have any serious, long-term medical problems?

No..... ☐

Yes..... ☐ → (PLEASE EXPLAIN BRIEFLY) _____

66. What is your marital status?

- | | |
|-----------------------|--------------------------|
| Single | <input type="checkbox"/> |
| Married | <input type="checkbox"/> |
| Separated or divorced | <input type="checkbox"/> |
| Widowed | <input type="checkbox"/> |
| Other | <input type="checkbox"/> |

67. What is your ethnicity?

- | | |
|--|--------------------------|
| Asian or Asian American, including Chinese, Japanese, and others | <input type="checkbox"/> |
| Black or African American | <input type="checkbox"/> |
| Hispanic or Latino, including Mexican American and Central American and others | <input type="checkbox"/> |
| White, Caucasian, Anglo, European American, not Hispanic | <input type="checkbox"/> |
| American Indian/Native American | <input type="checkbox"/> |
| Other (Write in): _____ | <input type="checkbox"/> |
| Prefer not to answer | <input type="checkbox"/> |

68. How many total children do you have? _____

69. What is your birthdate? MONTH _____ DAY _____ YEAR _____

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70. What is the highest level of education you have completed?

- Graduate degree ☐
- Some graduate school ☐
- College degree ☐
- Some college ☐
- High school ☐
- Some high school ☐

71. What is the highest level of education your husband/partner has completed?

- Graduate degree ☐
- Some graduate school ☐
- College degree ☐
- Some college ☐
- High school ☐
- Some high school ☐
- Does not apply ☐

72. Please "X" the box that best describes your total household income.

- Less than \$20,000 ☐
- \$20,000 to \$30,000 ☐
- \$30,000 to \$39,999 ☐
- \$40,000 to \$49,999 ☐
- \$50,000 to \$59,999 ☐
- More than \$60,000 ☐
- Prefer not to answer ☐

73. Date you completed this form: MONTH _____ DAY _____ YEAR _____

**THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE
PAID ENVELOPE PROVIDED.**

Infant Feeding Questionnaire: 2 Months
Feeding and Infant Growth (FIG) Study



BABY'S FEEDING AND HEALTH

If your baby is regularly cared for by someone else, it is very important that you ask your child care provider to give you information for the feeding questions.

If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: FEEDING

1. In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.
If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Cow's milk	_____	_____
Other milk: soy milk, rice milk, goat milk, etc	_____	_____
Other dairy foods: yogurt, cheese, ice cream, pudding, etc	_____	_____
Other soy foods: tofu, frozen soy desserts, etc	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks: juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc	_____	_____
Baby cereal	_____	_____
Other cereals and starches: breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc	_____	_____
Fruit	_____	_____
Vegetables	_____	_____
French fries	_____	_____
Meat, chicken, combination dinners	_____	_____
Fish or shellfish	_____	_____
Peanut butter, other peanut foods, or nuts	_____	_____
Eggs	_____	_____
Sweet foods, candy, cookies, cake, etc	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

2. What type of baby cereal was your baby fed in the past 7 days? (PLEASE "X" ALL THAT APPLY)

Baby was not fed baby cereal ☐ Dry cereal that you add liquid to ☐ Cereal in a jar already mixed ☐

3. Which of the following was your baby given in vitamin or mineral drops or pills at least 3 days a week during the past two weeks? If you baby was given drops or pills that contained more than one of the items listed, please mark each of the separate items. (PLEASE "X" ALL THAT APPLY)

Fluoride ☐ Vitamin D ☐ None of these ☐
Iron ☐ Other Vitamins ☐

**Infant Feeding Questionnaire: 2 Months
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4. During the past two weeks, how often was your baby put to bed with a bottle of formula, breast milk, juice, juice drink, or any other kind of milk?

At most bedtimes, including naps..... ☐
 At most night bedtimes, but not naps..... ☐
 At most naps, but not night bedtimes..... ☐
 Only occasionally at bedtimes, including naps ☐
 Never ☐

5. How often have you added each of the following items to your baby's bottle of formula or pumped (or expressed) breast milk in the past two weeks? If you have not given your baby a bottle in the past two weeks, "X" here ☐ and go to the instruction above Question 6.

	NEVER	ONLY RARELY	EVERY FEW DAYS	ABOUT ONCE A DAY	AT MOST FEEDINGS	EVERY FEEDING
Vitamins or minerals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 12 ON PAGE 3.

6. How often does your baby drink all of his or her bottle of formula?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

7. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

8. How often is your baby encouraged to finish a bottle if he or she stops drinking before the formula is all gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

9. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. (PLEASE "X" ALL THAT APPLY)

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

**Infant Feeding Questionnaire: 2 Months
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10. What type of infant formula was your baby fed? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|--------------------|--------------------------|---|--------------------------|
| Ready to feed | <input type="checkbox"/> | Powder from can that makes more than one bottle | <input type="checkbox"/> |
| Liquid concentrate | <input type="checkbox"/> | Powder from single serving packs | <input type="checkbox"/> |

11. Which of the following describes the iron content of the formula you usually use?

- | | | | |
|-----------|--------------------------|----------|--------------------------|
| With iron | <input type="checkbox"/> | Low iron | <input type="checkbox"/> |
|-----------|--------------------------|----------|--------------------------|

IF YOUR BABY WAS BREASTFED OR FED BREAST MILK IN A BOTTLE IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 2 ON THE NEXT PAGE.

12. Does your baby usually feed from both breasts at each feeding?

- | | | | | | | |
|-----|--------------------------|----|--------------------------|------------------------------|--------------------------|-----------------------|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | Baby is fed only pumped milk | <input type="checkbox"/> | → (GO TO QUESTION 15) |
|-----|--------------------------|----|--------------------------|------------------------------|--------------------------|-----------------------|

13. Does your baby usually let go of the breast him or herself?

- | | | | | | | | |
|-------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|----|--------------------------|
| Yes, both breasts | <input type="checkbox"/> | Yes, first breast only | <input type="checkbox"/> | Yes, second breast only | <input type="checkbox"/> | No | <input type="checkbox"/> |
|-------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|----|--------------------------|

14. About how long does an average breastfeeding last?

- | | | | | | |
|----------------------|--------------------------|------------------|--------------------------|--------------------|--------------------------|
| Less than 10 minutes | <input type="checkbox"/> | 20 to 29 minutes | <input type="checkbox"/> | 40 to 49 minutes | <input type="checkbox"/> |
| 10 to 19 minutes | <input type="checkbox"/> | 30 to 39 minutes | <input type="checkbox"/> | 50 or more minutes | <input type="checkbox"/> |

15. In an average 24-hour period what is the LONGEST time for you, the mother, between breastfeeding or pumping milk? Please count the time from the start of one breastfeeding or pumping session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. (WRITE IN THE NUMBER OF HOURS AND MINUTES)

_____ HOURS **AND** _____ MINUTES

16. How many times in the past 7 days was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. (Write in 0 if your baby was not fed expressed or pumped milk to drink.)
_____ TIMES (IF 0, GO TO SECTION 2 ON THE NEXT PAGE)

17. On average in the past 7 days how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

- | | | | | | |
|-----------------|--------------------------|---------------|--------------------------|--------------------|--------------------------|
| 1 ounce or less | <input type="checkbox"/> | 3 to 4 ounces | <input type="checkbox"/> | 7 to 8 ounces..... | <input type="checkbox"/> |
| 2 ounces..... | <input type="checkbox"/> | 5 to 6 ounces | <input type="checkbox"/> | More than 8 ounces | <input type="checkbox"/> |

18. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

- | | | | | | | | | | |
|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|-------------|--------------------------|
| 1 to 2 | <input type="checkbox"/> | 3 to 4 | <input type="checkbox"/> | 5 to 6 | <input type="checkbox"/> | 7 to 8 | <input type="checkbox"/> | More than 8 | <input type="checkbox"/> |
|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|-------------|--------------------------|

**Infant Feeding Questionnaire: 2 Months
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19. How often does your baby drink all of his or her cup or bottle of pumped milk?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

20. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

SECTION 2: HEALTH

21. Which of the following problems did your baby have during the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

Fever.....	<input type="checkbox"/>	Runny nose or cold.....	<input type="checkbox"/>
Diarrhea.....	<input type="checkbox"/>	Respiratory Syncytial Virus (RSV)	<input type="checkbox"/>
Vomiting.....	<input type="checkbox"/>	Cough or wheeze.....	<input type="checkbox"/>
Ear Infection.....	<input type="checkbox"/>	Asthma.....	<input type="checkbox"/>
Colic.....	<input type="checkbox"/>	Food Allergy.....	<input type="checkbox"/>
Fussy or irritable	<input type="checkbox"/>	Eczema (atopic dermatitis).....	<input type="checkbox"/>
Reflux.....	<input type="checkbox"/>	None of these.....	<input type="checkbox"/>

22. Did your baby receive any of the following medicines in the past 2 weeks? (Please do not include vitamins or minerals.)

	YES	NO
Antibiotics.....	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines...	<input type="checkbox"/>	<input type="checkbox"/>
Non-prescription medicines.....	<input type="checkbox"/>	<input type="checkbox"/>

23. How much did your baby weigh the last time he or she was weighed at a doctor's visit?

_____ POUNDS _____ OUNCES Don't know.....☐

24. What was the date of that weight?

_____ MONTH _____ DAY Don't know.....☐

25. How long was your baby the last time he or she was measured at the doctor's visit?

_____ INCHES Don't know.....☐

26. What was the date of that measurement?

_____ MONTH _____ DAY Don't know.....☐

27. Has your baby been hospitalized for any reason or has your baby been taken to a hospital for any outpatient procedure or surgery in the past 4 weeks?

Yes.....☐ No.....☐ → (GO TO SECTION 3 ON THE NEXT PAGE)

**Infant Feeding Questionnaire: 2 Months
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28. How many nights was your baby in the hospital for the most recent problem? (Write 0 if your baby did not stay overnight.)

_____ NIGHTS

SECTION 3: STOPPED BREASTFEEDING

29. Did you ever breastfeed your baby (or feed your baby your pumped milk)?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 8 ON PAGE 11)

30. Have you completely stopped breastfeeding and pumping milk for your baby?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 4 ON PAGE 7)

31. Did you breastfeed as long as you wanted to?

Yes..... ☐ No..... ☐

32. How old was your baby when you completely stopped breastfeeding and pumping milk?

_____ DAYS (If younger than 2 weeks) OR _____ WEEKS

CONTINUE TO THE NEXT PAGE →

**Infant Feeding Questionnaire: 2 Months
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33. How important was each of the following reasons for your decision to stop breastfeeding your baby? (PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby began to bite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were overfull or engorged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts leaked too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go on a weight loss diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go back to my usual diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to smoke again or more than I did while breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many household duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort that it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted my body back to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became pregnant or wanted to become pregnant again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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34. Did any of the following people want you to stop breastfeeding? (Mark "does not apply" if you do not have the person listed, such as "employer" if you do not work for pay.)

	YES	NO	DOES NOT APPLY / DON'T KNOW
The baby's father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother-in-law	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your grandmother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your employer or supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

35. Using 1 to mean "Very favorable" and 5 to mean "Very unfavorable," how do you feel about the experience of having breastfed your baby?

VERY FAVORABLE				VERY UNFAVORABLE	
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

36. Using 1 to mean "Not at all likely" and 5 to mean "Very likely," how likely is it that you would breastfeed again if you had another child?

NOT AT ALL LIKELY				VERY LIKELY	
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SECTION 4: BREASTFEEDING

37. Did you ever breastfeed your baby (or feed your baby your pumped milk)?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 8 ON PAGE 11)

CONTINUE TO THE NEXT PAGE →

**Infant Feeding Questionnaire: 2 Months
Feeding and Infant Growth (FIG) Study**



38. Have you obtained information about breastfeeding, your diet while breastfeeding, or breast pumps from any of the following sources for this baby or the previous one?

	INFORMATION ABOUT BREASTFEEDING	INFORMATION ABOUT BREAST PUMPS	NO INFORMATION FROM THIS SOURCE
Doctor or physicians assistant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nurse, nurse midwife, or nurse practitioner	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nutritionist or dietitian	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
WIC food program	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lactation consultant	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Relatives or friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Birthing or baby classes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Telephone support helpline or hotline	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Books or videos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newsletters	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Newspapers or magazines	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Television or radio	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Website	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Using 1 to mean "Very uncomfortable," and 5 to mean "Very comfortable," how comfortable would you be in the following situations?

	VERY UNCOMFORTABLE				VERY COMFORTABLE
	(1)	(2)	(3)	(4)	(5)
Nursing your baby in the presence of close women friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are not close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

40. Have you breastfed your baby or pumped breast milk in the past 7 days?

Yes..... ☐ → **(CONTINUE)** No..... ☐ → **(GO TO SECTION 5 ON PAGE 10)**

41. How old do you think your baby will be when you completely stop breastfeeding?

2 months	<input type="checkbox"/>	5 months	<input type="checkbox"/>	8 months	<input type="checkbox"/>	11 months	<input type="checkbox"/>
3 months	<input type="checkbox"/>	6 months	<input type="checkbox"/>	9 months	<input type="checkbox"/>	12 months	<input type="checkbox"/>
4 months	<input type="checkbox"/>	7 months	<input type="checkbox"/>	10 months	<input type="checkbox"/>	More than 12 months	<input type="checkbox"/>

42. Using 1 to mean "Not at all Confident" and 5 to mean "Very Confident," how confident are you that you will be able to breastfeed until the baby is the age you marked in Question 41?

NOT AT ALL CONFIDENT				VERY CONFIDENT
(1)	(2)	(3)	(4)	(5)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 2 Months
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43. Did you work for pay any time during the past 4 weeks?

Yes..... ☐

No..... ☐ → (GO TO SECTION INSTRUCTION ABOVE QUESTION 45 ON THIS PAGE)

44. Which of the following circumstances describe your situation during the past 4 weeks? (If you have stopped breastfeeding or stopped working for pay, please answer for the time you were breastfeeding and working. If you have worked for less than 4 weeks, please answer for the time you have been working.) (PLEASE "X" ALL THAT APPLY)

- I keep my baby with me while I work and breastfeed during my work day..... ☐
- I go to my baby and breastfeed him or her during my work day..... ☐
- My baby is brought to me to breastfeed during my work day..... ☐
- I pump milk during my work day and save it for my baby to drink later..... ☐
- I pump milk during my work day, but I do not save it for my baby to drink later..... ☐
- I neither pump milk nor breastfeed during my work day..... ☐

IF YOU ANSWERED SECTION 3: STOPPED BREASTFEEDING ON THIS QUESTIONNAIRE, GO TO SECTION 5 ON THE NEXT PAGE.

45. Was your baby fed formula to drink in the past 2 weeks, by you or anyone else?

Yes..... ☐

No..... ☐ → (GO TO SECTION 5 ON PAGE 10)

46. How important was each of the following reasons for feeding your baby formula? (PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked, or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Someone else wanted to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 2 Months
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SECTION 5: BREAST PUMPS

47. Since your baby was born, have you ever pumped or tried to pump milk? (Include expressing breast milk in any way as pumping milk.)
- Yes, but I did not get any milk ☐ Yes, and I got milk ☐ No ☐ → GO TO SECTION 8 ON PAGE 12
48. How old was your baby the first time you pumped or tried to pump milk?
- _____ DAYS OR _____ WEEKS
49. How have you pumped or expressed milk since the baby was born? (PLEASE "X" ALL THAT APPLY)
- Electric breast pump..... ☐
 Combination electric and battery operated breast pump ☐
 Battery operated pump ☐
 Manual breast pump (no batteries, no cord to plug in)... ☐
 By hand (without using a pump)..... ☐
50. Have you had any of the following problems with a breast pump that you used to express milk since the baby was born? (PLEASE "X" ALL THAT APPLY)
- Pressure or suction from the pump was hard to release ☐
 Pump was uncomfortable or painful to use even though it did not cause injury ☐
 Pump had a bad seal or milk got into the motor or other place it should not be ☐
 Could not get pump to work or to express any milk ☐
 Pump worked, but did not get enough/much milk ☐
 Pump worked, but it took too long to get enough milk ☐
 Pump worked for a while but then quit working ☐
 Pump had another problem (SPECIFY) _____ ☐
 No Problems ☐

SECTION 6: PUMPING OR EXPRESSING MILK

51. During the past 2 weeks, how many times did you pump milk? (Include expressing breast milk in any way as pumping milk.)
- _____ TIMES IN PAST TWO WEEKS → (IF 0, GO TO SECTION 8 ON PAGE 11)
52. Are you now pumping milk on a regular schedule?
- Yes..... ☐ No..... ☐ → (GO TO QUESTION 54)
53. How old was your baby when you first began pumping milk on a regular schedule?
- _____ DAYS OR _____ WEEKS
54. On average, in the past 2 weeks, how many ounces or milk did you pump each time?
- 1 ounce or less ☐ 3 to 4 ounces ☐ 7 to 8 ounces..... ☐
 2 ounces..... ☐ 5 to 6 ounces ☐ More than 8 ounces ☐

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**Infant Feeding Questionnaire: 2 Months
Feeding and Infant Growth (FIG) Study**



55. For what reasons have you pumped milk in the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

- To relieve engorgement ☐
- Because my nipples were too sore to nurse ☐
- To increase my milk supply ☐
- To get milk for someone else to feed to my baby ☐
- For me to feed my baby when I do not want to breastfeed or when my baby cannot breastfeed ☐
- To keep my milk supply up when my baby could not nurse (such as while you were away from your baby or when your baby was too sick to nurse) ☐
- To mix with cereal or other food ☐
- To have an emergency supply of milk ☐
- To donate to a baby other than my own ☐

56. In the past 2 weeks, has your baby been fed formula mixed with breast milk in the same bottle?

Yes..... ☐

No..... ☐ → (GO TO SECTION 8 ON THIS PAGE)

57. How were the formula and breast milk usually mixed? (PLEASE "X" ALL THAT APPLY)

- Added formula powder to breast milk..... ☐
- Added formula concentrate to breast milk..... ☐
- Added prepared (mixed up) formula or ready-to-feed formula to breast milk..... ☐

SECTION 8: INFANT FORMULA

58. Was your baby fed infant formula in the past 2 weeks, by you or anyone else?

Yes..... ☐

No..... ☐ → (GO TO SECTION 9 ON PAGE 12)

59. Formula packages have several types of directions and statements. Which of these kinds of information have you read on the package of the formula you use most often? (PLEASE "X" ALL THAT APPLY)

- Written directions for preparing the formula..... ☐
- How to store the package after opening it..... ☐
- How to store the formula after it is prepared..... ☐
- What to do with formula left over in the bottle after feeding the baby..... ☐
- Have not read any of this information..... ☐

60. How did you decide to use the formula you fed your baby in the past 7 days?

- | | |
|---|---|
| A doctor or other health professional recommended the formula..... <input type="checkbox"/> | I chose a formula labeled as useful for a problem my baby had..... <input type="checkbox"/> |
| I chose the same formula fed to my baby at the hospital..... <input type="checkbox"/> | I use the formula given by WIC..... <input type="checkbox"/> |
| I heard that the formula is better for my baby in some way..... <input type="checkbox"/> | I chose the same formula I fed an older child..... <input type="checkbox"/> |
| I chose the formula I received samples or coupons for..... <input type="checkbox"/> | Friends or relatives recommended the formula..... <input type="checkbox"/> |
| I saw an advertisement for the formula and wanted to buy it..... <input type="checkbox"/> | I chose a formula based on low price..... <input type="checkbox"/> |

**Infant Feeding Questionnaire: 2 Months
Feeding and Infant Growth (FIG) Study**



61. Did you discuss your choice of formula with the baby's doctor?

Yes..... ☐

No..... ☐

62. During the past 2 weeks, how many times have you switched the formula you feed your baby?

None ☐ → **GO TO SECTION 9** 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more ☐

63. Which formulas did you stop using in the past 2 weeks? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula you stopped using. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

64. Did you switch formulas because your baby had a problem with the formula you were using?

Yes..... ☐

No..... ☐ → **(GO TO SECTION 9 ON THIS PAGE)**

65. What type of problem did your baby have with the formula(s)? **(PLEASE "X" ALL THAT APPLY)**

An allergic reaction or intolerance..... <input type="checkbox"/>	Too much gas <input type="checkbox"/>
Constipation..... <input type="checkbox"/>	Too much spit up..... <input type="checkbox"/>
Diarrhea..... <input type="checkbox"/>	Vomiting <input type="checkbox"/>
Too much mucus..... <input type="checkbox"/>	Other problems (Please specify _____) <input type="checkbox"/>

SECTION 9: OTHER INFORMATION

66. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) **(PLEASE "X" ALL THAT APPLY)**

Yes, I was enrolled or got WIC food for myself..... ☐

Yes, my baby was enrolled or got WIC formula or food ☐

No..... ☐

67. Does your baby have any serious, long-term medical problems?

No..... ☐

Yes..... ☐ → **(PLEASE EXPLAIN BRIEFLY)** _____

68. Date you completed this form: MONTH _____ DAY _____ YEAR _____

THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE PAID ENVELOPE PROVIDED.

Infant Feeding Questionnaire: 3 Months
Feeding and Infant Growth (FIG) Study



BABY'S FEEDING AND HEALTH

If your baby is regularly cared for by someone else, it is very important that you ask your child care provider to give you information for the feeding questions.

If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: FEEDING

- In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.
If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Cow's milk	_____	_____
Other milk: soy milk, rice milk, goat milk, etc	_____	_____
Other dairy foods: yogurt, cheese, ice cream, pudding, etc	_____	_____
Other soy foods: tofu, frozen soy desserts, etc	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks: juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc	_____	_____
Baby cereal	_____	_____
Other cereals and starches: breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc	_____	_____
Fruit	_____	_____
Vegetables	_____	_____
French fries	_____	_____
Meat, chicken, combination dinners	_____	_____
Fish or shellfish	_____	_____
Peanut butter, other peanut foods, or nuts	_____	_____
Eggs	_____	_____
Sweet foods, candy, cookies, cake, etc	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

- What type of baby cereal was your baby fed in the past 7 days? (PLEASE "X" ALL THAT APPLY)

Baby was not fed baby cereal ☐
 Dry cereal that you add liquid to ☐
 Cereal in a jar already mixed ☐

**Infant Feeding Questionnaire: 3 Months
Feeding and Infant Growth (FIG) Study**



3. Which of the following was your baby given in vitamin or mineral drops or pills at least 3 days a week during the past two weeks? If you baby was given drops or pills that contained more than one of the items listed, please mark each of the separate items. **(PLEASE "X" ALL THAT APPLY)**

Fluoride ☐ Vitamin D ☐ None of these ☐
Iron ☐ Other Vitamins ☐

4. During the past two weeks, how often was your baby put to bed with a bottle of formula, breast milk, juice, juice drink, or any other kind of milk?

At most bedtimes, including naps..... ☐
At most night bedtimes, but not naps..... ☐
At most naps, but not night bedtimes..... ☐
Only occasionally at bedtimes, including naps ☐
Never..... ☐

5. How often have you added each of the following items to your baby's bottle of formula or pumped (or expressed) breast milk in the past two weeks? If you have not given your baby a bottle in the past two weeks, "X" here ☐ and go to the instruction above Question 6.

	NEVER	ONLY RARELY	EVERY FEW DAYS	ABOUT ONCE A DAY	AT MOST FEEDINGS	EVERY FEEDING
Vitamins or minerals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 12 ON PAGE 3.

6. How often does your baby drink all of his or her bottle of formula?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

7. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

8. How often is your baby encouraged to finish a bottle if he or she stops drinking before the formula is all gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

**Infant Feeding Questionnaire: 3 Months
Feeding and Infant Growth (FIG) Study**



9. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

10. What type of infant formula was your baby fed? **(PLEASE "X" ALL THAT APPLY)**

Ready to feed ☐ Powder from can that makes more than one bottle ☐
 Liquid concentrate ☐ Powder from single serving packs ☐

11. Which of the following describes the iron content of the formula you usually use?

With iron ☐ Low iron ☐

IF YOUR BABY WAS BREASTFED OR FED BREAST MILK IN A BOTTLE IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 2 ON THE NEXT PAGE.

12. Does your baby usually feed from both breasts at each feeding?

Yes ☐ No ☐ Baby is fed only pumped milk ☐ → (GO TO QUESTION 15)

13. Does your baby usually let go of the breast him or herself?

Yes, both breasts ☐ Yes, first breast only ☐ Yes, second breast only ☐ No ☐

14. About how long does an average breastfeeding last?

Less than 10 minutes ☐ 20 to 29 minutes ☐ 40 to 49 minutes ☐
 10 to 19 minutes ☐ 30 to 39 minutes ☐ 50 or more minutes ☐

15. In an average 24-hour period, what is the LONGEST time for you, the mother, between breastfeeding or pumping milk? Please count the time from the start of one breastfeeding or pumping session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. **(WRITE IN THE NUMBER OF HOURS AND MINUTES)**

_____ HOURS AND _____ MINUTES

16. How many times in the past 7 days was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. (Write in 0 if your baby was not fed expressed or pumped milk to drink.)

_____ TIMES → (IF 0, GO TO SECTION 2 ON THE NEXT PAGE)

**Infant Feeding Questionnaire: 3 Months
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17. On average in the past 7 days how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

1 ounce or less <input type="checkbox"/>	3 to 4 ounces <input type="checkbox"/>	7 to 8 ounces..... <input type="checkbox"/>
2 ounces..... <input type="checkbox"/>	5 to 6 ounces <input type="checkbox"/>	More than 8 ounces <input type="checkbox"/>

18. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

1 to 2 <input type="checkbox"/>	3 to 4 <input type="checkbox"/>	5 to 6 <input type="checkbox"/>	7 to 8 <input type="checkbox"/>	More than 8 <input type="checkbox"/>
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19. How often does your baby drink all of his or her cup or bottle of pumped milk?

Never	Rarely	Sometimes	Most of the time	Always
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

20. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

Never	Rarely	Sometimes	Most of the time	Always
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2: HEALTH

21. Which of the following problems did your baby have during the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

Fever..... <input type="checkbox"/>	Runny nose or cold..... <input type="checkbox"/>
Diarrhea..... <input type="checkbox"/>	Respiratory Syncytial Virus (RSV) <input type="checkbox"/>
Vomiting..... <input type="checkbox"/>	Cough or wheeze..... <input type="checkbox"/>
Ear Infection..... <input type="checkbox"/>	Asthma..... <input type="checkbox"/>
Colic..... <input type="checkbox"/>	Food Allergy..... <input type="checkbox"/>
Fussy or irritable <input type="checkbox"/>	Eczema (atopic dermatitis)..... <input type="checkbox"/>
Reflex..... <input type="checkbox"/>	None of these..... <input type="checkbox"/>

22. Did your baby receive any of the following medicines in the past 2 weeks? (Please do not include vitamins or minerals.)

	YES	NO
Antibiotics.....	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines	<input type="checkbox"/>	<input type="checkbox"/>
Non-prescription medicines....	<input type="checkbox"/>	<input type="checkbox"/>

23. How much did your baby weigh the last time he or she was weighed at a doctor's visit?

_____ POUNDS	_____ OUNCES	Don't know..... <input type="checkbox"/>
--------------	--------------	--

24. What was the date of that weight?

_____ MONTH	_____ DAY	Don't know..... <input type="checkbox"/>
-------------	-----------	--

**Infant Feeding Questionnaire: 3 Months
Feeding and Infant Growth (FIG) Study**



25. How long was your baby the last time he or she was measured at the doctor's visit?

_____ INCHES Don't know.....☐

26. What was the date of that measurement?

_____ MONTH _____ DAY Don't know.....☐

27. Has your baby been hospitalized for any reason or has your baby been taken to a hospital for any outpatient procedure or surgery in the past 4 weeks?

Yes.....☐ No.....☐ → (GO TO SECTION 3 ON THIS PAGE)

28. How many nights was your baby in the hospital for the most recent problem? (Write 0 if your baby did not stay overnight.)

_____ NIGHTS

SECTION 3: STOPPED BREASTFEEDING

29. Did you ever breastfeed your baby (or feed your baby your pumped milk)?

Yes.....☐ → (CONTINUE) No.....☐ → (GO TO SECTION 4 ON PAGE 7)

30. Have you completely stopped breastfeeding and pumping milk for your baby?

Yes.....☐ → (CONTINUE) No.....☐ → (GO TO SECTION 4 ON PAGE 7)

31. Have you filled out **SECTION 3: Stopped Breastfeeding** on a previous questionnaire since you stopped breastfeeding?

Yes.....☐ → (GO TO SECTION 4 ON PAGE 7) No.....☐ → (CONTINUE)

32. Did you breastfeed as long as you wanted to?

Yes.....☐ No.....☐

33. How old was your baby when you completely stopped breastfeeding and pumping milk?

_____ DAYS (if younger than 2 weeks) OR _____ WEEKS

**Infant Feeding Questionnaire: 3 Months
Feeding and Infant Growth (FIG) Study**



34. How important was each of the following reasons for your decision to stop breastfeeding your baby?
(PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby began to bite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were overfull or engorged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts leaked too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go on a weight loss diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go back to my usual diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to smoke again or more than I did while breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many household duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort that it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted my body back to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became pregnant or wanted to become pregnant again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 3 Months
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35. Did any of the following people want you to stop breastfeeding? (Mark "does not apply" if you do not have the person listed, such as "employer" if you do not work for pay.)

	YES	NO	DOES NOT APPLY / DON'T KNOW
The baby's father	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother-in-law	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your grandmother	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another family member	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your employer or supervisor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

36. Using 1 to mean "Very favorable" and 5 to mean "Very unfavorable," how do you feel about the experience of having breastfed your baby?

VERY FAVORABLE					VERY UNFAVORABLE
(1)	(2)	(3)	(4)		(5)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

37. Using 1 to mean "Not at all likely" and 5 to mean "Very likely," how likely is it that you would breastfeed again if you had another child?

NOT AT ALL LIKELY					VERY LIKELY
(1)	(2)	(3)	(4)		(5)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>

38. What was the longest time your baby usually slept at night without waking?

	2 Weeks	1 Month	2 Months	Now
2 hours or less	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3 to 4 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5 to 6 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7 to 8 hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8 or more hours	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 4: EMPLOYMENT

39. Did you work for pay any time during the past 4 weeks?

Yes..... ☐ No..... ☐ → (GO TO SECTION 5 ON PAGE 9)

40. How old was your baby when you began working after your delivery? (If you are not sure, give your best estimate).

_____ MONTHS AND _____ WEEKS

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41. How many hours per week did you usually work at your job during the past 4 weeks? (Answer for whatever time you have been working if less than 4 weeks) (If you work at two or more jobs, answer for the total number of hours you work)

1 to 9 hours per week	<input type="checkbox"/>	30 to 34 hours per week	<input type="checkbox"/>
10 to 19 hours per week	<input type="checkbox"/>	35 to 40 hours per week	<input type="checkbox"/>
20 to 29 hours per week	<input type="checkbox"/>	More than 40 hours per week	<input type="checkbox"/>

42. What type of setting do you work in?

A building (for example, office building, store or other retail building, restaurant, hospital, school).....	<input type="checkbox"/>
A private residence (for example your home or someone else's home)	<input type="checkbox"/>
A vehicle (for example, transportation, delivery, flight attendant, pilot)...	<input type="checkbox"/>
Outdoors (for example farmer, outdoor repair, gardener).....	<input type="checkbox"/>
Other.....	<input type="checkbox"/>

43. Using 1 to mean "None" and 5 to mean "Very much," how much satisfaction do you get from your paid work?

NONE					VERY MUCH
1	2	3	4	5	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

44. What do you do with your baby while you are working? (PLEASE "X" ALL THAT APPLY)

My baby is cared for by a family member.....	<input type="checkbox"/>
My baby is cared for by someone not in my family.....	<input type="checkbox"/>
I keep my baby with me while I work at home.....	<input type="checkbox"/>
I keep my baby with me while I work outside my home	<input type="checkbox"/>

45. In your opinion, how supportive of breastfeeding is your place of employment?

Not at all supportive	<input type="checkbox"/>	Somewhat supportive	<input type="checkbox"/>
Not too supportive	<input type="checkbox"/>	Very supportive	<input type="checkbox"/>

46. Did you breastfeed for any time during the past four weeks?

Yes..... ☐ No..... ☐ → (GO TO SECTION 5 ON PAGE 9)

47. Which of the following circumstances describe your situation during the past 4 weeks? (If you have stopped breastfeeding, please answer for the time you were breastfeeding) (PLEASE "X" ALL THAT APPLY)

I keep my baby with me while I work and breastfeed during my work day.....	<input type="checkbox"/>
I go to my baby and breastfeed him or her during my work day.....	<input type="checkbox"/>
My baby is brought to me to breastfeed during my work day	<input type="checkbox"/>
I pump milk during my work day and save it for my baby to drink later.....	<input type="checkbox"/>
I pump milk during my work day, but I do not save it for my baby to drink later	<input type="checkbox"/>
I neither pump milk nor breastfeed during my work day.....	<input type="checkbox"/>

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48. Have you had any of the following experiences during the past 4 weeks? Mark "No" if the item does not describe your circumstances, such as if you have no coworkers for the first item. *(If you have stopped breastfeeding, please answer for the time you were breastfeeding.)*

	YES	NO
A coworker made negative comments or complained about me breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
My employer or my supervisor made negative comments or complained to me about breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to arrange break time for breastfeeding or pumping milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to find a place to breastfeed or pump milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to arrange a place to store pumped breast milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to carry the equipment I needed to pump milk at work	<input type="checkbox"/>	<input type="checkbox"/>
I felt worried about keeping my job because of breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
I felt worried about continuing to breastfeed because of my job	<input type="checkbox"/>	<input type="checkbox"/>
I felt embarrassed among coworkers, my supervisor, or my employer because of breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 5: CHILDCARE

49. Was your baby cared for by someone other than you on a regular schedule during the past 4 weeks? That is, did someone else usually keep your baby at least once a week for 3 or more hours at a time? *(include arrangements in which the exact day or time may change if the child care usually occurred at least once a week).*

Please mark "yes" if your baby is regularly cared for by anyone other than you, including the baby's father or other close relative.

Yes..... ☐

No..... ☐ → (GO TO SECTION 6 ON PAGE 11)

50. Who usually kept your baby during the past 4 weeks? (PLEASE "X" ALL THAT APPLY)

Baby's father ☐ Other family member(s) ☐
 Baby's grandparent(s) ☐ Someone not in your family ☐

51. Where did the childcare usually occur? (PLEASE "X" ALL THAT APPLY)

Baby's home with no other children..... ☐ Other private home with no other children..... ☐
 Baby's home with other children or baby's brothers or sisters..... ☐ Other private home with older children or baby's brothers or sisters..... ☐
 Day care or child care center..... ☐ Other..... ☐

52. How many days in an average week was your baby cared for by your regularly scheduled child care provider(s)? *(Include days your baby was cared for by family members if they regularly provide child care while you are away from the baby)*

_____ DAYS PER WEEK

53. On an average day when your baby was with your regular child care provider(s), how many hours was he or she with the child care provider(s)?

_____ HOURS

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FOR QUESTIONS 54-56, IF YOUR ANSWER IS DIFFERENT FOR DIFFERENT CHILD CARE PROVIDERS, ANSWER FOR THE ONE WHO FED YOUR BABY THE MOST TIMES PER WEEK.

54. In your opinion, how supportive of breastfeeding is your child care provider?

Not at all supportive ☐ Somewhat supportive ☐ Don't know ☐
Not too supportive ☐ Very supportive ☐

55. On an average day when your baby was with your child care provider, how many times did the child care provider feed him or her? Please include feedings of breast milk, formula, and all other foods, and include meals and snacks.

_____ TIMES PER DAY FED BABY None ☐ → (GO TO INSTRUCTIONS ABOVE QUESTION 57)

56. How often did you find out what your regularly scheduled child care provider fed your baby?

Seldom or never ☐ Sometimes ☐ Always or most of the time ☐

IF YOUR BABY IS ONLY CARED FOR IN YOUR HOME, GO TO SECTION 6 ON THE NEXT PAGE.

ANSWER QUESTIONS 57-58 FOR YOUR CHILD CARE THAT IS OUTSIDE OF YOUR HOME. IF YOU HAVE MORE THAN ONE CHILD CARE PROVIDER OUTSIDE OF YOUR HOME, ANSWER FOR THE ONE WHO FEEDS YOUR BABY THE MOST TIMES PER WEEK.

57. Under your regular child care arrangements in the past 4 weeks, who usually provided the formula, if any, and food that your baby drank and ate? Include meals and snacks. **(PLEASE "X" ALL THAT APPLY)**

	THE CHILD CARE PROVIDER	YOU, THE MOTHER	SOMEONE ELSE	BABY WAS NOT FED THIS ITEM
Who provided the baby's formula?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who provided the baby's food for meals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who provided the baby's snacks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

58. Does your child care provider:

	YES	NO	DON'T KNOW
Feed a mother's pumped breast milk to her baby?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allow mothers to breastfeed at the child care place before or after work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allow mothers to come in and breastfeed during their lunch or other breaks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thaw and prepare bottles of pumped milk if needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keep extra breast milk in a freezer for use if they run out during the day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 3 Months
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SECTION 6: OTHER INFORMATION

59. During the past 2 weeks, have you had any health conditions which made it hard or impossible for you to take care of your baby?

Yes..... ☐

No..... ☐

60. On the average, how many cigarettes do you smoke a day now? (Write in 0 if you do not smoke).

_____ CIGARETTES PER DAY

61. How many people including yourself smoke inside your home most days? (*Include yourself, family members, friends, and anyone else*)

0 ☐

1 ☐

2 ☐

3 ☐

4 or more ☐

62. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) **(PLEASE "X" ALL THAT APPLY)**

Yes, I was enrolled or got WIC food for myself..... ☐

Yes, my baby was enrolled or got WIC formula or food ☐

No..... ☐

63. Does your baby have any serious, long-term medical problems?

No..... ☐

Yes..... ☐ → **(PLEASE EXPLAIN BRIEFLY)** _____

64. Date you completed this form: MONTH _____ DAY _____ YEAR _____

**THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE PAID
ENVELOPE PROVIDED.**

Infant Feeding Questionnaire: 4 Months
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BABY'S FEEDING AND HEALTH

If your baby is regularly cared for by someone else, it is very important that you ask your child care provider to give you information for the feeding questions.

If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: FEEDING

1. In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.
If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Cow's milk	_____	_____
Other milk: soy milk, rice milk, goat milk, etc	_____	_____
Other dairy foods: yogurt, cheese, ice cream, pudding, etc	_____	_____
Other soy foods: tofu, frozen soy desserts, etc	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks: juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc	_____	_____
Baby cereal	_____	_____
Other cereals and starches: breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc	_____	_____
Fruit	_____	_____
Vegetables	_____	_____
French fries	_____	_____
Meat, chicken, combination dinners	_____	_____
Fish or shellfish	_____	_____
Peanut butter, other peanut foods, or nuts	_____	_____
Eggs	_____	_____
Sweet foods, candy, cookies, cake, etc	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

2. What type of baby cereal was your baby fed in the past 7 days? (PLEASE "X" ALL THAT APPLY)

Baby was not fed baby cereal ☐ Dry cereal that you add liquid to ☐ Cereal in a jar already mixed ☐

3. Which of the following was your baby given in vitamin or mineral drops or pills at least 3 days a week during the past two weeks? If your baby was given drops or pills that contained more than one of the items listed, please mark each of the separate items. (PLEASE "X" ALL THAT APPLY)

Fluoride ☐ Vitamin D ☐ None of these ☐
Iron ☐ Other Vitamins ☐

**Infant Feeding Questionnaire: 4 Months
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4. During the past two weeks, how often was your baby put to bed with a bottle of formula, breast milk, juice, juice drink, or any other kind of milk?

At most bedtimes, including naps..... ☐
 At most night bedtimes, but not naps..... ☐
 At most naps, but not night bedtimes..... ☐
 Only occasionally at bedtimes, including naps ☐
 Never ☐

5. How often have you added each of the following items to your baby's bottle of formula or pumped (or expressed) breast milk in the past two weeks? If you have not given your baby a bottle in the past two weeks, "X" here ☐ and go to Question 6.

	NEVER	ONLY RARELY	EVERY FEW DAYS	ABOUT ONCE A DAY	AT MOST FEEDINGS	EVERY FEEDING
Vitamins or minerals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify).....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In the past 2 weeks, have you chewed up food and then given it to your baby, so the food was already chewed up before you fed it to your baby?

Yes..... ☐ No..... ☐

7. Have you obtained information about feeding babies from any of the following sources for this baby or a previous one? Think of information you have already received about breastfeeding, formula feeding, feeding solid foods, or any other infant feeding information.

	YES	NO
Doctor, nurse, or other health professional	<input type="checkbox"/>	<input type="checkbox"/>
WIC food program	<input type="checkbox"/>	<input type="checkbox"/>
Baby care class or support group	<input type="checkbox"/>	<input type="checkbox"/>
Relative or friend	<input type="checkbox"/>	<input type="checkbox"/>
Books or videos	<input type="checkbox"/>	<input type="checkbox"/>
Newsletters	<input type="checkbox"/>	<input type="checkbox"/>
Newspapers or magazines	<input type="checkbox"/>	<input type="checkbox"/>
Television or radio	<input type="checkbox"/>	<input type="checkbox"/>
Website	<input type="checkbox"/>	<input type="checkbox"/>

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 14 ON PAGE 3.

8. How often does your baby drink all of his or her bottle of formula?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

**Infant Feeding Questionnaire: 4 Months
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9. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

10. How often is your baby encouraged to finish a bottle if he or she stops drinking before the formula is all gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

11. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

12. What type of infant formula was your baby fed? **(PLEASE "X" ALL THAT APPLY)**

Ready to feed ☐ Powder from can that makes more than one bottle ☐
Liquid concentrate ☐ Powder from single serving packs ☐

13. Which of the following describes the iron content of the formula you usually use?

With iron ☐ Low iron ☐

IF YOUR BABY WAS BREASTFED OR FED BREAST MILK IN A BOTTLE IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 2 ON PAGE 4.

14. Does your baby usually feed from both breasts at each feeding?

Yes ☐ No ☐ Baby is fed only pumped milk ☐ → (GO TO QUESTION 17)

15. Does your baby usually let go of the breast him or herself?

Yes, both breasts ☐ Yes, first breast only ☐ Yes, second breast only ☐ No ☐

16. About how long does an average breastfeeding last?

Less than 10 minutes ☐ 20 to 29 minutes ☐ 40 to 49 minutes ☐
10 to 19 minutes ☐ 30 to 39 minutes ☐ 50 or more minutes ☐

**Infant Feeding Questionnaire: 4 Months
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17. In an average 24-hour period, what is the LONGEST time for you, the mother, between breastfeeding or pumping milk? Please count the time from the start of one breastfeeding or pumping session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. (WRITE IN THE NUMBER OF HOURS AND MINUTES)

_____ HOURS **AND** _____ MINUTES

18. How many times in the past 7 days was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. (Write in 0 if your baby was not fed expressed or pumped milk to drink.)

_____ TIMES → (If 0, GO TO SECTION 2 ON THIS PAGE)

19. On average in the past 7 days how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

1 ounce or less	<input type="checkbox"/>	3 to 4 ounces	<input type="checkbox"/>	7 to 8 ounces.....	<input type="checkbox"/>
2 ounces.....	<input type="checkbox"/>	5 to 6 ounces	<input type="checkbox"/>	More than 8 ounces	<input type="checkbox"/>

20. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

1 to 2	<input type="checkbox"/>	3 to 4	<input type="checkbox"/>	5 to 6	<input type="checkbox"/>	7 to 8	<input type="checkbox"/>	More than 8	<input type="checkbox"/>
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21. How often does your baby drink all of his or her cup or bottle of pumped milk?

<u>Never</u>	<u>Rarely</u>	<u>Sometimes</u>	<u>Most of the time</u>	<u>Always</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

22. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

<u>Never</u>	<u>Rarely</u>	<u>Sometimes</u>	<u>Most of the time</u>	<u>Always</u>
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 2: HEALTH

23. Which of the following problems did your baby have during the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

Fever.....	<input type="checkbox"/>	Runny nose or cold.....	<input type="checkbox"/>
Diarrhea.....	<input type="checkbox"/>	Respiratory Syncytial Virus (RSV)	<input type="checkbox"/>
Vomiting.....	<input type="checkbox"/>	Cough or wheeze.....	<input type="checkbox"/>
Ear Infection.....	<input type="checkbox"/>	Asthma.....	<input type="checkbox"/>
Colic.....	<input type="checkbox"/>	Food Allergy.....	<input type="checkbox"/>
Fussy or irritable	<input type="checkbox"/>	Eczema (atopic dermatitis).....	<input type="checkbox"/>
Reflux.....	<input type="checkbox"/>	None of these.....	<input type="checkbox"/>

**Infant Feeding Questionnaire: 4 Months
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24. Did your baby receive any of the following medicines in the past 2 weeks? (Please do not include vitamins or minerals.)

	YES	NO
Antibiotics.....	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines	<input type="checkbox"/>	<input type="checkbox"/>
Non-prescription medicines	<input type="checkbox"/>	<input type="checkbox"/>

25. How much did your baby weigh the last time he or she was weighed at a doctor's visit?

_____ POUNDS _____ OUNCES Don't know.....☐

26. What was the date of that weight?

_____ MONTH _____ DAY Don't know.....☐

27. How long was your baby the last time he or she was measured at the doctor's visit?

_____ INCHES Don't know.....☐

28. What was the date of that measurement?

_____ MONTH _____ DAY Don't know.....☐

29. Has your baby been hospitalized for any reason or has your baby been taken to a hospital for any outpatient procedure or surgery in the past 4 weeks?

Yes.....☐ No.....☐ → (GO TO SECTION 3 ON THIS PAGE)

30. How many nights was your baby in the hospital for the most recent problem? (Write 0 if your baby did not stay overnight.)

_____ NIGHTS

SECTION 3: STOPPED BREASTFEEDING

31. Did you ever breastfeed your baby (or feed your baby your pumped milk)?

Yes.....☐ → (CONTINUE) No.....☐ → (GO TO SECTION 4 ON PAGE 8)

32. Have you completely stopped breastfeeding and pumping milk for your baby?

Yes.....☐ → (CONTINUE) No.....☐ → (GO TO SECTION 4 ON PAGE 8)

33. Have you filled out **SECTION 3: Stopped Breastfeeding** on a previous questionnaire since you stopped breastfeeding?

Yes.....☐ → (GO TO SECTION 4 ON PAGE 8) No.....☐ → (CONTINUE)

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34. Did you breastfeed as long as you wanted to?

Yes..... ☐

No..... ☐

35. How old was your baby when you completely stopped breastfeeding and pumping milk?

_____ WEEKS **OR** _____ MONTHS

PLEASE CONTINUE TO THE NEXT PAGE →

**Infant Feeding Questionnaire: 4 Months
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36. How important was each of the following reasons for your decision to stop breastfeeding your baby?
(PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby began to bite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were overfull or engorged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts leaked too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go on a weight loss diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go back to my usual diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to smoke again or more than I did while breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many household duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort that it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted my body back to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became pregnant or wanted to become pregnant again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 4 Months
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37. Did any of the following people want you to stop breastfeeding? (Mark "does not apply" if you do not have the person listed, such as "employer" if you do not work for pay.)

	YES	NO	DOES NOT APPLY / DON'T KNOW
The baby's father.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother-in-law.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your grandmother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another family member.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your employer or supervisor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

38. Using 1 to mean "Very favorable" and 5 to mean "Very unfavorable," how do you feel about the experience of having breastfed your baby?

VERY FAVORABLE		VERY UNFAVORABLE	
(1)	(2)	(3)	(4)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Using 1 to mean "Not at all likely" and 5 to mean "Very likely," how likely is it that you would breastfeed again if you had another child?

NOT AT ALL LIKELY		VERY LIKELY	
(1)	(2)	(3)	(4)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

40. What was the longest time your baby usually slept at night without waking?

2 hours or less	<input type="checkbox"/>
3 to 4 hours	<input type="checkbox"/>
5 to 6 hours	<input type="checkbox"/>
7 to 8 hours	<input type="checkbox"/>
8 hours or more	<input type="checkbox"/>

SECTION 4: FOOD ALLERGIES

41. Has your baby ever had problems caused by food, such as an allergic reaction, sensitivity, or intolerance?

Yes..... ☐ No..... ☐ → (GO TO SECTION 5 ON PAGE 11)

42. Did your baby have a reaction the first time he or she ate the food?

Yes..... ☐ No..... ☐ Not Sure..... ☐

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43. Were the problems caused by...(PLEASE "X" ALL THAT APPLY)

- Food your baby ate (including infant formula)..... ☐
 Food your baby was exposed to through breast milk because of something you ate ☐

44. How old was your baby the first time he or she had a problem with food? (Include food your baby reacted to through breast milk.)

- | | | |
|--|-----------------------------------|-----------------------------------|
| 1 month or less <input type="checkbox"/> | 3 months <input type="checkbox"/> | 5 months <input type="checkbox"/> |
| 2 months <input type="checkbox"/> | 4 months <input type="checkbox"/> | 6 months <input type="checkbox"/> |

45. Did you take your baby to a medical doctor because of these problems with food?

- Yes..... ☐ No..... ☐ → (GO TO QUESTION 48)

46. If your baby was tested or examined for food allergy, what method was used? (PLEASE "X" ALL THAT APPLY)

If your baby was not tested or examined for food allergy "X" here ☐ and go to question 48.

- Parents' description of symptoms..... ☐
 A skin test..... ☐
 A blood test such as RAST, or CAP-RAST..... ☐
 An esophageal or intestinal study..... ☐
 Food elimination (withdrawal of the specific food to see if symptoms disappeared)..... ☐
 Food challenge (introduction of a specific food to see if symptoms reappeared).... ☐
 Other (PLEASE SPECIFY)..... ☐

47. Was your baby diagnosed by a medical doctor as having an allergy to any food?

- Yes..... ☐ No..... ☐

48. What symptoms of a problem with food has your baby had? (PLEASE "X" ALL THAT APPLY)

- | | |
|--|--|
| Congestion..... <input type="checkbox"/> | Gassiness or stomach cramps <input type="checkbox"/> |
| Runny nose..... <input type="checkbox"/> | Vomiting..... <input type="checkbox"/> |
| Asthma or wheezing..... <input type="checkbox"/> | Diarrhea..... <input type="checkbox"/> |
| Trouble breathing..... <input type="checkbox"/> | Constipation..... <input type="checkbox"/> |
| Coughing..... <input type="checkbox"/> | Colic..... <input type="checkbox"/> |
| Swollen eyes and or lips..... <input type="checkbox"/> | Irritability..... <input type="checkbox"/> |
| Hives or welts..... <input type="checkbox"/> | Sleepiness..... <input type="checkbox"/> |
| Flushing..... <input type="checkbox"/> | Blood in stool..... <input type="checkbox"/> |
| Skin rash or eczema..... <input type="checkbox"/> | Loss of consciousness..... <input type="checkbox"/> |
| Spitting up..... <input type="checkbox"/> | |

49. How have the symptoms been treated? (PLEASE "X" ALL THAT APPLY)

- Treated in a doctor's office or emergency room ☐
 Treated by emergency medical technician..... ☐
 Admitted to a hospital..... ☐
 Given epinephrine, such as with an EpiPen..... ☐
 Given Benadryl or other anti-histamine..... ☐
 Prescribed an EpiPen or other epinephrine..... ☐
 None of the above..... ☐

**Infant Feeding Questionnaire: 4 Months
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50. Please indicate which foods caused a problem for your baby in column 10A, including food your baby reacted to through breast milk. In column 10B, indicated the foods that your baby has been diagnosed as allergic to. (If you baby has had a problem with a food and has been diagnosed as allergic to the food, mark both columns for that food.) **(PLEASE "X" ALL THAT APPLY)**

	10A	10B
	BABY HAD A PROBLEM WITH	DIAGNOSED AS ALLERGIC TO
Cow's milk or other dairy products (including infant formula made with cow milk)	<input type="checkbox"/>	<input type="checkbox"/>
Soy milk or other soy food (including infant formula made with soy)	<input type="checkbox"/>	<input type="checkbox"/>
Eggs	<input type="checkbox"/>	<input type="checkbox"/>
Peanuts, peanut butter, peanut oil	<input type="checkbox"/>	<input type="checkbox"/>
Nuts (such as, almonds, pecans, walnuts)	<input type="checkbox"/>	<input type="checkbox"/>
Sesame seeds, tahini, or sesame seed oil	<input type="checkbox"/>	<input type="checkbox"/>
Fish, shellfish, or other seafood	<input type="checkbox"/>	<input type="checkbox"/>
Beef, chicken or turkey	<input type="checkbox"/>	<input type="checkbox"/>
Wheat, gluten, or wheat starch	<input type="checkbox"/>	<input type="checkbox"/>
Other grain or cereal (such as oats, barley)	<input type="checkbox"/>	<input type="checkbox"/>
Fruit or fruit juice	<input type="checkbox"/>	<input type="checkbox"/>
Vegetable	<input type="checkbox"/>	<input type="checkbox"/>
Other food (SPECIFY) _____	<input type="checkbox"/>	<input type="checkbox"/>

IF YOUR BABY HAS HAD A PROBLEM WITH INFANT FORMULA, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 5 ON THE NEXT PAGE.

51. Which infant formula has your baby had a problem with? Infant formulas are listed alphabetically on the insert along with a group number. Please "X" the group number for each formula your baby had a problem with. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

52. How many of the different formulas listed on the insert has your baby had a problem with?

1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more ☐

**Infant Feeding Questionnaire: 4 Months
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SECTION 5: OTHER INFORMATION

53. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) **(PLEASE "X" ALL THAT APPLY)**

Yes, I was enrolled or got WIC food for myself.....☐
Yes, my baby was enrolled or got WIC formula or food☐
No.....☐

54. Does your baby have any serious, long-term medical problems?

No.....☐ Yes.....☐ → **(PLEASE EXPLAIN BRIEFLY)** _____

55. Date you completed this form: MONTH _____ DAY _____ YEAR _____

**THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE PAID
ENVELOPE PROVIDED.**

Infant Feeding Questionnaire: 5 Months
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BABY'S FEEDING AND HEALTH

If your baby is regularly cared for by someone else, it is very important that you ask your child care provider to give you information for the feeding questions.

If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: FEEDING

1. In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.
If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Cow's milk	_____	_____
Other milk: soy milk, rice milk, goat milk, etc	_____	_____
Other dairy foods: yogurt, cheese, ice cream, pudding, etc	_____	_____
Other soy foods: tofu, frozen soy desserts, etc	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks: juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc	_____	_____
Baby cereal	_____	_____
Other cereals and starches: breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc	_____	_____
Fruit	_____	_____
Vegetables	_____	_____
French fries	_____	_____
Meat, chicken, combination dinners	_____	_____
Fish or shellfish	_____	_____
Peanut butter, other peanut foods, or nuts	_____	_____
Eggs	_____	_____
Sweet foods, candy, cookies, cake, etc	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

2. What type of baby cereal was your baby fed in the past 7 days? (PLEASE "X" ALL THAT APPLY)

Baby was not fed baby cereal ☐ Dry cereal that you add liquid to ☐ Cereal in a jar already mixed ☐

3. Which of the following was your baby given in vitamin or mineral drops or pills at least 3 days a week during the past two weeks? If your baby was given drops or pills that contained more than one of the items listed, please mark each of the separate items. (PLEASE "X" ALL THAT APPLY)

Fluoride ☐ Vitamin D ☐ None of these ☐
Iron ☐ Other Vitamins ☐

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4. During the past two weeks, how often was your baby put to bed with a bottle of formula, breast milk, juice, juice drink, or any other kind of milk?

At most bedtimes, including naps..... ☐
 At most night bedtimes, but not naps..... ☐
 At most naps, but not night bedtimes..... ☐
 Only occasionally at bedtimes, including naps ☐
 Never ☐

5. How often have you added each of the following items to your baby's bottle of formula or pumped (or expressed) breast milk in the past two weeks? If you have not given your baby a bottle in the past two weeks, "X" here ☐ and go to Question 6.

	NEVER	ONLY RARELY	EVERY FEW DAYS	ABOUT ONCE A DAY	AT MOST FEEDINGS	EVERY FEEDING
Vitamins or minerals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In the past 2 weeks, have you chewed up food and then given it to your baby, so the food was already chewed up before you fed it to your baby?

Yes..... ☐ No..... ☐

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 13 ON PAGE 3.

7. How often does your baby drink all of his or her bottle of formula?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

8. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

9. How often is your baby encouraged to finish a bottle if he or she stops drinking before the formula is all gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

10. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

**Infant Feeding Questionnaire: 5 Months
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11. What type of infant formula was your baby fed? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|--------------------|--------------------------|---|--------------------------|
| Ready to feed | <input type="checkbox"/> | Powder from can that makes more than one bottle | <input type="checkbox"/> |
| Liquid concentrate | <input type="checkbox"/> | Powder from single serving packs | <input type="checkbox"/> |

12. Which of the following describes the iron content of the formula you usually use?

- | | | | |
|-----------|--------------------------|----------|--------------------------|
| With iron | <input type="checkbox"/> | Low iron | <input type="checkbox"/> |
|-----------|--------------------------|----------|--------------------------|

IF YOUR BABY WAS BREASTFED OR FED BREAST MILK IN A BOTTLE IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 22 ON PAGE 4.

13. Does your baby usually feed from both breasts at each feeding?

- | | | | | | | |
|-----|--------------------------|----|--------------------------|------------------------------|--------------------------|-----------------------|
| Yes | <input type="checkbox"/> | No | <input type="checkbox"/> | Baby is fed only pumped milk | <input type="checkbox"/> | → (GO TO QUESTION 16) |
|-----|--------------------------|----|--------------------------|------------------------------|--------------------------|-----------------------|

14. Does your baby usually let go of the breast him or herself?

- | | | | | | | | |
|-------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|----|--------------------------|
| Yes, both breasts | <input type="checkbox"/> | Yes, first breast only | <input type="checkbox"/> | Yes, second breast only | <input type="checkbox"/> | No | <input type="checkbox"/> |
|-------------------|--------------------------|------------------------|--------------------------|-------------------------|--------------------------|----|--------------------------|

15. About how long does an average breastfeeding last?

- | | | | | | |
|----------------------|--------------------------|------------------|--------------------------|--------------------|--------------------------|
| Less than 10 minutes | <input type="checkbox"/> | 20 to 29 minutes | <input type="checkbox"/> | 40 to 49 minutes | <input type="checkbox"/> |
| 10 to 19 minutes | <input type="checkbox"/> | 30 to 39 minutes | <input type="checkbox"/> | 50 or more minutes | <input type="checkbox"/> |

16. In an average 24-hour period, what is the LONGEST time for you, the mother, between breastfeeding or pumping milk? Please count the time from the start of one breastfeeding or pumping session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. (WRITE IN THE NUMBER OF HOURS AND MINUTES)

_____ HOURS **AND** _____ MINUTES

17. How many times in the past 7 days was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. (Write in 0 if your baby was not fed expressed or pumped milk to drink.)

_____ TIMES → (IF 0, GO TO INSTRUCTION ABOVE QUESTION 22 ON PAGE 4)

18. On average in the past 7 days how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

- | | | | | | |
|-----------------|--------------------------|---------------|--------------------------|--------------------|--------------------------|
| 1 ounce or less | <input type="checkbox"/> | 3 to 4 ounces | <input type="checkbox"/> | 7 to 8 ounces..... | <input type="checkbox"/> |
| 2 ounces..... | <input type="checkbox"/> | 5 to 6 ounces | <input type="checkbox"/> | More than 8 ounces | <input type="checkbox"/> |

19. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

- | | | | | | | | | | |
|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|-------------|--------------------------|
| 1 to 2 | <input type="checkbox"/> | 3 to 4 | <input type="checkbox"/> | 5 to 6 | <input type="checkbox"/> | 7 to 8 | <input type="checkbox"/> | More than 8 | <input type="checkbox"/> |
|--------|--------------------------|--------|--------------------------|--------|--------------------------|--------|--------------------------|-------------|--------------------------|

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20. How often does your baby drink all of his or her cup or bottle of pumped milk?

☐ **Never**
☐ **Rarely**
☐ **Sometimes**
☐ **Most of the time**
☐ **Always**

21. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

☐ **Never**
☐ **Rarely**
☐ **Sometimes**
☐ **Most of the time**
☐ **Always**

IF YOUR BABY IS FED ANY FOODS OR DRINKS BESIDES BREAST MILK OR FORMULA, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 2 ON THE NEXT PAGE.

22. How important was each of the following reasons for feeding your baby solid food for the very first time? Solid foods are foods such as cereal, baby foods, or table food. (PLEASE ANSWER EACH ITEM) If your baby has not been fed solid food "X" here ☐ and go to Question 24

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby was nursing too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was drinking too much formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby seemed hungry a lot of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to feed my baby something in addition to breast milk or formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would help my baby sleep longer at night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough to begin eating solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby had a medical condition that might be helped by feeding solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional said my baby should begin eating solid foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends or relatives said my baby should begin eating solid foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby wanted food I ate or in other ways showed an interest in solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

23. About how often did you introduce new foods (such as specific type of cereal, fruit, vegetable, or meat) to your baby over the past 2 weeks?

No new foods in the past 2 weeks.....	<input type="checkbox"/>	About 1 new food every 2 days	<input type="checkbox"/>
About 1 new food per week or less often	<input type="checkbox"/>	About 1 new food every day	<input type="checkbox"/>
About 1 new food every 4 or 5 days.....	<input type="checkbox"/>	More than 1 new food every day	<input type="checkbox"/>
About 1 new food every 3 days.....	<input type="checkbox"/>		

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SECTION 2: HEALTH

24. Which of the following problems did your baby have during the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

Fever.....	<input type="checkbox"/>	Runny nose or cold.....	<input type="checkbox"/>
Diarrhea.....	<input type="checkbox"/>	Respiratory Syncytial Virus (RSV)	<input type="checkbox"/>
Vomiting.....	<input type="checkbox"/>	Cough or wheeze.....	<input type="checkbox"/>
Ear Infection.....	<input type="checkbox"/>	Asthma.....	<input type="checkbox"/>
Colic.....	<input type="checkbox"/>	Food Allergy.....	<input type="checkbox"/>
Fussy or irritable	<input type="checkbox"/>	Eczema (atopic dermatitis).....	<input type="checkbox"/>
Reflux.....	<input type="checkbox"/>	None of these.....	<input type="checkbox"/>

25. Did your baby receive any of the following medicines in the past 2 weeks? (Please do not include vitamins or minerals.)

	YES	NO
Antibiotics.....	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines	<input type="checkbox"/>	<input type="checkbox"/>
Non-prescription medicines.....	<input type="checkbox"/>	<input type="checkbox"/>

26. How much did your baby weigh the last time he or she was weighed at a doctor's visit?

_____ POUNDS _____ OUNCES Don't know.....☐

27. What was the date of that weight?

_____ MONTH _____ DAY Don't know.....☐

28. How long was your baby the last time he or she was measured at the doctor's visit?

_____ INCHES Don't know.....☐

29. What was the date of that measurement?

_____ MONTH _____ DAY Don't know.....☐

30. Has your baby been hospitalized for any reason or has your baby been taken to a hospital for any outpatient procedure or surgery in the past 4 weeks?

Yes.....☐ No.....☐ → (GO TO SECTION 3 ON THE NEXT PAGE)

31. How many nights was your baby in the hospital for the most recent problem? (Write 0 if your baby did not stay overnight.)

_____ NIGHTS

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SECTION 3: STOPPED BREASTFEEDING

32. Did you ever breastfeed your baby (or feed your baby your pumped milk)?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 7 ON PAGE 12)

33. Have you completely stopped breastfeeding and pumping milk for your baby?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 4 ON PAGE 8)

34. Have you filled out **SECTION 3: Stopped Breastfeeding** on a previous questionnaire since you stopped breastfeeding?

Yes..... ☐ → (GO TO SECTION 7 ON PAGE 12) No..... ☐ → (CONTINUE)

35. Did you breastfeed as long as you wanted to?

Yes..... ☐ No..... ☐

36. How old was your baby when you completely stopped breastfeeding and pumping milk?

_____ WEEKS OR _____ MONTHS

CONTINUE TO THE NEXT PAGE→

**Infant Feeding Questionnaire: 5 Months
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37. How important was each of the following reasons for your decision to stop breastfeeding your baby?
(PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby began to bite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were overfull or engorged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts leaked too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go on a weight loss diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go back to my usual diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to smoke again or more than I did while breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many household duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort that it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted my body back to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became pregnant or wanted to become pregnant again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 5 Months
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38. Did any of the following people want you to stop breastfeeding? (Mark "does not apply" if you do not have the person listed, such as "employer" if you do not work for pay.)

	YES	NO	DOES NOT APPLY / DON'T KNOW
The baby's father.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother-in-law.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your grandmother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another family member.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your employer or supervisor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Using 1 to mean "Very favorable" and 5 to mean "Very unfavorable," how do you feel about the experience of having breastfed your baby?

VERY FAVORABLE					VERY UNFAVORABLE
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

40. Using 1 to mean "Not at all likely" and 5 to mean "Very likely," how likely is it that you would breastfeed again if you had another child?

NOT AT ALL LIKELY					VERY LIKELY
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SECTION 4: BREASTFEEDING

41. In the past 3 months, did you breastfeed your baby (or feed your baby your pumped milk)?

Yes..... ☐ → (CONTINUE)

No..... ☐ → (GO TO SECTION 7 ON PAGE 12)

42. Using 1 to mean "Very uncomfortable," and 5 to mean "Very comfortable," how comfortable would you be in the following situations?

	VERY UNCOMFORTABLE				VERY COMFORTABLE
	(1)	(2)	(3)	(4)	(5)
Nursing your baby in the presence of close women friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nursing your baby in the presence of men and women who are not close friends	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Infant Feeding Questionnaire: 5 Months
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43. Have you breastfed your baby or pumped breast milk in the past 7 days?

Yes..... ☐ → (CONTINUE)

No..... ☐ → (GO TO SECTION 5 ON PAGE 10)

44. How old do you think your baby will be when you completely stop breastfeeding?

5 months ☐
6 months ☐
7 months ☐

8 months ☐
9 months ☐
10 months ☐

11 months ☐
12 months ☐
More than
12 months ☐

45. Using 1 to mean "Not at all Confident" and 5 to mean "Very Confident," how confident are you that you will be able to breastfeed until the baby is the age you marked in Question 42?

**NOT AT ALL
CONFIDENT**
(1) ☐

(2) ☐

(3) ☐

(4) ☐

**VERY
CONFIDENT**
(5) ☐

46. Did you work for pay any time during the past 4 weeks?

Yes..... ☐

No..... ☐ → (GO TO THE INSTRUCTION ABOVE QUESTION 48 ON THIS PAGE)

47. Which of the following circumstances describe your situation during the past 4 weeks? (If you have stopped breastfeeding or stopped working for pay, please answer for the time you were breastfeeding and working. If you have worked for less than 4 weeks, please answer for the time you have been working.) (PLEASE "X" ALL THAT APPLY)

- I keep my baby with me while I work and breastfeed during my work day..... ☐
- I go to my baby and breastfeed him or her during my work day..... ☐
- My baby is brought to me to breastfeed during my work day..... ☐
- I pump milk during my work day and save it for my baby to drink later..... ☐
- I pump milk during my work day, but I do not save it for my baby to drink later..... ☐
- I neither pump milk nor breastfeed during my work day..... ☐

IF YOU ANSWERED THE STOPPED BREASTFEEDING SECTION ON THIS QUESTIONNAIRE, GO TO SECTION 5: BREAST PUMPS ON THE NEXT PAGE.

48. Was your baby fed formula to drink in the past 2 weeks, by you or anyone else?

Yes..... ☐

No..... ☐ → (GO TO SECTION 5 ON PAGE 10)

CONTINUE TO THE NEXT PAGE→

**Infant Feeding Questionnaire: 5 Months
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49. How important was each of the following reasons for feeding your baby formula? **(PLEASE ANSWER EACH ITEM)**

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked, or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Someone else wanted to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 5: BREAST PUMPS

50. In the past 3 months, have you pumped or tried to pump milk? (Include expressing breast milk in any way as pumping milk.)

Yes, but I did not get any milk ☐ Yes, and I got milk ☐ No ☐ → GO TO SECTION 7 ON PAGE 12

51. How old was your baby the first time you pumped or tried to pump milk?

_____ DAYS OR _____ WEEKS

52. How have you pumped or expressed milk in the past 3 months? **(PLEASE "X" ALL THAT APPLY)**

- Electric breast pump..... ☐
- Combination electric and battery operated breast pump ☐
- Battery operated pump..... ☐
- Manual breast pump (no batteries, no cord to plug in).... ☐
- By hand (without using a pump)..... ☐

**Infant Feeding Questionnaire: 5 Months
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53. Have you had any of the following problems with a breast pump that you used to express milk since the baby was born? (PLEASE "X" ALL THAT APPLY)

Pressure or suction from the pump was hard to release
 Pump was uncomfortable or painful to use even though it did not cause injury
 Pump had a bad seal or milk got into the motor or other place it should not be
 Could not get pump to work or to express any milk
 Pump worked, but did not get enough/much milk
 Pump worked, but it took too long to get enough milk
 Pump worked for a while but then quit working
 Pump had another problem (SPECIFY) _____
 No Problems

☐
☐
☐
☐
☐
☐
☐
☐

SECTION 6: PUMPING OR EXPRESSING MILK

54. During the past 2 weeks, how many times did you pump milk? (Include expressing breast milk in any way as pumping milk.)

_____ TIMES IN PAST TWO WEEKS → (IF 0, GO TO SECTION 7 ON PAGE 12)

55. Are you now pumping milk on a regular schedule?

Yes..... ☐ No..... ☐ → (GO TO QUESTION 57)

56. How old was your baby when you first began pumping milk on a regular schedule?

_____ DAYS OR _____ WEEKS OR _____ MONTHS

57. On average, in the past 2 weeks, how many ounces of milk did you pump each time?

1 ounce or less ☐ 3 to 4 ounces ☐ 7 to 8 ounces..... ☐
 2 ounces..... ☐ 5 to 6 ounces ☐ More than 8 ounces ☐

58. For what reasons have you pumped milk in the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

To relieve engorgement ☐
 Because my nipples were too sore to nurse ☐
 To increase my milk supply ☐
 To get milk for someone else to feed to my baby ☐
 For me to feed my baby when I do not want to breastfeed or when my baby cannot breastfeed ☐
 To keep my milk supply up when my baby could not nurse (such as while you were away from your baby or when your baby was too sick to nurse) ☐
 To mix with cereal or other food ☐
 To have an emergency supply of milk ☐
 To donate to a baby other than my own ☐

**Infant Feeding Questionnaire: 5 Months
Feeding and Infant Growth (FIG) Study**



59. In the past 2 weeks, has your baby been fed formula mixed with breast milk in the same bottle?

Yes..... ☐ No..... ☐ → (GO TO SECTION 7 ON THIS PAGE)

60. How were the formula and breast milk usually mixed? (PLEASE "X" ALL THAT APPLY)

- Added formula powder to breast milk..... ☐
 Added formula concentrate to breast milk..... ☐
 Added prepared (mixed up) formula or ready-to-feed formula to breast milk..... ☐

SECTION 7: INFANT FORMULA

61. Was your baby fed infant formula in the past 2 weeks, by you or anyone else?

Yes..... ☐ No..... ☐ → (GO TO SECTION 8 ON PAGE 13)

62. How did you decide to use the formula you fed your baby in the past 7 days?

- | | | | |
|--|--------------------------|--|--------------------------|
| A doctor or other health professional recommended the formula..... | <input type="checkbox"/> | I chose a formula labeled as useful for a problem my baby had..... | <input type="checkbox"/> |
| I chose the same formula fed to my baby at the hospital..... | <input type="checkbox"/> | I use the formula given by WIC..... | <input type="checkbox"/> |
| I heard that the formula is better for my baby in some way..... | <input type="checkbox"/> | I chose the same formula I fed an older child..... | <input type="checkbox"/> |
| I chose the formula I received samples or coupons for..... | <input type="checkbox"/> | Friends or relatives recommended the formula..... | <input type="checkbox"/> |
| I saw an advertisement for the formula and wanted to buy it..... | <input type="checkbox"/> | I chose a formula based on low price..... | <input type="checkbox"/> |

63. Did you discuss your choice of formula with the baby's doctor?

Yes..... ☐ No..... ☐

64. During the past 2 weeks, how many times have you switched the formula you feed your baby?

None ☐ → GO TO SECTION 8 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 or more ☐

65. Which formulas did you stop using in the past 2 weeks? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula you stopped using. (PLEASE "X" ALL THAT APPLY)

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

**Infant Feeding Questionnaire: 5 Months
Feeding and Infant Growth (FIG) Study**



66. Did you switch formulas because your baby had a problem with the formula you were using?

Yes..... ☐

No..... ☐ → (GO TO SECTION 8 ON THIS PAGE)

67. What type of problem did your baby have with the formula(s)? (PLEASE "X" ALL THAT APPLY)

An allergic reaction or intolerance ☐
Constipation..... ☐
Diarrhea..... ☐
Too much mucus..... ☐

Too much gas..... ☐
Too much spit up..... ☐
Vomiting..... ☐
Other problems (Please specify.....) ☐

SECTION 8: OTHER INFORMATION

68. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) (PLEASE "X" ALL THAT APPLY)

Yes, I was enrolled or got WIC food for myself..... ☐

Yes, my baby was enrolled or got WIC formula or food..... ☐

No..... ☐

69. What was the longest time your baby usually slept at night without waking?

2 hours or less ☐
3 to 4 hours ☐
5 to 6 hours ☐
7 to 8 hours ☐
8 hours or more ☐

70. Does your baby have any serious, long-term medical problems?

No..... ☐

Yes..... ☐ → (PLEASE EXPLAIN BRIEFLY) _____

71. Date you completed this form: MONTH _____ DAY _____ YEAR _____

THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE PAID ENVELOPE PROVIDED.

Infant Feeding Questionnaire: 6 Months
Feeding and Infant Growth (FIG) Study



BABY'S FEEDING AND HEALTH

If your baby is regularly cared for by someone else, it is very important that you ask your child care provider to give you information for the feeding questions.

If you have older children, please only think about your youngest baby when you answer the questions.

SECTION 1: FEEDING

- In the past 7 days, how often was your baby fed each food listed below? Include feedings by everyone who feeds the baby and include snacks and night-time feedings.
If your baby was fed the food once a day or more, write the number of feedings per day in the first column. If your baby was fed the food less than once a day, write the number of feedings per week in the second column. **Fill in only one column for each item.** If your baby was not fed the food at all during the past seven days, write 0 in the second column.

	FEEDINGS PER DAY	FEEDINGS PER WEEK
Breast milk	_____	_____
Formula	_____	_____
Cow's milk	_____	_____
Other milk: soy milk, rice milk, goat milk, etc	_____	_____
Other dairy foods: yogurt, cheese, ice cream, pudding, etc	_____	_____
Other soy foods: tofu, frozen soy desserts, etc	_____	_____
100% fruit or 100% vegetable juice	_____	_____
Sweet drinks: juice drinks, soft drinks, soda, sweet tea, Kool-Aid, etc	_____	_____
Baby cereal	_____	_____
Other cereals and starches: breakfast cereals, teething biscuits, crackers, breads, pasta, rice, etc	_____	_____
Fruit	_____	_____
Vegetables	_____	_____
French fries	_____	_____
Meat, chicken, combination dinners	_____	_____
Fish or shellfish	_____	_____
Peanut butter, other peanut foods, or nuts	_____	_____
Eggs	_____	_____
Sweet foods, candy, cookies, cake, etc	_____	_____
Other (PLEASE SPECIFY) _____	_____	_____

- In the past 7 days, how many times was your baby usually fed in a 24-hour period? Please include breast feedings, bottles, meals, snacks, and night-time feedings?

1 to 2	<input type="checkbox"/>	6	<input type="checkbox"/>
3	<input type="checkbox"/>	7	<input type="checkbox"/>
4	<input type="checkbox"/>	8 or more	<input type="checkbox"/>
5	<input type="checkbox"/>		

**Infant Feeding Questionnaire: 6 Months
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3. Which of the following was your baby given in vitamin or mineral drops or pills at least 3 days a week during the past two weeks? If you baby was given drops or pills that contained more than one of the items listed, please mark each of the separate items. **(PLEASE "X" ALL THAT APPLY)**

Fluoride ☐ Vitamin D ☐ None of these ☐
Iron ☐ Other Vitamins ☐

4. During the past two weeks, how often was your baby put to bed with a bottle of formula, breast milk, juice, juice drink, or any other kind of milk?

At most bedtimes, including naps..... ☐
At most night bedtimes, but not naps..... ☐
At most naps, but not night bedtimes..... ☐
Only occasionally at bedtimes, including naps ☐
Never ☐

5. How often have you added each of the following items to your baby's bottle of formula or pumped (or expressed) breast milk in the past two weeks? If you have not given your baby a bottle in the past two weeks, "X" here ☐ and go to Question 6.

	NEVER	ONLY RARELY	EVERY FEW DAYS	ABOUT ONCE A DAY	AT MOST FEEDINGS	EVERY FEEDING
Vitamins or minerals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Baby cereal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sweetener	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (Specify) _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. In the past 2 weeks, have you chewed up food and then given it to your baby, so the food was already chewed up before you fed it to your baby?

Yes..... ☐ No..... ☐

IF YOUR BABY WAS FED FORMULA IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO INSTRUCTION ABOVE QUESTION 13 ON PAGE 3.

7. How often does your baby drink all of his or her bottle of formula?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

8. In the past 7 days, about how many ounces of formula did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

9. How often is your baby encouraged to finish a bottle if he or she stops drinking before the formula is all gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

**Infant Feeding Questionnaire: 6 Months
Feeding and Infant Growth (FIG) Study**



10. Which formula was fed to your baby in the past 7 days? Infant formulas are listed alphabetically on the Formula List insert along with a group number. Please "X" the group number for each infant formula your baby was fed. **(PLEASE "X" ALL THAT APPLY)**

Group 1 ☐ Group 2 ☐ Group 3 ☐ Group 4 ☐ Group 5 ☐ Group 6 ☐

11. What type of infant formula was your baby fed? **(PLEASE "X" ALL THAT APPLY)**

Ready to feed ☐ Powder from can that makes more than one bottle ☐
 Liquid concentrate ☐ Powder from single serving packs ☐

12. Which of the following describes the iron content of the formula you usually use?

With iron ☐ Low iron ☐

IF YOUR BABY WAS BREASTFED OR FED BREAST MILK IN A BOTTLE IN THE PAST 7 DAYS, PLEASE CONTINUE. ALL OTHERS GO TO THE INSTRUCTION ABOVE QUESTION 22 ON PAGE 4.

13. Does your baby usually feed from both breasts at each feeding?

Yes ☐ No ☐ Baby is fed only pumped milk ☐ → (GO TO QUESTION 16)

14. Does your baby usually let go of the breast him or herself?

Yes, both breasts ☐ Yes, first breast only ☐ Yes, second breast only ☐ No ☐

15. About how long does an average breastfeeding last?

Less than 10 minutes ☐ 20 to 29 minutes ☐ 40 to 49 minutes ☐
 10 to 19 minutes ☐ 30 to 39 minutes ☐ 50 or more minutes ☐

16. In an average 24-hour period, what is the LONGEST time for you, the mother, between breastfeeding or pumping milk? Please count the time from the start of one breastfeeding or pumping session to the start of the next. Please think of the time between feedings during both night and day to find the longest time. **(WRITE IN THE NUMBER OF HOURS AND MINUTES)**

_____ HOURS **AND** _____ MINUTES

17. How many times in the past 7 days was your baby fed pumped breast milk to drink? Include breast milk you expressed in any way as pumped milk. (Write in 0 if your baby was not fed expressed or pumped milk to drink.)

_____ TIMES (IF 0, GO TO INSTRUCTIONS ABOVE QUESTION 22)

**Infant Feeding Questionnaire: 6 Months
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18. On average in the past 7 days how many ounces of pumped breast milk was in the bottle or cup you fed to your baby (before beginning the feeding)?

1 ounce or less ☐ 3 to 4 ounces ☐ 7 to 8 ounces..... ☐
2 ounces..... ☐ 5 to 6 ounces ☐ More than 8 ounces ☐

19. In the past 7 days, about how many ounces of pumped breast milk did your baby drink at each feeding?

1 to 2 ☐ 3 to 4 ☐ 5 to 6 ☐ 7 to 8 ☐ More than 8 ☐

20. How often does your baby drink all of his or her cup or bottle of pumped milk?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

21. How often is your baby encouraged to finish a cup or bottle if he or she stops drinking before the pumped breast milk is gone?

Never ☐ Rarely ☐ Sometimes ☐ Most of the time ☐ Always ☐

IF YOUR BABY IS FED ANY FOODS OR DRINKS BESIDES BREAST MILK OR FORMULA, PLEASE CONTINUE. ALL OTHERS GO TO SECTION 2 ON PAGE 5.

22. How important was each of the following reasons for feeding your baby solid food for the very first time? Solid foods are foods such as cereal, baby foods, or table food. **(PLEASE ANSWER EACH ITEM)** If your baby has not been fed solid food "X" here ☐ and go to Question 24.

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby was nursing too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was drinking too much formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby seemed hungry a lot of the time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to feed my baby something in addition to breast milk or formula	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
It would help my baby sleep longer at night	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough to begin eating solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby had a medical condition that might be helped by feeding solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional said my baby should begin eating solid foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Friends or relatives said my baby should begin eating solid foods	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby wanted food I ate or in other ways showed an interest in solid food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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23. About how often did you introduce new foods (such as specific type of cereal, fruit, vegetable, or meat) to your baby over the past 2 weeks?

- | | | | |
|--|--------------------------|-------------------------------------|--------------------------|
| No new foods in the past 2 weeks..... | <input type="checkbox"/> | About 1 new food every 2 days..... | <input type="checkbox"/> |
| About 1 new food per week or less often..... | <input type="checkbox"/> | About 1 new food every day..... | <input type="checkbox"/> |
| About 1 new food every 4 or 5 days..... | <input type="checkbox"/> | More than 1 new food every day..... | <input type="checkbox"/> |
| About 1 new food every 3 days..... | <input type="checkbox"/> | | |

SECTION 2: HEALTH

24. Which of the following problems did your baby have during the past 2 weeks? (PLEASE "X" ALL THAT APPLY)

- | | | | |
|-------------------------|--------------------------|--|--------------------------|
| Fever..... | <input type="checkbox"/> | Runny nose or cold..... | <input type="checkbox"/> |
| Diarrhea..... | <input type="checkbox"/> | Respiratory Syncytial Virus (RSV)..... | <input type="checkbox"/> |
| Vomiting..... | <input type="checkbox"/> | Cough or wheeze..... | <input type="checkbox"/> |
| Ear Infection..... | <input type="checkbox"/> | Asthma..... | <input type="checkbox"/> |
| Colic..... | <input type="checkbox"/> | Food Allergy..... | <input type="checkbox"/> |
| Fussy or irritable..... | <input type="checkbox"/> | Eczema (atopic dermatitis)..... | <input type="checkbox"/> |
| Reflux..... | <input type="checkbox"/> | None of these..... | <input type="checkbox"/> |

25. Did your baby receive any of the following medicines in the past 2 weeks? (Please do not include vitamins or minerals.)

	YES	NO
Antibiotics.....	<input type="checkbox"/>	<input type="checkbox"/>
Other prescription medicines.....	<input type="checkbox"/>	<input type="checkbox"/>
Non-prescription medicines.....	<input type="checkbox"/>	<input type="checkbox"/>

26. How much did your baby weigh the last time he or she was weighed at a doctor's visit?

_____ POUNDS _____ OUNCES Don't know.....☐

27. What was the date of that weight?

_____ MONTH _____ DAY Don't know.....☐

28. How long was your baby the last time he or she was measured at the doctor's visit?

_____ INCHES Don't know.....☐

29. What was the date of that measurement?

_____ MONTH _____ DAY Don't know.....☐

30. Has your baby been hospitalized for any reason or has your baby been taken to a hospital for any outpatient procedure or surgery in the past 4 weeks?

Yes.....☐ No.....☐ → (GO TO SECTION 3 ON THE NEXT PAGE)

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31. How many nights was your baby in the hospital for the most recent problem? (*Write 0 if your baby did not stay overnight.*)

_____ NIGHTS

SECTION 3: STOPPED BREASTFEEDING

32. Did you ever breastfeed your baby (*or feed your baby your pumped milk*)?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 4 ON PAGE 8)

33. Have you completely stopped breastfeeding and pumping milk for your baby?

Yes..... ☐ → (CONTINUE) No..... ☐ → (GO TO SECTION 4 ON PAGE 8)

34. Have you filled out **SECTION 3: Stopped Breastfeeding** on a previous questionnaire since you stopped breastfeeding?

Yes..... ☐ → (GO TO SECTION 4 ON PAGE 8) No..... ☐ → (CONTINUE)

35. Did you breastfeed as long as you wanted to?

Yes..... ☐ No..... ☐

36. How old was your baby when you completely stopped breastfeeding and pumping milk?

_____ WEEKS (If younger than 2 weeks) OR _____ MONTHS

CONTINUE TO THE NEXT PAGE→

**Infant Feeding Questionnaire: 6 Months
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37. How important was each of the following reasons for your decision to stop breastfeeding your baby?
(PLEASE ANSWER EACH ITEM)

	NOT AT ALL IMPORTANT	NOT VERY IMPORTANT	SOMEWHAT IMPORTANT	VERY IMPORTANT
My baby had trouble sucking or latching on	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby became sick and could not breastfeed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby began to bite	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby lost interest in nursing or began to wean him or herself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My baby was old enough that the difference between breast milk and formula no longer mattered	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breast milk alone did not satisfy my baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I thought that my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A health professional said my baby was not gaining enough weight	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had trouble getting the milk flow to start	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I didn't have enough milk	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My nipples were sore, cracked or bleeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were overfull or engorged	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts were infected or abscessed	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My breasts leaked too much	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too painful	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too tiring	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was sick or had to take medicine	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Breastfeeding was too inconvenient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not like breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to be able to leave my baby for several hours at a time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go on a weight loss diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to go back to my usual diet	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted to smoke again or more than I did while breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I had too many household duties	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I could not or did not want to pump or breastfeed at work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pumping milk no longer seemed worth the effort that it required	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I was not present to feed my baby for reasons other than work	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted or needed someone else to feed the baby	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I did not want to breastfeed in public	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I wanted my body back to myself	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
I became pregnant or wanted to become pregnant again	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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38. Did any of the following people want you to stop breastfeeding? (Mark "does not apply" if you do not have the person listed, such as "employer" if you do not work for pay.)

	YES	NO	DOES NOT APPLY / DON'T KNOW
The baby's father.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your mother-in-law.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your grandmother.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Another family member.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
A doctor or other health professional.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Your employer or supervisor.....	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

39. Using 1 to mean "Very favorable" and 5 to mean "Very unfavorable," how do you feel about the experience of having breastfed your baby?

<u>VERY FAVORABLE</u>					<u>VERY UNFAVORABLE</u>
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

40. Using 1 to mean "Not at all likely" and 5 to mean "Very likely," how likely is it that you would breastfeed again if you had another child?

<u>NOT AT ALL LIKELY</u>					<u>VERY LIKELY</u>
(1)	(2)	(3)	(4)	(5)	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

SECTION 4: EMPLOYMENT

41. Did you work for pay any time during the past 4 weeks?

Yes..... ☐ No..... ☐ → (GO TO SECTION 5 ON PAGE 10)

42. How old was your baby when you began working after your delivery? (If you are not sure, give your best estimate).

_____ MONTHS AND _____ WEEKS

43. How many hours per week did you usually work at your job during the past 4 weeks? (Answer for whatever time you have been working if less than 4 weeks) (If you work at two or more jobs, answer for the total number of hours you work)

1 to 9 hours per week	<input type="checkbox"/>	30 to 34 hours per week	<input type="checkbox"/>
10 to 19 hours per week	<input type="checkbox"/>	35 to 40 hours per week	<input type="checkbox"/>
20 to 29 hours per week	<input type="checkbox"/>	More than 40 hours per week	<input type="checkbox"/>

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44. What type of setting do you work in?

- A building (for example, office building, store or other retail building, restaurant, hospital, school)..... ☐
A private residence (for example your home or someone else's home)..... ☐
A vehicle (for example, transportation, delivery, flight attendant, pilot)..... ☐
Outdoors (for example farmer, outdoor repair, gardener)..... ☐
Other..... ☐

45. Using 1 to mean "None" and 5 to mean "Very much," how much satisfaction do you get from your paid work?

- NONE** **1** **2** **3** **4** **VERY MUCH** **5**
☐ ☐ ☐ ☐ ☐

46. What do you do with your baby while you are working? (PLEASE "X" ALL THAT APPLY)

- My baby is cared for by a family member..... ☐
My baby is cared for by someone not in my family..... ☐
I keep my baby with me while I work at home..... ☐
I keep my baby with me while I work outside my home..... ☐

47. In your opinion, how supportive of breastfeeding is your place of employment?

- Not at all supportive ☐ Somewhat supportive ☐
Not too supportive ☐ Very supportive ☐

48. Did you breastfeed for any time during the past four weeks?

- Yes..... ☐ No..... ☐ → (GO TO SECTION 5 ON PAGE 10)

49. Which of the following circumstances describe your situation during the past 4 weeks? (If you have stopped breastfeeding, please answer for the time you were breastfeeding) (PLEASE "X" ALL THAT APPLY)

- I keep my baby with me while I work and breastfeed during my work day..... ☐
I go to my baby and breastfeed him or her during my work day..... ☐
My baby is brought to me to breastfeed during my work day..... ☐
I pump milk during my work day and save it for my baby to drink later..... ☐
I pump milk during my work day, but I do not save it for my baby to drink later..... ☐
I neither pump milk nor breastfeed during my work day..... ☐

50. Have you had any of the following experiences during the past 4 weeks? Mark "No" if the item does not describe your circumstances, such as if you have no coworkers for the first item. (If you have stopped breastfeeding, please answer for the time you were breastfeeding.)

	YES	NO
A coworker made negative comments or complained about me breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
My employer or my supervisor made negative comments or complained to me about breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to arrange break time for breastfeeding or pumping milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to find a place to breastfeed or pump milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to arrange a place to store pumped breast milk	<input type="checkbox"/>	<input type="checkbox"/>
It was hard for me to carry the equipment I needed to pump milk at work	<input type="checkbox"/>	<input type="checkbox"/>
I felt worried about keeping my job because of breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>
I felt worried about continuing to breastfeed because of my job	<input type="checkbox"/>	<input type="checkbox"/>
I felt embarrassed among coworkers, my supervisor, or my employer because of breastfeeding	<input type="checkbox"/>	<input type="checkbox"/>

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SECTION 5: CHILDCARE

51. Was your baby cared for by someone other than you on a regular schedule during the past 4 weeks? That is, did someone else usually keep your baby at least once a week for 3 or more hours at a time? (include arrangements in which the exact day or time may change if the child care usually occurred at least once a week).
Please mark "yes" if your baby is regularly cared for by anyone other than you, including the baby's father or other close relative.

Yes..... ☐

No..... ☐ → (GO TO SECTION 6 ON PAGE 11)

52. Who usually kept your baby during the past 4 weeks? (PLEASE "X" ALL THAT APPLY)

Baby's father ☐
Baby's grandparent(s) ☐

Other family member(s) ☐
Someone not in your family ☐

53. Where did the childcare usually occur? (PLEASE "X" ALL THAT APPLY)

Baby's home with no other children..... ☐
Baby's home with other children or baby's
brothers or sisters..... ☐
Day care or child care center..... ☐

Other private home with no other children..... ☐
Other private home with older children or baby's
brothers or sisters..... ☐
Other..... ☐

54. How many days in an average week was your baby cared for by your regularly scheduled child care provider(s)? (Include days your baby was cared for by family members if they regularly provide child care while you are away from the baby)

_____ DAYS PER WEEK

55. On an average day when your baby was with your regular child care provider(s), how many hours was he or she with the child care provider(s)?

_____ HOURS

FOR QUESTIONS 56-58, IF YOUR ANSWER IS DIFFERENT FOR DIFFERENT CHILD CARE PROVIDERS, ANSWER FOR THE ONE WHO FED YOUR BABY THE MOST TIMES PER WEEK.

56. In your opinion, how supportive of breastfeeding is your child care provider?

Not at all supportive ☐
Not too supportive ☐

Somewhat supportive ☐
Very supportive ☐

Don't know ☐

57. On an average day when your baby was with your child care provider, how many times did the child care provider feed him or her? Please include feedings of breast milk, formula, and all other foods, and include meals and snacks.

_____ TIMES PER DAY FED BABY None ☐ → (GO TO INSTRUCTIONS AFTER QUESTION 58)

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58. How often did you find out what your regularly scheduled child care provider fed your baby?

Seldom or never ☐ Sometimes ☐ Always or most of the time ☐

IF YOUR BABY IS ONLY CARED FOR IN YOUR HOME, GO TO SECTION 6 THIS PAGE.

ANSWER QUESTIONS 59-60 FOR YOUR CHILD CARE THAT IS OUTSIDE OF YOUR HOME. IF YOU HAVE MORE THAN ONE CHILD CARE PROVIDER OUTSIDE OF YOUR HOME, ANSWER FOR THE ONE WHO FEEDS YOUR BABY THE MOST TIMES PER WEEK.

59. Under your regular child care arrangements in the past 4 weeks, who usually provided the formula, if any, and food that your baby drank and ate? Include meals and snacks. **(PLEASE "X" ALL THAT APPLY)**

	THE CHILD CARE PROVIDER	YOU, THE MOTHER	SOMEONE ELSE	BABY WAS NOT FED THIS ITEM
Who provided the baby's formula?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who provided the baby's food for meals?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Who provided the baby's snacks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

60. Does your child care provider:

	YES	NO	DON'T KNOW
Feed a mother's pumped breast milk to her baby?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allow mothers to breastfeed at the child care place before or after work?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Allow mothers to come in and breastfeed during their lunch or other breaks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Thaw and prepare bottles of pumped milk if needed?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Keep extra breast milk in a freezer for use if they run out during the day?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

SECTION 6: OTHER INFORMATION

61. During the past 2 weeks, have you had any health conditions, which made it hard or impossible for you to take care of your baby?

Yes..... ☐ No..... ☐

62. On the average, how many cigarettes do you smoke a day now? (Write in 0 if you do not smoke).

_____ CIGARETTES PER DAY

63. How many people including yourself smoke inside your home most days? (*Include yourself, family members, friends, and anyone else*)

0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 or more ☐

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64. In the past month, were you or your baby enrolled in the WIC program or did you get WIC food or vouchers for yourself or for your baby? (WIC is a program that gives food to pregnant and nursing women, babies, and young children.) **(PLEASE "X" ALL THAT APPLY)**

Yes, I was enrolled or got WIC food for myself.....☐
 Yes, my baby was enrolled or got WIC formula or food☐
 No.....☐

65. Does your baby have any serious, long-term medical problems?

No.....☐ Yes.....☐ → **(PLEASE EXPLAIN BRIEFLY)** _____

66. What was the longest time your baby usually slept at night without waking?

2 hours or less ☐
 3 to 4 hours ☐
 5 to 6 hours ☐
 7 to 8 hours ☐
 8 hours or more ☐

67. Date you completed this form: MONTH _____ DAY _____ YEAR _____

THANK YOU. PLEASE RETURN THIS QUESTIONNAIRE AS SOON AS POSSIBLE IN THE POSTAGE PAID ENVELOPE PROVIDED.

APPENDIX E

STUDY PROCEDURES

The study design consists of direct measurements and questionnaires.

Home visits will be scheduled at the participant's convenience by phone or email. The participant will be given the option to come to the Human Nutrition Lab if they prefer. If they come to the Human Nutrition Lab a parking pass will be provided.

Consent/Neonatal Home Visit:

1. Researcher arrives and introduces herself to the mother and/or other family members.
2. Researcher goes over the consent process with the mother.
3. If mother requires additional time to consent or refuses to consent then researchers will thank her for her time, schedule another home visit if appropriate, and then leave.
4. If the mother consents, then the researcher will give the mother the neonatal questionnaire.
5. After the mother completes the questionnaire, the researcher will collect it, give the mother the small gift for her participation, thank her for her participation, and then leave.

Home Visits when infant is 2 months old, 4 months old, 6 months old, 9 months old, and 12 months old:

6. Researcher (s) arrive, introduce themselves, and set up equipment. Equipment includes a pan-type pediatric electric scale, recumbent length measuring board, infant skinfold thickness caliper, an adult electronic scale, and measuring tape
7. Researcher will explain to the mother that she may stop or pause measurements at any time.
8. Mother weight measurement procedure:
 - a. Scale will be accurate to the nearest 100g and placed on a hard flat surface
 - b. The scale will be calibrated
 - c. Mother dressed in light clothing will be instructed to stand in the middle of the scale's platform without touching anything and the body distributed on both feet
 - d. The researcher will record the body weight noting the date and time.

- e. A repeat measurement will be taken to ensure accuracy (weights should be within 100g or ¼ lb). If there is a discrepancy between the weights take a third measurement.
 - f. If necessary the scale will be recalibrated and measurements repeated.
9. Mothers waist circumference measurement:
- a. Researcher will instruct the mother to stand with heels together and arms at her side.
 - b. Researcher will locate the top of the right iliac crest, the high point of the hip bone on the right side.
 - c. A measuring tape will be placed in a horizontal plane (parallel to the floor) around the abdomen at the level of the iliac crest.
 - d. Researcher will ensure the tape is snug, but not compressing the skin.
 - e. The measurement will be recorded at the end of normal expiration.
 - f. The measurement will be repeated for accuracy.
10. Infant weight measurement procedure:
- a. Researcher will ask the mother to undress the infant and ensure diaper is dry.
 - b. Scale will be accurate within 10g or ½ oz.
 - c. Researcher or mother will place infant in the middle of the pan.
 - d. 3 measurements will be taken and recorded
 - e. If infant is moving excessively weighing will be deferred to a later time during the visit
 - f. If infant is still too active to be measured researcher will ask the mother to stand on the adult scale holding the baby. The baby's weight will be subtracted.
 - g. Mother will be given time to redress infant if desired. Researcher will ask mother to leave infants socks and shoes off.
11. Infant length measurement procedure:
- a. Infant will be placed on the measuring device. One researcher (or mother if only 1 researcher) will gently hold the infant's head against the backboard, with the crown of the head securely against the headboard.
 - b. Researcher will then ensure that the long axis of the infant's body is aligned with the center line of the backboard, infant's shoulders and buttocks securely touching the backboard, and the shoulders and hips at right angles to the long axis of the body
 - c. The other researcher will gently straighten the legs of the infant against the backboard.
 - d. Then the researcher slides the footboard against the bottom of the feet (without shoes or socks) with toes pointing upward.
 - e. Length will be recorded to the nearest .1cm or 1/8 in.
 - f. Measurement will be repeated.
 - g. If infant is moving or crying excessively measurement will be deferred to later in the visit.

- h. If infant is not cooperative at the later time a best estimate will be recorded with a note describing conditions.
12. Infant skinfold thickness measurement procedure:
- a. Skinfold measurement is a quick and noninvasive way to estimate body fat. Before beginning researcher will explain the procedure to mothers. Researchers will explain that the infant may experience mild discomfort at the skinfold site, while the measurement is being taken due to the slight pinching required by the procedure. The researcher will reassure the mother that every effort that she will be gentle, measure quickly, and stop if infant cries excessively or the mother requests. If mothers seem unsure about the measurement researchers will show mothers what it feels like, so they can be reassured that their infant will not be in any pain. .
 - b. All skinfold measurements will be taken on the **right** side of the infant's body using the Harpenden caliper.
 - c. Researcher will make a small mark with a washable marker at the skinfold site with permission from the mother.
 - d. The 4 sites that will be measured include: **tricep, bicep, subscapular, and suprailiac.**
 - e. The skinfold will be grasped by the researcher's thumb and index finger of the left hand about 1 cm or ½ in. proximal to the skinfold site and pulled away from the body. The amount of tissue must be enough to form a fold with approximately parallel sides. The thicker the fat layer under the skin the wider the necessary fold.
 - f. Researcher will hold the caliper in the right hand, perpendicular to the long axis of the skinfold and with the caliper's dial facing up and easily readable.
 - g. Caliper tips should be placed on the site and should be 1 cm or ½ in distal to the fingers holding the skinfold, so pressure from the fingers will not affect the measured value.
 - h. The researcher will place the caliper arms on the skinfold one at a time. Being careful not to place the calipers too deeply or too close to the tip of the skinfold.
 - i. Researcher will read the dial 4 seconds after the pressure from the measurer's hand has been released on the level arm of the caliper. Readings will be recorded to the nearest 1mm.
 - j. A minimum of two measurements will be taken at each site. Measurements will be at least 15 seconds apart to allow skinfold site to return to normal. If consecutive measurements vary by more than 1mm, more will be taken until there is consistency.
 - k. Measurer will maintain pressure with thumb and index finger throughout each measurement
 - l. Averages of the measurements will be taken and entered into a regression equation for the percent body fat prediction.

- m. If child is crying excessively researchers will pause or stop the procedure. Trying again once the infant has calmed down with the mothers permission.
- 13. Researcher will ask mother if she has completed and mailed in the most recent questionnaire. If she has not completed the questionnaire the researcher will read the questions the mother and mark answers indicated by the mother.
- 14. At the end of the visit the researcher will thank the mother for participating and give the mother and infant the small gift.

Postnatal Questionnaires:

Mothers will be asked to complete 10 postnatal questionnaires on infant feeding practices. The neonatal questionnaire will be completed after consent at the first home visit. The 9 remaining questionnaires will be mailed when the infant is approximately 2 months, 3 months, 4 months, 5 months, 6 months, 7 months, 9 months, 10 months, and 12 months old. The questionnaires will be mailed with a pre-paid return envelope.