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THE INITIATION AND DURATION OF BREAST MILK FEEDING BY MOTHERS OF MULTIPLES COMPARED TO MOTHERS OF SINGLETONS

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by

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ABSTRACT

Objectives: Over 3% of infants born annually in the United States are from a multiple gestation pregnancy, yet there is little data published about the feeding practices of their mothers. The objectives of this study were to compare the rates of breast milk feeding of mothers of multiples and mothers of singletons.

Methods: Stratified random sampling based on plurality of pregnancy and gestational age at delivery was performed on a Greater Cincinnati area 1999 birth certificate database. Identified for recruitment into the study were equal sized groups of mothers (n=178 per group): term singletons (TS), preterm singletons (PS), term multiples (TM), and preterm multiples (PM). Data was collected by self-administered questionnaire and phone interview. Breast milk feeding, breast milk fed either at the breast or pumped, was classified as "at least some" and "exclusive." Initiation was defined as providing breast milk by the third day postpartum. Data were analyzed using chi-square and logistic or multiple regression.

Results: Feeding information was obtained from 346 mothers (n= 81 TS, 80 PS, 90 TM, and 95 PM). TM fed breast milk as often and for as long as TS. PM initiated "at least some" breast milk feeding less often than the other three groups. PM fed "at least some" breast milk less often than TS and TM at all time points except two weeks and one month postpartum, and fed "exclusive" breast milk less often at all time points. Among mothers who initiated breast milk feeding, the geometric mean duration of at least some breast milk feeding was significantly

shorter for mothers of preterm multiples than for all other groups: TS=23 weeks, TM=24 weeks, PS=19 weeks, and PM=12 weeks ($p = 0.002$).

Conclusions: Compared to mothers of term singletons, preterm singletons, and term multiples, mothers of preterm multiples fed breast milk to their infants the least often and for the shortest mean length of time. Further evaluation of the potential causes for the lower breast milk feeding rates among mothers of preterm multiples is needed to develop effective intervention strategies and increase the number of multiple gestation infants receiving breast milk.

PREFACE

I gratefully acknowledge my thesis committee for their guidance in the design, development, analysis, and interpretation of the results of this study:

Dr. Susan Pinney – Chair
Dr. Heidi Kalkwarf
Dr. Gopalan Sethuraman

I also would like to recognize the Division of General and Community Pediatrics at Cincinnati Children's Hospital for providing me with the support and time necessary to complete this degree.

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LIST OF ABBREVIATIONS

TS	Mothers of term singletons (>37 weeks gestation)
PS	Mothers of preterm (≤ 37 weeks gestation) singletons
TM	Mothers of term multiples (twins and triplets)
PM	Mothers of preterm multiples
CPRC	Child Policy Research Center (at Cincinnati Children's Hospital)

INTRODUCTION

Breast milk universally is acknowledged as the optimal source of nutrition for infants.[1-3] Extensive research documents its immunologic, psychologic, and economic benefits. Milk is species specific. Antibodies found in a mother's milk are tailored to her environment, providing ideal protection for her infant. Human milk contains antimicrobial, anti-inflammatory, and immunomodulating components that account for a decrease in common childhood infections such as otitis media[4-6] and diarrhea.[4, 5, 7] Chronic diseases such as asthma and atopy have been shown to be less frequent and less severe in infants who have received breast milk.[8-10] Human milk is especially advantageous for preterm infants (< 37 weeks gestation) because it offers protection against complications associated with early delivery.[11-13] The milk of mothers who delivered prematurely has ideal concentrations of lipids, protein, and selected immunoglobulins that are readily absorbed through an immature gut wall and are thought to be protective against necrotizing enterocolitis, a serious and often fatal disease in these infants.[14-16] Premature infants who were fed their mothers' milk instead of formula had less residual feedings in the stomach, fewer episodes of vomiting, and could be weaned sooner from intravenous nutrition.[17]

While national breastfeeding rates are periodically determined for mothers of a singleton gestation pregnancy,[18-20] there are no published data on the breastfeeding rates among mothers of infants of a multiple gestation pregnancy. Since 1980, the birth rate of twins has increased by 59% and the birth rate of higher-order multiples (triplets or more) has increased by over 400%.[21] In 2001, the 128,717 multiple gestation infants born that year

accounted for 3.2% of live births.[21] What currently is known about the intent and ability of mothers of multiples to breastfeed is primarily through case reports and anecdotal evidence. From these personal accounts it cannot be discerned to what extent breastfeeding rates are affected by the obstacles of feeding more than one infant at a time. As the number of multiples born annually in the United States continues to rise, more information is needed about the feeding practices of their mothers. Approximately 60% of twins and 90% of higher order multiples are born at less than 37 weeks gestation. Thus, special attention needs to be focused on feeding premature multiple gestation infants that may have unique medical complications hindering proper breastfeeding technique. The aim of this study was to determine the rates of breast milk feeding of mothers of term and preterm multiples compared to mothers of term and preterm singletons.

METHODS

This study was designed to compare the feeding practices of four distinct groups: mothers of full term (≥ 37 weeks gestation) singletons (TS), mothers of preterm (27-37 weeks gestation) singletons (PS), mothers of full term multiples (TM) and mothers of preterm multiples (PM). To make meaningful comparisons among these groups, mothers were chosen from the same geographic region and time period. The four groups of mothers in the study sample were composed of women who delivered live-born children in 1999 and were living in Hamilton, Warren, Butler, or Clermont Counties in Ohio, or Boone, Kenton, or Campbell counties in Northern Kentucky. These counties were chosen because of their close proximity to Cincinnati Children's Hospital Medical Center, and

the percentage of infants born in this region from a multiple gestation pregnancy are reflective of the national population. In Ohio and Kentucky, the birth certificate is separated into two parts. The first section, which is in the public domain, includes the names of the parents, the infant's name and gender, the birth date, and the parents' address at the time of delivery. The second section, to which we did not have access, contains details about the pregnancy and delivery. Since we needed information within this second section for our study, we asked the Child Policy Research Center (CPRC) to help create our sample.

The CPRC is a community liaison housed at Cincinnati Children's Hospital Medical Center with the primary focus of assisting policy makers and researchers in projects aimed at studying child health-related issues. The CPRC has been approved by the Vital Statistics Departments of both Ohio and Kentucky to use the entire birth certificate for research purposes. The CPRC has computerized files of all births in the Greater Cincinnati area and has access to the entire birth certificate, including the section where gestational age and plurality are located. After segregating the 1999 birth cohort into four categories based on pregnancy (singleton or multiple) and gestational age at time of delivery (<37 weeks gestation or ≥37 weeks gestation), the CPRC randomly sampled an equal number of infants born in the Greater Cincinnati area from each of the categories. The CPRC initially selected 178 mothers for each of the four groups. After further consideration, however, the CPRC removed names of 26 mothers who delivered an infant or infants less than 27 weeks gestation. This was done since there was a high likelihood of potential medical complications and mortality in these infants. As mentioned above,

we had permission to view information within the public domain portion of the birth certificate only. To preserve the confidentially of information regarding prematurity and multiple gestation, the CPRC gave us the names and addresses of 686 mothers in one randomly ordered list. We subsequently had to ask each mother the gestational age and plurality of her pregnancy following her consent to be in the study. This method of subject selection and subsequent data collection was approved by the Institutional Review Boards of both Cincinnati Children's Hospital Medical Center and the University of Cincinnati College of Medicine.

In January 2002, initial contact was made with the identified mothers. All children were at least two years old by this time. Information on the study consisted of a two-page mailed letter. The first page formally introduced the study. The second page contained the informed consent information, and provided the opportunity for the mother to accept or decline participation. If the mother agreed to be in the study, she also was asked to indicate the number of children she delivered on the date we identified. This form of study enrollment not only recognized women who wished to participate, it provided us with the plurality information necessary to properly categorize each participant. All mothers who agreed to be in the study were eligible except when there was discordance in the number of infants a mother delivered on the identified date and the number of infants that still lived with her. This exclusion criterion was necessitated by the fact that within this cohort an infant(s) may have potentially died or been taken from a mother's custody. Mothers not eligible by this criterion received a letter thanking them for their offer to be in the study with an acknowledgment of their ineligibility. In an attempt to

encourage participation, the introductory letter was sent to mothers up to three times. A toy store gift certificate of $10 was offered to each mother upon completion of the study.

There were two phases to the data collection for this study: a self-administered questionnaire and a structured phone interview. All mothers who agreed to be in the study were sent the self-administered questionnaire. The purpose of this mailed survey was to obtain perinatal information, including the length of the pregnancy, and document which mothers fed breast milk to their infant(s). This written portion of the data collection also asked mothers for the following sociodemographic characteristics known to be related to breastfeeding: maternal age, race/ethnic origin, marital status, education, annual household income, type of delivery, receipt of free formula, and working more than twenty hours per week outside the home by six months postpartum.

If a mother fed any breast milk to at least one of her infants, a research assistant called her and conducted a one-time phone interview. The goal of the phone interview was to establish the quantity of breast milk fed to each infant at the following postpartum times: twenty-four hours, three days, two weeks, and the end of months one, two, three, four, five, and six. At each time period, mothers were asked to choose from the following categories of type of milk fed: all formula, mostly formula/some breast milk, about half formula/half breast milk, mostly breast milk/some formula, all breast milk, or the infant did not receive any form of milk. An identical set of questions was repeated for each of the sibling infants of a multiple gestation pregnancy. A trained research assistant read the questionnaire to each mother while following a carefully worded script. Both the mailed

and phone portions of the questionnaire took approximately 10-20 minutes to complete, depending on the number of questions that had to be repeated.

Since it is common practice that premature infants are fed pumped breast milk through a bottle or nasogastric tube, for this study, "breast milk feeding" was defined to include breast milk fed at the breast or pumped and then fed by any other route such as a bottle, cup, or feeding tube. Mothers who fed at least some breast milk to a singleton or to at least one infant of a multiple gestation pregnancy by the third day postpartum were said to have initiated breast milk feeding. This three-day designation was chosen to co-inside with stage II of lactogenesis when copious milk production by the mammary glands normally begins.[22, 23] Although mothers of preterm infants may have had difficulty initiating lactation,[12, 24] most of these mothers would have produced milk by 72 hours after delivery.[12] Mothers who initiated breast milk feeding also were asked for the total weeks duration that at least some breast milk was fed to each infant. Information on the feeding of solid foods was not collected.

At the time of the study, there were no validated survey instruments applicable to the topic of feeding multiple gestation infants. The questions used for this study, therefore, were developed in concert with individuals from a variety of disciplines. Pre-testing was done with mothers of singletons and multiples, nurses, general pediatricians, obstetricians, and researchers in nutrition, psychology, epidemiology, and statistics. Pilot testing was performed on mothers representing the four study groups from a variety of

sociodemographic backgrounds. (*Copies of the questionnaires can be obtained from Sheela R. Geraghty, MD.)

DATA ANALYSIS

Data were managed and analyzed using SAS version 8.1 (SAS Institute Inc., Cary, NC.). Periodically throughout the study, both the mailed and phone surveys were randomly reviewed to ensure a less than a one-percent error rate in coding and data entry. Frequency distributions were generated for each variable to examine characteristics of the sample and identify potential errors in the data set. The kappa statistic was used to determine the agreement in the type of milk fed to sibling twins and sibling triplets. The Pearson correlation coefficient was utilized to compare the number of weeks that sibling multiples were fed breast milk. The breast milk feeding behavior by all mothers in the study was separated into two categories: "at least some" (any combination of the mother's breast milk and infant formula or the mother's breast milk exclusively) vs. no breast milk feeding, and "exclusive" (the mother's breast milk only) vs. all other combinations of breast milk feeding and infant formula only. The proportions of breast milk feeding were determined for each of the four groups at twenty-four hours, three days, two weeks, and at the end of months one through six postpartum. At time points when a mother reported an infant was not fed any milk, that data point was not included in the analysis since the infant was not receiving any enteral nutrition. Comparisons were made between the feeding behavior of a mother of singletons for one infant and the feeding behavior of a mother multiples simultaneously for twins or triplets.

Chi-square and logistic regression analysis were performed for "at least some breast milk feeding" and "exclusive breast milk feeding" at twenty-four hours, three days, two weeks, one month, and six months postpartum. Mothers of term singletons were considered the referent group when calculating all odds ratios. Two logistic regression modeling techniques were utilized. First, all regression models were run with the following independent variables known to affect breastfeeding: group (TS, PS, TM, or TS), maternal age (years), race/ethnic origin (white vs. non-white), marital status (married vs. not married), education (≤ high school graduate, some college, ≥college graduate), annual household income (<$14,000, $15,000-34,999, $35,000-54,999, $55,000-74,999, >$75,000), route of delivery (Cesarean vs. not Cesarean) , receipt of free formula (yes vs. no), and working more than twenty hours per week by six months postpartum (yes vs. no). These variables are well known to influence the initiation and duration of breastfeeding, and although were not all statistically significant at the P≤ 0.1 level in every model, were retained in all models for consistency. Models were also run utilizing the backward elimination technique. With this technique, the variable "group" was forced into all models so odds ratios could be computed comparing mothers of term singletons to the other three groups. Of the remaining variables, those significant at the 0.05 level were kept in the model and all others were systematically removed. Multiple linear regression was used to compare the geometric mean duration of at least some breast milk feeding among groups.

RESULTS

Of the 686 introductory letters sent, 195 mothers never responded, and 104 letters were returned unopened with no verifiable address. A return envelope was received from 387 (56.4%) mothers, with 358 agreeing to participate by returning a signed informed consent. Four mothers who agreed to be in the study were ineligible because each had one infant of a twin pair die prior to study enrollment. Feeding information was obtained from 346 mothers (n= 81 TS, 80 PS, 90 TM, and 95 PM). Of the mothers of multiples, 89 had term twins, 82 had preterm twins, one had term triplets, and thirteen had preterm triplets. Seven mothers of preterm singletons and seven mothers of preterm multiples reported that their infants were not fed any milk at twenty-four hours of life. Three mothers of preterm singletons and two mothers of preterm multiples said that their infants did not receive any type of milk at three days. All infants in the study were receiving some type of milk (formula or breast milk) by two weeks of life.

Table 1 presents the baseline characteristics of the participants in the study. There was no significant difference among the four groups of mothers in ethnic origin, education, annual household income, parity, and receipt of free formula after delivery. Compared to mothers of singletons, however, mothers of multiples were older, more likely to be married, had a greater annual household income, were admitted to the hospital for a greater number of pre-delivery days, underwent more cesarean sections, and were less likely to work more than twenty hours per week outside the home by six months postpartum.

The type of milk and duration of breast milk feeding by mothers of multiples was compared for sibling infants of the same pregnancy. When comparing the type of milk fed at each of the designated time points to sibling twins and triplets born from the same pregnancy, the kappa measures of agreement ranged from 0.93 to 1.00. When comparing the agreement in duration of breast milk feeding, the Pearson correlation coefficient for between sibling twins was 0.99 ($p<0.0001$), and among sibling triplets the values were 0.97, 0.98, and 0.99 ($p<0.0001$). Despite the complexity of feeding more than one infant at a time, mothers of multiples seldom fed their infants born from the same pregnancy differently. Except in very few instances, maternal feeding decisions were made for the infants as a group. Thus, when reporting the proportions of breast milk feeding for the four groups of mothers in this study, the feeding behavior of a mother of singletons is towards one infant, while the feeding behavior of a mother multiples is simultaneously towards twins or triplets.

At Least Some Breast Milk Feeding

Figure 1 illustrates the percentage of mothers in each group who fed at least some breast milk to their infants. At twenty-four hours, the proportions of at least some breast milk feeding among mothers of both preterm groups were less than both of the term groups: TS=68%, PS=52%, TM=69%, PM=42% ($p=0.0005$). The proportions breast milk feeding among both PS and PM rose dramatically within the first three days postpartum. By three days postpartum, while mothers of preterm singletons fed breast milk as often as the term groups, the mothers of preterm multiples still fed breast milk less often: TS=69%, PS=66%, TM=73%, PM=57% ($p=0.035$). The only times when the proportions at least some breast milk feeding by mothers all four groups were statistically

indistinguishable was at two weeks and one month postpartum: TS=67%, PS=65%, TM=68%, PM=57% (p=0.41) and TS=64%, PS=60%, TM=68%, PM=50% (p=0.064), respectively. The proportion of breast milk feeding by PM was the highest at two weeks. By two months, the proportion of mothers of preterm multiples who fed at least some breast milk was less than the other three groups and remained so until the last time point collected at six months. At six months postpartum, the proportion of mothers feeding their infants at least some breast milk was: TS=35%, PS=29%, TM=38%, PM=14% (p=0.002).

Logistic regression modeling was performed two ways: first, models were created with all terms representing variables known to affect breastfeeding initiation and duration rates, and second, models were tested utilizing the backward elimination technique. Both of these methods were used to determine if there was a significant difference between the proportion of breast milk feeding between the referent group (mothers of term singletons) and mothers of preterm singletons, term multiples, and preterm multiples, respectively for both outcomes: at least some breast milk feeding and exclusive breast milk feeding.

Comparisons were made at early postpartum times (twenty-four hours, three days, two weeks, and one month) and at six months for the outcome, at least some breast milk feeding. Table 2 shows the results of modeling with a full model containing the variables group, maternal age, race/ethnic origin, marital status, education, annual household income, route of delivery, receipt of free formula, and working by six months postpartum. The odds ratios for breast milk feeding by mothers of term multiples were

never statistically different from mothers of term singletons, which served as the referent group. The odds ratios for mothers of preterm multiples, however, were statistically similar to the referent group only at two weeks postpartum. At all other time points, the odds ratios for at least some breast milk feeding by mothers of preterm multiples were lower than mothers of term singletons. When excluding the fourteen mothers of triplets from the cohort and comparing mothers of singletons to twins only, the adjusted odds ratios for at least some breast milk feeding did not change.

The backward elimination technique was performed for at least some breast milk feeding at the above designated time points: twenty-four hours, three days, two weeks, one month and six months postpartum. The only variable consistently left in each of the models was maternal education. Working more than twenty hours per week by six months postpartum was left in all models except at twenty-four hours, and income was retained at three days and two weeks. As examples, Tables 3 and 4 show results of the backward elimination procedure and variables left in the model at two weeks and six months postpartum. Both logistic regression techniques, adjusting for all maternal characteristics known from the literature to affect breastfeeding as well as backward elimination, yielded similar odds ratios for each group (PS, TM, and PM) compared to the referent (TS).

Exclusive Breast Milk Feeding

Figure 2 illustrates the percentages of all mothers in the study per group who fed breast milk exclusively at the designated time points. The proportion of mothers of term singletons who exclusively fed breast milk was greater than the other three groups at twenty-four hours and three days postpartum: TS=56%, PS=37%, TM=40%, PM=17%

($p \leq 0.0001$) and TS=59%, PS=44%, TM=40%, PM=19% ($p \leq 0.0001$), respectively. By two weeks postpartum, mothers of preterm singletons fed breast milk exclusively as often as mothers of term singletons, but both multiples groups still exclusively fed breast milk less often than mothers of term singletons: TS=56%, PS=43%, TM=33%, PM=25% ($p=0.0003$). By one month postpartum, the percentage of mothers of term singletons, preterm singletons, and term multiples who fed breast milk exclusively were statistically similar, while mothers of preterm multiples continued to exclusively feed breast milk less often: TS=51%, PS=38%, TM=37%, PM=19% ($p=0.0002$). Mothers of preterm multiples never fed breast milk exclusively as often as mothers of term singletons. At six months, none of the groups had an exclusive breast milk feeding rate above 20%, and very few mothers of preterm multiples fed breast milk exclusively: TS=19%, PS=13%, PS=16%, PM=2% ($p=0.004$).

Logistic regression modeling for exclusive breast milk feeding again was performed two ways: adjusted for independent variables known to affect breastfeeding initiation and duration rates (group, maternal age, race/ethnic origin, marital status, education, annual household income, route of delivery, receipt of free formula, and working by six months postpartum) and by backward elimination. For the outcome exclusive breast milk feeding, these methods were used to determine if there was a significant difference between groups at early postpartum times (twenty-four hours, three days, two weeks, and one month) and at six months. Table 2 shows that at twenty-four hours and three days postpartum, the odds ratios for breast milk feeding by mothers of preterm singletons and both multiple groups was significantly different than odds ratio of mothers of term

singletons. By two weeks the odds ratio for mothers of preterm singletons was statistically similar to the referent group, but it was not until two months postpartum that the odds ratio for exclusive breast milk feeding by mothers of term multiples was the same as mothers of term singletons (0.6, 95% CI, 0.3,1.3). At all time points, the odds ratios for exclusive breast milk feeding by mothers of preterm multiples were lower than the referent group. When excluding the fourteen mothers of triplets from the cohort and comparing mothers of singletons to twins only, the odds ratios for exclusive breast milk feeding did not change when adjusting for maternal baseline characteristics.

The backward elimination technique was performed for exclusive breast milk feeding at the above designated time points as well. As in the backward elimination models for at least some breast milk feeding, maternal education consistently was retained in all of the exclusive models. Working by six months was also retained in all of these exclusive models except at twenty-four hours. As an example, Table 5 shows results of the backward elimination procedure and variables left in the model at two weeks. Both logistic regression techniques, adjusting for all maternal characteristics known from the literature to affect breastfeeding as well as backward elimination, yielded similar odds ratios for each group (PS, TM, and PM) compared to the referent (TS).

Duration of Breast Milk Feeding

The mean duration of at least some breast milk feeding among mothers who initiated breast milk feeding was compared among the groups as well. The geometric mean length of time mothers of preterm multiples fed at least some breast milk was 12 weeks, versus 24 weeks for mothers of term singletons, 19 weeks for mothers of preterm singletons, and

22 weeks for mothers of term multiples ($p<0.0001$). The duration of at least some breast milk feeding was still significantly shorter for mothers of preterm multiples when adjusting for the maternal characteristics mentioned above ($p=0.0006$). Information on the duration of exclusive breast milk feeding was not collected.

DISCUSSION

The benefits of breastfeeding for both mothers and infants are so widely recognized that the United States has set national breastfeeding goals.[25, 26] Through the periodic reporting of national breastfeeding rates for mothers of singletons,[18-20] evaluation and monitoring of the set standards can be assessed.[27-29] In our study, the proportion of mothers of term singletons that fed at least some breast milk while in the hospital (68%) was similar to the proportion of in-hospital breastfeeding by mothers of term singletons recently published by Ryan (69.5%).[20] The proportion of mothers of term singletons who fed at least some breast milk at six months was similar between our study and Ryan as well, 35% and 32.5%, respectively.[20] Unlike previous studies, however, we evaluated the effects of prematurity (< 37 weeks) and plurality of pregnancy (twins and triplets) on the rates of breast milk feeding as well.

Our results showed that mothers of preterm multiples fed breast milk less often and for a shorter length of time than mothers of term singletons. When comparing the proportion of breast milk feeding by mothers of premature multiple gestation infants to mothers of term singleton infants, the odds ratios for exclusive breast milk feeding were statistically lower at all time points measured. When comparing at least some breast milk feeding,

mothers of preterm multiples fed breast milk less often at all times except at two weeks postpartum. These lower rates in breast milk feeding by mothers of preterm multiples were most likely due to the detrimental effects of premature delivery on both maternal milk supply and the infants' inability to feed at the breast. Mothers of preterm multiples presumably had difficulty in establishing and maintaining an adequate milk volume for their twins and triplets since they may have had to rely on artificial pumping techniques. These mothers most likely were not able to be at the bedside for every scheduled feeding, resulting in their infants being fed formula if there was not enough stored milk. Most likely some of the premature infants of mothers in the study had persistent feeding difficulties due to complicated medical issues. If the proper technique for feeding infants at the breast was not established by the time the infants are sent home, mothers of preterm multiples may have found it is too time consuming to pump breast milk, as well as prepare bottles, feed the infants, clean the bottles, etc.

Despite the challenges of feeding more than one infant a time, mothers of term multiples fed at least some breast milk as often and for as long as mothers of term singletons. Since the groups of mothers of term and preterm multiples were statistically similar in age, race, marital status, income, education, delivery type, receipt of free formula, and working by six months postpartum, it appears as if a combination of both plurality of pregnancy and preterm delivery were related to lower breast milk feeding rates. Although mothers of term multiples did not feed breast milk exclusively as often as mothers of term singletons until two months postpartum, it is reassuring to know that

mothers of term multiple gestation infants are being fed breast milk as often as their singleton counterparts.

Determining the rates of breast milk feeding and/or breastfeeding by mothers of infants with inherent feeding difficulties may be more of a challenging process than following the traditional points of measurement. The intent of the study was to highlight the postpartum time periods traditionally reported when evaluating breastfeeding rates: "initiation" and "at six months." We knew from the outset, since the cohort included mothers of premature and multiple gestation infants, the traditional time frame of "in-hospital" initiation of breastfeeding may be inadequate. Thus, we collected data at multiple time points early in the postpartum period. We found that during this early postpartum period in both the preterm singleton and preterm multiple groups, the proportion of infants that were fed breast milk rose dramatically from twenty-four hours to three days postpartum. This could have been secondary to difficulties in establishing an adequate milk supply due to delayed lactogenesis, maternal emotional stress, and having to rely on artificial means to express breast milk or to hospital practices that limited breast milk feeding to preterm infants early after birth. Whereas the proportion of breast milk feeding by mothers of preterm singletons peaked with both term groups by three days, the proportion of mothers of preterm multiples collectively providing breast milk to their twins and triplets did not reach its maximum point until two weeks postpartum. Again, this could reflect poor milk supply or hospital practice. Most likely it was the combination of numerous challenges that contributed to the delayed peak in breast milk feeding of preterm multiple gestation infants.

This inconsistency in peak breast milk feeding among the four groups of mothers has implications for research purposes. The mean postpartum length of stay in the hospital for all groups of mothers in the study was three days or less. The traditional measurement of "initiation" of breastfeeding prior to a mother's hospital discharge underestimated the proportion of mothers feeding breast milk in all four groups in this study. All of the mothers who reported their infants were not receiving any milk at twenty-four hours and three days postpartum, fed at least some breast milk to their infants by two weeks postpartum. While these infants may not have been fed breast milk due to insufficient milk supply and/or medical contraindication, their mothers must have been persistently pumping their milk to establish an adequate milk supply to feed the infants by two weeks. The behavior of these mothers indicate that they were initiating lactation even though their infants were not being fed any milk.

Two of the main limitations of this study are response and recall bias. Due to the confidential nature of the sampling technique, we do not have information about the mothers that did not respond. Although there were an approximate equal number of responses in each of the four groups of mothers, if these mothers were more likely to provide breast milk than the non-responders, we potentially could have overestimated the rates of breast milk feeding per group. Also, we do not know if a mother confused some of the feeding history of one infant with another. There have been several studies that cited maternal recall of infant feeding events as being accurate years later,[30-34] but this previous work was conducted with mothers of singletons and does not include identical

questions asked simultaneously about more than one infant. To ascertain the extent of potential recall bias in mothers of multiples, careful records would have to be collected prospectively on the feeding regimen of each infant, then compared to responses years later.

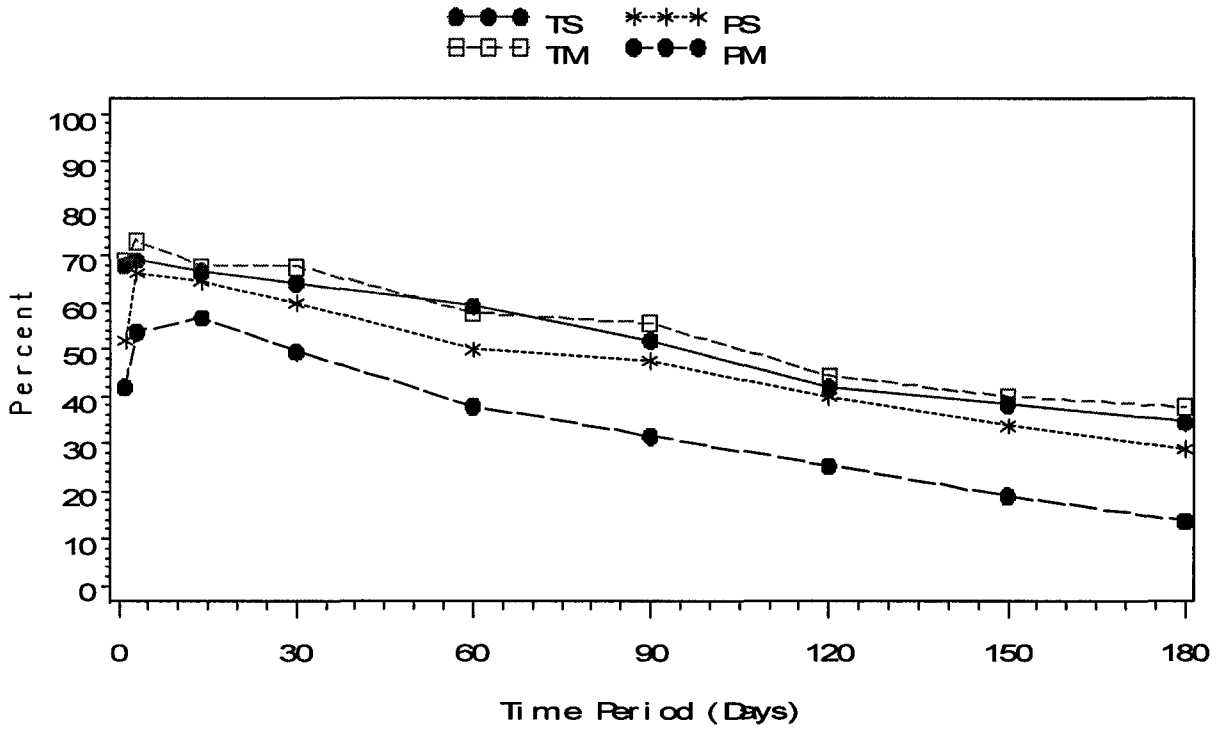
CONCLUSION

Despite all the compelling advantages of human milk, it is known that breastfeeding rates among mothers of singletons are lower than the established national standard. Currently, there are no national standards specifically for breastfeeding by mothers of multiple gestation infants and it is not known what proportion of mothers of multiples feed breast milk to their infants. More information on the feeding practices of mothers of multiples is needed, particularly of those mothers feeding infants with inherent feeding challenges associated with prematurity. This study showed that infants of a preterm multiple gestation pregnancy were the least likely to be fed breast milk for the shortest length of time compared to term singletons, preterm singletons and term multiples. The findings also indicate that "initiation" of breast milk feeding and/or breastfeeding by mothers of multiples and premature infants should be measured at several time periods to obtain a more accurate representation of the early provision of breast milk. If the health care community is to increase rates of breast milk provision among mothers of multiples, particularly among mothers of premature multiples, there must be a more careful review and understanding of the specific issues related to this ever-growing segment of the population.

Table 1
Demographic and Maternal Characteristics of the Four Groups

	Term Singletons n=78	Preterm Singletons n=79	Term Multiples n=90 (89 twin mothers, 1 mother of triplets)	Preterm Multiples n=93 (83 twin mothers, 13 mothers of triplets)	p value
Cesarean delivery (%)	22	23	53	56	<0.0001
Pre-delivery days in hospital (%)					<0.0001
<24 hours	56	24	54	23	
1-3 days	39	48	34	22	
4 or more days	5	28	12	55	
Maternal age (y)	29 ± 5.5	29 ± 6.4	32 ± 4.8	30± 5.2	0.001
Married (%)	81	71	92	88	0.001
Work by 6 months after delivery (%)	55	56	39	39	0.025
Previous # of Children (%)					ns
0	39	48	43	53	
1	40	41	30	30	
2 or more	22	11	27	17	
Caucasian (%)	95	87	89	94	ns
Highest level of education (%)					ns
≤high school graduate	18	32	14	24	
some college	35	29	27	30	
≥college graduate	47	39	59	46	
Received free formula (%)	71	65	69	77	ns
Annual household income (%)					ns
<$14,999	11	14	6	7	
$15,000-34,999	23	22	9	16	
$35,000-54,999	12	26	18	19	
$55,000-74,499	21	17	27	24	
>$75,000	33	22	40	34	

Figure 1
Proportion of At Least Some Breast Milk Feeding Per Group Per time Period



TS=Mothers of term singletons, PS=Mothers of preterm singletons, TM=Mothers of term multiples, PM=Mothers of preterm multiples

Table 2
Adjusted odds ratios for at least some and exclusive breast milk feeding early in the postpartum period and at six months for the four groups

Breast Milk Feeding Classification	Time Postpartum	Adjusted OR# and 95% CI per Group			
		TS n=81	PS n=80	TM n=90 89 twins, 1 triplet	PM n=95 82 twins, 13 triplets
At Least Some					
	24 hours	1.0	0.45* (0.21-0.97)	0.69 (0.32-1.47)	0.27* (0.13-0.58)
	3 Days	1.0	0.95 (0.43-2.10)	0.72 (0.33-1.61)	0.36* (0.17-0.78)
	2 weeks	1.0	1.10 (0.50-2.45)	0.62 (0.28-1.36)	0.49 (0.23-1.06)
	1 Month	1.0	1.08 (0.50-2.37)	0.86 (0.40-1.91)	0.46* (0.22-0.97)
	6 Months	1.0	0.86 (0.40-1.84)	0.78 (0.38-1.41)	0.25* (0.11-0.56)
Exclusive					
	24 hours	1.0	0.47* (0.23-0.99)	0.41* (0.20-0.84)	0.14* (0.06-0.31)
	3 Days	1.0	0.50* (0.25-1.03)	0.30* (0.15-0.62)	0.13* (0.06-0.27)
	2 Weeks	1.0	0.69 (0.34-1.39)	0.28* (0.14-0.58)	0.22* (0.10-0.47)
	1 Month	1.0	0.71 (0.35-1.45)	0.40* (0.20-0.82)	0.18* (0.07-0.39)
	6 Months	1.0	0.69 (0.28-1.73)	0.62 (0.25-1.53)	0.08* (0.02-0.42)

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

Variables included in all models: group (TS, PS, TM, or TS), maternal age, race/ethnic origin, marital status, education, annual household income, route of delivery, receipt of free formula, and working by six months postpartum

Table 3
Logistic Regression, Backward Elimination[&] for
At Least Some Breast Milk Feeding at 2 Weeks Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	0.12	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.36	0.25	--	1.08	0.48-2.38
TM vs. TS	-0.22	0.23	--	0.60	0.28-1.30
PM vs. TS	-0.42	0.22	--	0.49	0.24-1.03
INCOME	--	--	0.01	--	--
≤$14,999	--	--	--	1.0	--
$15,000-34,999 vs. ≤$14,999	-0.54	0.28	--	1.24	0.44-3.47
$35,000-54,999 vs. ≤$14,999	-0.07	0.26	--	1.97	0.70-5.60
$55,000-74,499 vs. ≤$14,999	0.67	0.27	--	4.11*	1.39-12.22
≥$75,000 vs. ≤$14,999	0.68	0.27	--	4.18*	1.41-12.33
EDUCATION	--	--	0.0014	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.08	0.19	--	2.25*	1.13-4.47
≥College graduate vs. ≤ high school graduate	0.65	0.21	--	4.00*	1.88-8.40
WORK BY 6 MONTHS	--	--	<0.0001	--	--
No work vs. work	0.55	0.10	--	3.02*	1.76-5.17

[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, route of delivery, and receipt of free formula

Table 4
Logistic Regression, Backward Elimination[&] for
At Least Some Breast Milk Feeding at 6 Months Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	0.0049	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.27	0.24	--	0.88	0.42-1.83
TM vs. TS	0.24	0.21	--	0.85	0.43-1.67
PM vs. TS	-0.92	0.19	--	0.27*	0.12-0.59
EDUCATION	--	--	<0.0001	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.03	0.22	--	2.5	0.99-6.43
≥College graduate vs. ≤ high school graduate	0.99	0.20	--	7.00*	3.00-16.59
WORK BY 6 MONTHS	--	--	0.015	--	--
No work vs. work	0.33	0.13	--	1.93*	1.14-3.27

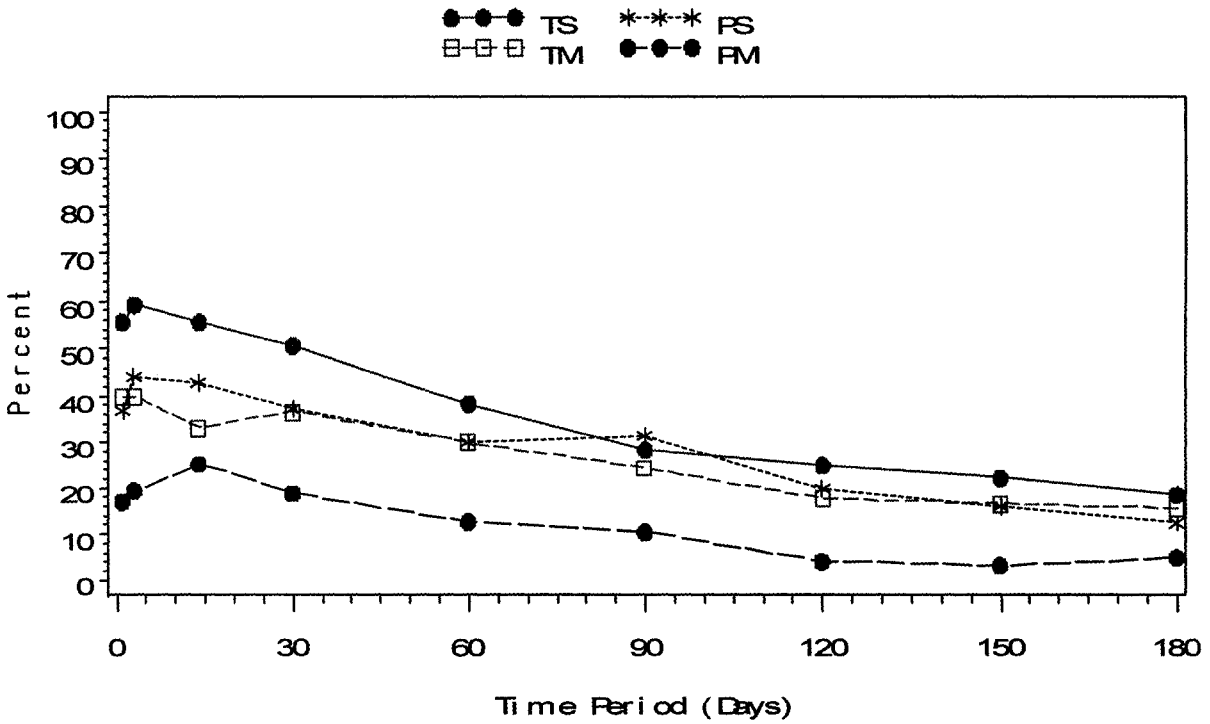
[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, annual household income, route of delivery, and receipt of free formula

Figure 2
Proportion of Exclusive Breast Milk Feeding Per Group per Time Period



TS=Mothers of term singletons, PS=Mothers of preterm singletons, TM=Mothers of term multiples, PM=Mothers of preterm multiples

Table 5
Logistic Regression, Backward Elimination[&] for
Exclusive Breast Milk Feeding at 2 Weeks Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	<0.0001	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.34	0.21	--	0.62	0.31-1.23
TM vs. TS	-0.47	0.21	--	0.28*	0.14-0.54
PM vs. TS	-0.67	0.21	--	0.23*	0.11-0.45
EDUCATION	--	--	0.0004	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.14	0.19	--	2.44*	1.17-5.06
≥College graduate vs. ≤ high school graduate	0.62	0.17	--	3.93*	2.00-7.79
WORK BY 6 MONTHS	--	--	0.0081	--	--
No work vs. work	0.33	0.12	--	1.94*	1.19-3.17

[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, annual household income, route of delivery, and receipt of free formula

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APPENDICIES

APPENDIX A
SPECIFIC AIMS, HYPOTHESES, and SUMMARY STATEMENT

AIM 1: To compare the number of women who initiated human milk feeding (provided human milk to their infants at least once daily during the first 72 hours of life) among mothers of multiples and mothers of singletons.
Hypothesis 1.1: The initiation of human milk feeding by mothers of term multiple is **less than** that of mothers of term singletons.
Hypothesis 1.2: The initiation of human milk feeding by mothers of preterm multiples is **less than** that of mothers of preterm singletons.

AIM 2: To compare the number of women who were providing human milk to their infants at least once daily at age 6 months among mothers of multiples and mothers of singletons.
Hypothesis 2.1: The daily provision of human milk at age 6 months of age is **less prevalent** among mothers of term multiples than among mothers of term singletons.
Hypothesis 2.2: The daily provision of human milk at age 6 months of age is **less prevalent** among mothers of preterm multiples than among mothers of preterm singletons.

Summary Statement
Although the above hypotheses were generated following interviews with mothers of multiples, discussions with health care providers, and a careful review of the literature, the results of this study did not fully support the predicted outcomes. This study showed that, compared to all other groups, mothers of preterm multiples fed the least amount of breast milk for the shortest length of time. Mothers of term multiples, however, provided breast milk to their infants as often and for as long as mothers of both singleton groups.

The most important implication for finding results different than those expected by the hypotheses is that the recommendation for intervention strategies can be more specific. While mothers of preterm multiples initially provided "at least some" breast milk at a rate equal to the other groups, the rates of "exclusive" breast milk feeding by these mothers was much lower from the start. Our results indicate that health care resources would be best spent, not only by helping mothers of preterm multiples initiate breast milk feeding, but by helping these mothers increase the amount of breast milk they are feeding their infants.

Cincinnati Children's
Hospital Medical Center

APPENDIX B
INTRODUCTORY LETTER

Sue Smith
1234 Any Street
Cincinnati, Ohio 45233

January, 2002

Dear Sue Smith,

My name is Dr. Sheela Geraghty and I am a pediatrician at the Children's Hospital Medical Center in Cincinnati. As you know, mothers often want advice from pediatricians about feeding babies. This time, however, we want advice from mothers about feeding babies. So, we are asking for your help.

Your name was selected at random along with 1,000 other mothers to participate in the ***Feeding Our Babies*** study going on at Children's Hospital. The purpose of this study is to help pediatricians better understand the challenges of feeding babies from a mother's point of view. The study involves simply filling out a survey that takes about 10 to 15 minutes to complete. Some mothers also will be called on the phone for various follow-up questions. **All mothers who finish the study will get a $10 gift certificate to Toys R Us.**

If you are not interested in filling out our survey, simply check the "No" box on the second page of this letter. If you are interested in filling out the survey, please provide all the information on "Page 2". We will then send you a copy of the survey in the mail. There is a self-addressed envelope for you to send us your reply either way. Any information that you give us will be strictly confidential.

My e-mail address is sheela.geraghty@chmcc.org and my office phone number is (513) 636-2526. If you have questions, please feel free to contact me. As the mother of 3 young children, I know feeding babies is rewarding, but also very challenging. My team and I value your input. We hope you chose to help us in this very important project.

Sincerely,

Sheela Geraghty, M.D.
Division of General and Community Pediatrics

Enclosures

Cincinnati Children's
Hospital Medical Center
3333 Burnet Avenue
Cincinnati, OH 45229-3039
(513) 636-4200
www.cincinnatichildrens.org

APPENDIX C
CONSENT FORM

Feeding Our Babies

One, Two, & Three at a time
One..Two..&..Three at a time

Dear Sue Smith, January, 2002

The purpose of the ***Feeding Our Babies*** study going on at Children's Hospital Medical Center is to help doctors better understand the challenges of feeding babies from a mother's point of view. This is how we will know if you would like to participate. Please put an X next to the "No" or "Yes " response and send the letter back. If you answered "Yes" please fill in the information after you sign your name.

__ No, I would not like to participate in the survey. Please do not send me anymore information about this study.

__ Yes, I would like to participate in the ***Feeding Our Babies*** study going on at Children's Hospital. I am aware of the following things:

1. All information that I give will be strictly confidential.
2. The medical care that my child or children get from Children's Hospital will never be compromised if I do not participate in this study.
3. There are no direct health benefits to me for participating.
4. I can withdraw from the study at anytime.
5. If I have any questions, I can call Dr. Sheela Geraghty at (513) 636-2526. If I have any questions about my rights as a research subject, I can contact Dr. Irwin Light, Chairman, Children's Hospital Institutional Review Board at (513) 636-8039.
6. **I will receive a $10 gift certificate to Toys R Us when I finish the study.**

Please sign your name here: _____ **Date:** _____

Please fill out the following information for our records.

Print the **name** you prefer to use. _____

How **many babies** did you give birth to on «DOB»? _____
How many of the babies born on «DOB» **are living with you**? _____

What is the best **address** for us to use to contact you?

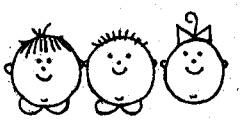
_____

_____

Best **phone #** for us to call you	Best **days of the week** to call you at that phone #	Best **times of day** to call you at that phone #
_____	_____	_____
Alternate **phone #** for us to call you	Best **days of the week** to call you at the alternate phone #	Best **time of the day** to call you at the alternate phone #
_____	_____	_____

Please return this form in the enclosed envelope to:

Dr. Sheela Geraghty
Children's Hospital Medical Center, TCHRF 6527, 3333 Burnet Ave.
Cincinnati, Ohio 45229



APPENDIX D
DATA COLLECTION/MANAGEMENT FORMS FOR MAILED QUESTIONNAIRE

D1. MAILED SURVEY FOR MOTHERS OF TWINS

*We know you may have other children, but please answer these questions in relation to the infants you gave birth to on the date we mentioned in our first letter. Remember that there are no right or wrong answers. Place an **X** next to only **one** answer for each question unless the question says you can pick more than one. A few questions ask you to fill in the blanks.*

1. While you were pregnant with your twins, how easy or difficult did you think it would be to feed them **formula**?
   - __ Very easy
   - __ Somewhat easy
   - __ Somewhat difficult
   - __ Very difficult

2. While you were pregnant with your twins, how easy or difficult did you think it would be to feed them **breastmilk**?
   - __ Very easy
   - __ Somewhat easy
   - __ Somewhat difficult
   - __ Very difficult

3. While you were pregnant with your twins, what type of milk did you **intend** to feed them when they were **3 days old**?
   - __ You did not know
   - __ All formula
   - __ Mostly formula, some breastmilk
   - __ About ½ formula, ½ breastmilk
   - __ Mostly breastmilk, some formula
   - __ All breastmilk

4. While you were pregnant with your twins, what type of milk did you **intend** to feed them when they were **6 months old**?
   - __ You did not know
   - __ All formula
   - __ Mostly formula, some breastmilk
   - __ About ½ formula, ½ breastmilk
   - __ Mostly breastmilk, some formula
   - __ All breastmilk

5. While you were pregnant with your twins, what were your beliefs about breastfeeding them? ***(You may choose more than one answer for this question.)***
   - __ Breastfeeding twins would take too much time.
   - __ Breastfeeding twins would delay my return to work or school.
   - __ Breastfeeding twins was an unnatural thing to do.
   - __ I wasn't going to make enough milk to breastfeed twins.

__ I did not think of any of the above things.

6. While you were pregnant with your twins, which of the following people wanted you to feed them **mostly formula**? ***(You may choose more than one answer for this question.)***
   __ The twins' father
   __ Your mother
   __ Your closest female relative besides your mother
   __ Your closest female friend
   __ Your pregnancy and/or delivery doctor
   __ The twins' doctor
   __ Other mothers of twins
   __ None of the above

7. While you were pregnant with your twins, which of the following people wanted you to feed them **mostly breastmilk**? ***(You may choose more than one answer for this question.)***
   __ The twins' father
   __ Your mother
   __ Your closest female relative besides your mother
   __ Your closest female friend
   __ Your pregnancy and/or delivery doctor
   __ The twins' doctor
   __ Other mothers of twins
   __ None of the above

8. While you were pregnant with your twins, which of the following people's opinion had **some impact** on what type of milk you chose to feed them? ***(You may choose more than one answer for this question.)***
   __ The twins' father
   __ Your mother
   __ Your closest female relative besides your mother
   __ Your closest female friend
   __ Your pregnancy and/or delivery doctor
   __ The twins' doctor
   __ Other mothers of twins
   __ None of the above

9. How many days **total** throughout your pregnancy, including your delivery date, were you in the hospital? ***(Do not include the days after you gave birth.)***
   __ Less than 24 hours
   __ 1 day to 3 days
   __ 4 days to 7 days
   __ Longer than 1 week

10. How many weeks pregnant were you at the time of your delivery?
__ 37-40 weeks (full term)
__ 34-36 weeks (about 1 month to 6 weeks early)
__ 30-33 weeks (about 2 months early)
__ 26-29 weeks (about 3 to 4 months early)
__ Less than 26 weeks (more than 4 months early)

11. What type of delivery did you have with your twins?
__ Vaginal
__ C-section
__ Both

12. How many days did **you** stay in the hospital after your delivery.
____ number of days

13. What is the sex of your first-born twin?
__ Male
__ Female

14. How much did your first-born twin weigh at birth in **pounds** and **ounces.**
____ pounds, ____ ounces

15. After delivery, when did you hold your first-born twin?
__ Within the first hour
__ After the first hour, but within the first 24 hours
__ After the first 24 hours, but within the first week
__ After the first week

16. After delivery, when was your first-born twin discharged from the hospital?
____ number of days

17. What is the sex of your second-born twin?
__ Male
__ Female

18. How much did your second-born twin weigh at birth in **pounds** and **ounces**?
____ pounds, ____ounces

19. After delivery, when did you hold your second-born twin?
__ Within the first hour
__ After the first hour, but within the first 24 hours
__ After the first 24 hours, but within the first week
__ After the first week

20. After delivery, when was your second-born twin discharged from the hospital?
____ number of days

21. During the first month after **your twins** were home from the hospital, about how many hours of sleep **did you get** in a 24-hour period?
    __ Less than 2 hours
    __ 2 to 4 hours
    __ 5 to 8 hours
    __ More than 8 hours

22. During the first month after **your twins** were home from the hospital, about how many hours a day **did you have help** from people other than the twins' father?
    __ None
    __ Less than 2 hours a day
    __ Between 2 and 6 hours a day
    __ Between 7 and 12 hours a day
    __ More than 12 hours a day

23. As a general rule, during the first month after **twins** are home from the hospital, about how many hours a day **do you think a mother of twins needs help** from people other than the twins' father?
    __ None
    __ Less than 2 hours a day
    __ Between 2 and 6 hours a day
    __ Between 7 and 12 hours a day
    __ More than 12 hours a day

24. Did you ever feed your breastmilk to either of your twins?
    __ Yes
    __ No

25. At what age did you start feeding solid food (such as cereal) to your first-born twin?
    __ Less than 4 months old
    __ Between 4 and 6 months old
    __ After 6 months old

26. At what age did you start feeding solid food (such as cereal) to your second-born twin?
    __ Less than 4 months old
    __ Between 4 and 6 months old
    __ After 6 months old

27. Which of the following people **did you expect** to give you useful information about feeding **formula** to twins? ***(You may choose more than one answer for this question.)***
    __ Your pregnancy and/or delivery doctor
    __ The twins' doctor
    __ Someone from the nursing staff
    __ Family and friends

__ You expected none of these people to give you useful information on formula-feeding

28. Which of the following people **actually gave you** useful information about feeding **formula** to twins? ***(You may choose more than one answer for this question.)***
    __ Your pregnancy and/or delivery doctor
    __ The twins' doctor
    __ Someone from the nursing staff
    __ Family and friends
    __ None of these people gave you useful information on formula-feeding

29. Which of the following people **did you expect** to give you useful information about feeding **breastmilk** to twins? ***(You may choose more than one answer for this question.)***
    __ Your pregnancy and/or delivery doctor
    __ The twins' doctor
    __ Someone from the nursing staff
    __ A lactation consultant (breastfeeding specialist)
    __ Family and friends
    __ You expected none of these people to give you useful information on breastfeeding

30. Which of the following people **actually gave you** useful information about feeding **breastmilk** to twins? ***(You may choose more than one answer for this question.)***
    __ Your pregnancy and/or delivery doctor
    __ The twins' doctor
    __ Someone from the nursing staff
    __ A lactation consultant (breastfeeding specialist)
    __ Family and friends
    __ None of these people gave you useful information on breastfeeding

31. Which one of the following people **did you want to answer** most of your questions about feeding twins in general? ***(Please choose only one answer.)***
    __ Your pregnancy and/or delivery doctor
    __ The twins' doctor
    __ Someone from the nursing staff
    __ A lactation consultant (breastfeeding specialist)
    __ Family and friends
    __ None of these people

32. What type of milk did your mother feed you in your first 6 months of life?
    __ You do not know
    __ Mostly formula
    __ Mostly breastmilk
    __ About ½ formula, ½ breastmilk

33. Did you ever observe a female friend or relative breastfeed her baby prior to the delivery of your twins?
    __ Yes
    __ No

34. Before your twins were born, did you ever breastfeed another child?
    __ Yes *If you answered "Yes" to this question, please answer* ***question #35***
    __ No *If you answered "No," please go to* ***question #36***

35. How would you rate your previous breastfeeding experience?
    __ Very positive
    __ Somewhat positive
    __ Somewhat negative
    __ Very negative

36. Please use this space to write down anything that you would like future mothers of twins to know about feeding multiple infants during the first 6 months of their lives.

    _____
    _____
    _____
    _____
    _____

37. What is your ethnic origin? ***(You may choose more than one answer for this question.)***
    __ African-American
    __ Caucasian/White
    __ Hispanic
    __ East Asian/Southeast Asian (Chinese, Korean, Japanese, Vietnamese, Malaysian, Indonesian, etc.)
    __ South Asian (Indian subcontinent and Countries of the Persian Gulf)
    __ Native American or Alaskan Native
    __ Other *(please specify)* _____

38. What is the highest level of schooling that you finished?
    __ Did not go to high school
    __ Attended high-school, did not finish
    __ High-school graduate/GED/technical or vocational training
    __ Some college/associate's degree
    __ College graduate
    __ Post-college education

39. What was your marital status when **you found out** that you were pregnant with twins?
    __ Single

__ Married
__ Separated or Divorced
__ Widowed

40. What was your total household income (before taxes) when **you found out** that you were pregnant with twins?
    __ Less than $15,000
    __ $15,000 to $34,999
    __ $35,000 to $54,999
    __ $55,000 to $74,999
    __ $75,000 or more

41. How many people, **including yourself**, were living in your household when **you found out** that you were pregnant with twins?
    __ 1
    __ 2
    __ 3
    __ 4
    __ 5 or more

42. How many children did you give birth to before the delivery of your twins?
    __ 0
    __ 1
    __ 2
    __ 3 or more

43. During your pregnancy or before your twins were 6 months old, were you ever in the Women, Infants, and Children (WIC) supplemental food program? ***(You may chose more than one answer for this question.)***
    __ Yes, when I was pregnant with my twins
    __ Yes, after my twins were born and before they were 6 months old
    __ No

44. During your pregnancy or before your twins were 6 months old, did you ever receive free formula from any other source besides the WIC program (for example: at your doctor's office or from the hospital)?
    __ Yes
    __ No

45. After your twins were born, and before they were 6 months old, did you ever work more than 20 hours a week outside your home?
    __ Yes *If you answered "Yes" to this question, please answer question* ***#46.***
    __ No *If you answered "No," please go to the* ***CONCLUSION.***

46. About how long after you gave birth to your twins did you begin to work more than 20 hours a week outside your home? ***(Please choose the closest response.)***

__ 4 weeks
__ 6 weeks
__ 2 months
__ 3 months
__ 4 months
__ 5 months
__ 6 months
__ After 6 months

CONCLUSION

We, at Cincinnati Children's Hospital Medical Center, greatly appreciate you taking the time to complete our survey. Please send the survey back to us in the envelope we provided. If you have any questions, please feel free to call Dr. Geraghty at (513) 636-2526 at any time. Her address is Dr. Sheela Geraghty, Children's Hospital Medical Center, TCHRF 6527, 3333 Burnet Ave., Cincinnati, Ohio 45229.

We are planning to call some of the mothers who respond to our survey to ask some follow-up questions. These questions should take about 15 minutes to answer. If you have not already given us your phone numbers where we can best reach you, please fill in the following information.

Your Name _____

Best **phone #** for us to call you	Best **days of the week** to call you at that phone #	Best **times of day** to call you at that phone #
_____	_____	_____
Alternate **phone #** for us to call you	Best **days of the week** to call you at the alternate phone #	Best **time of the day** to call you at the alternate phone #
_____	_____	_____

You should receive your gift certificate in about 6 to 8 weeks. Again, thank you so much for your time and effort.

D2. DATA CODING INSTRUCTION SHEET
Mailed Surveys

Question #	Singleton Survey	Twins Survey	Triplets Survey
1	1,2,3, or 4	1,2,3, or 4	1,2,3, or 4
2	1,2,3, or 4	1,2,3, or 4	1,2,3, or 4
3	1,2,3,4,5,or 6	1,2,3,4,5,or 6	1,2,3,4,5,or 6
4	1,2,3,4,5,or 6	1,2,3,4,5,or 6	1,2,3,4,5,or 6
5	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0
6	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0
7	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0
8	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0	For each variable: Yes=1, No=0
9	1,2,3, or 4	1,2,3, or 4	1,2,3, or 4
10	5,4,3,2,or 1 **Reverse coding**	5,4,3,2,or 1 **Reverse coding**	5,4,3,2,or 1 **Reverse coding**
11	1 or 2	1,2, or 3	1,2, or 3
12	# days	# days	# days
13	M or F	M or F	M or F
14	Convert to grams	Convert to grams	Convert to grams
15	1,2,3, or 4	1,2,3, or 4	1,2,3, or 4
16	# days	# days	# days
17	1,2,3, or 4	M or F	M or F
18	1,2,3,4, or 5	Convert to grams	Convert to grams
19	1,2,3,4, or 5	1,2,3, or 4	1,2,3, or 4
20	Yes=1, No=0	# days	# days
21	1,2, or 3	1,2,3, or 4	M or F
22	For each variable: Yes=1, No=0	1,2,3,4, or 5	Convert to grams
23	For each variable: Yes=1, No=0	1,2,3,4, or 5	1,2,3, or 4
24	For each variable: Yes=1, No=0	Yes=1, No=0	# days
25	For each variable: Yes=1, No=0	1,2, or 3	1,2,3, or 4
26	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4, or 5
27	1,2,3, or 4	For each variable: Yes=1, No=0	1,2,3,4, or 5
28	Yes=1, No=0	For each variable: Yes=1, No=0	Yes=1, No=0
29	Yes=1, No=0	For each variable:	1,2, or 3

		Yes=1, No=0	
30	If #29 Yes, 1,2,3, or 4	For each variable: Yes=1, No=0	1,2, or 3
31	Open-ended	1,2,3,4,5, or 6	1,2, or 3
32	1,2,3,4,5,6, or 7 (Can have 2 choices)	1,2,3, or 4	For each variable: Yes=1, No=0
33	1,2,3,4,5, or 6	Yes=1, No=0	For each variable: Yes=1, No=0
34	1,2,3, or 4	Yes=1, No=0	For each variable: Yes=1, No=0
35	1,2,3,4, or 5	If #34 Yes, 1,2,3, or 4	For each variable: Yes=1, No=0
36	1,2,3,4, or 5	Open-ended	1,2,3,4,5, or 6
37	1,2,3, or 4	1,2,3,4,5,6, or 7 (Can have 2 choices)	1,2,3, or 4
38	Add responses: 1= Yes, pregnant 2=Yes, before 6 mo 0=No 0,1,2, or 3	1,2,3,4,5, or 6	Yes=1, No=0
39	Yes=1, No=0	1,2,3, or 4	Yes=1, No=0
40	Yes=1, No=0	1,2,3,4, or 5	If #40 Yes, 1,2,3, or 4
41	If #40 Yes, 1,2,3,4,5,6,7, or 8	1,2,3,4, or 5	Open-ended
42		1,2,3, or 4	1,2,3,4,5,6, or 7 (Can have 2 choices)
43		Add responses: 1= Yes, pregnant 2=Yes, before 6 mo 0=No	1,2,3,4,5, or 6
44		Yes=1, No=0	1,2,3, or 4
45		Yes=1, No=0	1,2,3,4, or 5
46		If #45 Yes, 1,2,3,4,5,6,7, or 8	1,2,3,4, or 5
47			1,2,3, or 4
48			Add responses: 1= Yes, pregnant 2=Yes, before 6 mo 0=No 0,1,2, or 3
49			Yes=1, No=0
50			Yes=1, No=0
51			If #50 Yes, 1,2,3,4,5,6,7, or 8

APPENDIX E
DATA COLLECTION/MANAGEMENT FORMS FOR PHONE QUESTIONNAIRE

E1. PHONE QUESTIONNAIRE FOR MOTHERS OF TWINS

The following questions are to determine the type of milk your twins were fed in the first 6 months of life. Please remember that there are no right or wrong answers to any of the questions. The information that you provide will be used for research purposes only. Do you have any questions before we begin? ***Wait for questions. If the mother has none, say****...I am now going to start with question #1.*

1. Did you ever feed your breastmilk, either at the breast or by pumping your milk, to your first-born twin?
   __ Yes
   __ No*
2. Did you ever feed your breastmilk, either at the breast or by pumping your milk, to your second-born twin?
   __ Yes
   __ No*

****If the mother says "No" to both Q#1 and Q#2, remind her that she answered "Yes" when asked if she fed either of her twins breastmilk on the mailed part of the survey. Clarify her response.***

If she still says "No, I did not feed either of my twins breastmilk," thank her for her time in returning the mailed part of the questionnaire. If she still says "Yes" to feeding either of the twins breastmilk, repeat questions #1 and #2. Then continue on with the questions.

3. While you were pregnant, did you have any guidance or read information specifically designed to teach mothers of twins how to breastfeed?
   __ Yes **Go to Q#4**
   __ No **Go to Q#5**

4. Where did you receive this instruction? For this question, please answer yes or no to each of the following choices. I will begin reading the choices now.
   __ Books
   __ Classes given by the hospital or doctor's office
   __ Mothers of twins groups
   __ Another place we did not mention. Where was that? _____

5. During the first 6 months after your delivery, was there ever a time that you did not make the amount of breastmilk that you wanted?
   __ Yes **Go to Q#6**
   __ No **Go to Q#7**

6. At what time or times after your delivery were you not able to make the amount of breastmilk that you wanted? For this question, please answer yes or no to each of the following choices. I will begin reading the choices now.

__ During the first 24 hours after delivery
__ On the 3rd day after delivery
__ During the second week after delivery
__ During the 1st month after delivery
__ During the 2nd month
__ During the 3rd month
__ During the 4th month
__ During the 5th month
__ During the 6th month
__ You don't remember

7. Did you ever have sore breasts or nipples for any reason after your infants were born?
   __ Yes **Go to Q#8**
   __ No **Go to Q#9**

8. Did your breast or nipple soreness cause you to stop breastfeeding earlier than you would have wanted?
   __ Yes
   __ No

I am now going to ask you details about each of your twins' feedings during the first 6 months of their lives. At each time period, I will first ask you what type of milk each twin was fed. If a twin was given any breastmilk, I will then ask you if the breastmilk was fed at the breast, pumped then given by another way such as bottle or through a tube, or a combination of at the breast and pumped milk. I'll begin reading this section now.

9. In the first 24 hours of life, what type of milk was your first-born twin fed? Please pick 1 answer from the following 6 choices.
   __ All formula **Go to Q#11**
   __ Mostly formula, some breastmilk
   __ About ½ formula, ½ breastmilk
   __ Mostly breastmilk, some formula
   __ All breastmilk
   __ This infant did not receive any form of milk **Go to Q#11**

If the mother said the infant received I.V. fluids, ask her if the infant received milk during this time as well. If she says the infant received only I.V. fluids, fill in "The infant did not receive any type of milk."

If a mother said she only produced "milk like fluid" or colostrum early after delivery, consider that breastmilk.

10. In the first 24 hours of life, how was your breastmilk fed to your first-born twin? Please pick 1 answer from the following 3 choices.
    __ At the breast
    __ Pumped

__ A combination of at the breast and pumped milk

11. On the 3rd day of life, what type of milk was your first-born twin fed? Again, please pick 1 answer from the following 6 choices.
    __ All formula **Go to Q#13**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#13**

12. On the 3rd day of life, how was your breastmilk fed to your first-born twin? Please pick 1 answer from the following 3 choices.
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

13. At the end of the 2nd week of life, what type of milk was your first-born twin fed?
    __ All formula **Go to Q#15**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#15**

********If the mother answered "All formula" 2 times on a row ask:***
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#27***

14. At the end of the 2nd week of life, how was your breastmilk fed to your first-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

These same questions will now be repeated for 1 month intervals until your first-born twin turned 6 months old.

15. At the end of the 1st month of life, what type of milk was your first-born twin fed?
    __ All formula **Go to Q#17**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#17**

If the mother answered "All formula" 2 times on a row ask:
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ No ***Go to Q#27***

16. At the end of the 1st month of life, how was your breastmilk fed to your first-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

17. At the end of the 2nd month of life, what type of milk was your first-born twin fed?
    __ All formula **Go to Q#19**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#19**

If the mother answered "All formula" 2 times on a row ask:
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ No ***Go to Q#27***

18. At the end of the 2nd month of life, how was your breastmilk fed to your first-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

19. At the end of the 3rd month of life, what type of milk was your first-born twin fed?
    __ All formula **Go to Q#22**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#22**

If the mother answered "All formula" 2 times on a row ask:
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ No ***Go to Q#27***

20. At the end of the 3rd month of life, how was your breastmilk fed to your first-born twin?

__ At the breast
__ Pumped
__ A combination of at the breast and pumped milk

21. At the end of the 4th month of life, what type of milk was your first-born twin fed?
__ All formula **Go to Q#23**
__ Mostly formula, some breastmilk
__ About ½ formula, ½ breastmilk
__ Mostly breastmilk, some formula
__ All breastmilk
__ This infant did not receive any form of milk **Go to Q#23**

If the mother answered "All formula" 2 times on a row ask:
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ No ***Go to Q#27***

22. At the end of the 4th month of life, how was your breastmilk fed to your first-born twin?
__ At the breast
__ Pumped
__ A combination of at the breast and pumped milk

23. At the end of the 5th month of life, what type of milk was your first-born i twin fed?
__ All formula **Go to Q#25**
__ Mostly formula, some breastmilk
__ About ½ formula, ½ breastmilk
__ Mostly breastmilk, some formula
__ All breastmilk
__ This infant did not receive any form of milk **Go to Q#25**

If the mother answered "All formula" 2 times on a row ask:
Did your first-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ No ***Go to Q#27***

24. At the end of the 5th month of life, how was your breastmilk fed to your first-born twin?
__ At the breast
__ Pumped
__ A combination of at the breast and pumped milk

25. At the end of the 6th month of life, what type of milk was your first-born twin fed?
__ All formula **Go to Q#27**
__ Mostly formula, some breastmilk
__ About ½ formula, ½ breastmilk

__ Mostly breastmilk, some formula
__ All breastmilk
__ This infant did not receive any form of milk **Go to Q#27**

26. At the end of the 6th month of life, how was your breastmilk fed to your first-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

27. How long did you provide any of your breastmilk, either at the breast or by pumping your milk, to your first-born twin? _____

Make sure the mother answers in a number that can be converted to "weeks." (ie: "4 days" will be <1 week, "1 and ½ months" will be 6 weeks, "3 months" will be 12 weeks, "a few days past 10 months" will be 10months x 4 weeks=40 weeks + 1 week for the "few days" total is 41 weeks.)

28. Which of the following reasons explain why you stopped feeding your first-born twin breastmilk? For this question, please answer yes or no to each of the following choices. I will begin reading the choices now.
    __ You did not make enough milk
    __ Your nipples or breasts were too sore
    __ You were too tired
    __ You needed more help
    __ You went back to work or school
    __ It was too hard emotionally
    __ Was there something we did not mention?_____

Now I am going to ask you the same questions about your second-born twin.

29. In the first 24 hours of life, what type of milk was your second-born twin fed? Again, please pick only 1 answer from the following 6 choices.
    __ All formula **Go to Q#30**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#30**

If the mother said the infant received I.V. fluids, ask her if the infant received milk during this time as well. If she says the infant received only I.V. fluids, fill in "The infant did not receive any type of milk."

If a mother said she only produced "milk like fluid" or colostrum early after delivery, consider that breastmilk.

30. In the first 24 hours of life, how was your breastmilk fed to your second-born twin? Please pick 1 answer from the following 3 choices.
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

31. On the 3rd day of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#32**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#32**

32. On the 3rd day of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped and then given by bottle or other route
    __ A combination of at the breast and pumped milk

33. At the end of the 2nd week of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#34**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#34**

If the mother answered "All formula" 2 times on a row ask:
Did your second-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

34. At the end of the 2nd week of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

These same questions will now be repeated for 1 month intervals until your second-born twin turned 6 months old.

35. At the end of the 1st month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#36**

__ Mostly formula, some breastmilk
__ About ½ formula, ½ breastmilk
__ Mostly breastmilk, some formula
__ All breastmilk
__ This infant did not receive any form of milk **Go to Q#36**

If the mother answered "All formula" 2 times on a row ask:
Did your second-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

36. At the end of the 1st month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

37. At the end of the 2nd month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#38**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#38**

If the mother answered "All formula" 2 times on a row ask:
Did your second -born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

38. At the end of the 2nd month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

39. At the end of the 3rd month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#40**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#40**

If the mother answered "All formula" 2 times on a row ask:
Did your second-born twin ever receive anymore breastmilk in the first 6 months of life?

__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

40. At the end of the 3rd month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

41. At the end of the 4th month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#42**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#42**

If the mother answered "All formula" 2 times on a row ask:
Did your second-born infant ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

42. At the end of the 4th month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped
    __ A combination of at the breast and pumped milk

43. At the end of the 5th month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#44**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#44**

If the mother answered "All formula" 2 times on a row ask:
Did your second-born twin ever receive anymore breastmilk in the first 6 months of life?
__ *Yes* ***Continue with the Questions***
__ *No* ***Go to Q#46***

44. At the end of the 5th month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped

__ A combination of at the breast and pumped milk

45. At the end of the 6th month of life, what type of milk was your second-born twin fed?
    __ All formula **Go to Q#46**
    __ Mostly formula, some breastmilk
    __ About ½ formula, ½ breastmilk
    __ Mostly breastmilk, some formula
    __ All breastmilk
    __ This infant did not receive any form of milk **Go to Q#46**

46. At the end of the 6th month of life, how was your breastmilk fed to your second-born twin?
    __ At the breast
    __ Pumped and then given by bottle or other route
    __ A combination of at the breast and pumped milk

47. How long did you provide any of your breastmilk, either at the breast or by pumping your milk, to your second-born twin? _____

Make sure the mother answers in a number that can be converted to "weeks." (ie: "4 days" will be <1 week, "1 and ½ months" will be 6 weeks, "3 months" will be 12 weeks, "a few days past 10 months" will be 10months x 4 weeks=40 weeks + 1 week for the "few days" total is 41 weeks.)

48. Which of the following reasons explain why you stopped feeding your second-born twin breastmilk? For this question, please answer yes or no to each of the following choices. I will begin reading the choices now.
    __ You did not make enough milk
    __ Your nipples or breasts were too sore
    __ You were too tired
    __ You needed more help
    __ You went back to work or school
    __ It was too hard emotionally
    __ Was there something we did not mention?_____

49. Overall, how would you rate the process of providing breastmilk to your twins? Please chose from one of the following four choices.
    __ Very easy
    __ Somewhat easy
    __ Somewhat difficult
    __ Very difficult

This is the end of our survey. Thank you so much for taking the time to answer our questions. The information you have given to us is for research purposes only.

E2. DATA CODING INSTRUCTION SHEET
Phone Surveys

Question #	Singleton Survey	Twins Survey	Triplets Survey
1	Yes=1, No=0	Yes=1, No=0	Yes=1, No=0
2	Yes=1, No=0	Yes=1, No=0	Yes=1, No=0
3	If #2 Yes, For each variable: Yes=1, No=0 3.4a is fill-in	Yes=1, No=0	Yes=1, No=0
4	Yes=1, No=0	If #3 Yes, For each variable: Yes=1, No=0 4.4a is fill-in	Yes=1, No=0
5	If #4 Yes, For each variable: Yes=1, No=0	Yes=1, No=0	If #4 Yes, For each variable: Yes=1, No=0 5.4a is fill-in
6	Yes=1, No=0	If #5 Yes, For each variable: Yes=1, No=0	Yes=1, No=0
7	If #6 Yes, Yes=1, No=0	Yes=1, No=0	If #6 Yes, For each variable: Yes=1, No=0
8	1,2,3,4,5, or 6	If #7 Yes, Yes=1, No=0	Yes=1, No=0
9	1,2, or 3	1,2,3,4,5, or 6	If #8 Yes, Yes=1, No=0
10	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
11	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
12	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
13	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
14	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
15	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
16	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
17	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
18	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
19	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
20	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
21	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
22	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
23	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3

24	1,2,3,4,5, or 6	1,2, or 3	1,2,3,4,5, or 6
25	1,2, or 3	1,2,3,4,5, or 6	1,2, or 3
26	# of weeks	1,2, or 3	1,2,3,4,5, or 6
27	For each variable: Yes=1, No=0 27.7a is fill-in	# of weeks	1,2, or 3
28	1,2,3, or 4	For each variable: Yes=1, No=0 28.7a is fill-in	# of weeks
29		1,2,3,4,5, or 6	For each variable: Yes=1, No=0 29.7a is fill-in
30		1,2, or 3	1,2,3,4,5, or 6
31		1,2,3,4,5, or 6	1,2, or 3
32		1,2, or 3	1,2,3,4,5, or 6
33		1,2,3,4,5, or 6	1,2, or 3
34		1,2, or 3	1,2,3,4,5, or 6
35		1,2,3,4,5, or 6	1,2, or 3
36		1,2, or 3	1,2,3,4,5, or 6
37		1,2,3,4,5, or 6	1,2, or 3
38		1,2, or 3	1,2,3,4,5, or 6
39		1,2,3,4,5, or 6	1,2, or 3
40		1,2, or 3	1,2,3,4,5, or 6
41		1,2,3,4,5, or 6	1,2, or 3
42		1,2, or 3	1,2,3,4,5, or 6
43		1,2,3,4,5, or 6	1,2, or 3
44		1,2, or 3	1,2,3,4,5, or 6
45		1,2,3,4,5, or 6	1,2, or 3
46		1,2, or 3	1,2,3,4,5, or 6
47		# of weeks	1,2, or 3
48		For each variable: Yes=1, No=0 48.7a is fill-in	# of weeks
49		1,2,3, or 4	For each variable: Yes=1, No=0 49.7a is fill-in
50			1,2,3,4,5, or 6
51			1,2, or 3
52			1,2,3,4,5, or 6
53			1,2, or 3
54			1,2,3,4,5, or 6
55			1,2, or 3
56			1,2,3,4,5, or 6

57			1,2, or 3
58			1,2,3,4,5, or 6
59			1,2, or 3
60			1,2,3,4,5, or 6
61			1,2, or 3
62			1,2,3,4,5, or 6
63			1,2, or 3
64			1,2,3,4,5, or 6
65			1,2, or 3
66			1,2,3,4,5, or 6
67			1,2, or 3
68			# of weeks
69			For each variable: Yes=1, No=0 69.7a is fill-in
70			1,2,3, or 4

APPENDIX F
MAGNET/INCENTIVE

Feeding Our Babies

One.....Two.....&.....Three at a time

(513) 636-2526

APPENDIX G
THANK YOU LETTER

Thank you very much for being part of the **Feeding Our Babies** study here at Children's Hospital. Your contribution is sure to help mothers in the future.

Your "Thank You" letter has been colored personally by a child who was in Children's Hospital during the last few months. We hope you enjoy his or her artwork.

If you have any questions, you can always call Dr. Geraghty at (513) 636-2526.

Thank you again.

APPENDIX H
QUALITY ASSURANCE PROCEDURES

QA Procedure #1

Action: To compare the # of mothers who answered *No* to breastfeeding on the mailed survey, to the # of mothers who say *No* to breastfeeding when asked on the phone.

Purpose: To ensure consistency in the response to this question. This type of consistency check, which asks for the same information in two different ways, will increase the confidence that almost all mothers answered this question accurately.

Implementation:

Mothers who said *No* to breastfeeding will be chosen using a query of the access table. Sheela will run this query and save it in the database. Twenty percent of these mothers will be chosen for phone calls.

As of 3/15/02 there were 57 mothers who did not breastfeed. The # of singleton mothers to be called is 5 (23 x 20%), the # of twins is 5 (28 x 20%), and the # of triplets is 1 (6 x 20%). The surveys will be selected by choosing every 5th ID # to ensure random selection. Rubina will call the chosen mothers confirming their breastfeeding status. She will also ask if each mother has received the gift certificate, what formula they used, and what was the first solid foods they fed their child(ren). The data collected concerning these few questions will not be used. The questions provide a non-threatening framework to confirm the breastfeeding status of the mother. If a mother does change her status over the phone, Rubina will go ahead and proceed with the phone interview.

Desired Outcome:

Ideally there should be 100% agreement between the answer of *No* on the mailed survey, and *No* when the mother is called. If this is not the case, there will be concern for response error. A reevaluation of the question and QA process will be done if there is not 100% agreement.

Actual Outcome:

	Singletons	**Twins**	**Triplets**
# Surveys selected	5	5	1
# Mothers called	5	5	1
# Mothers who confirmed never feeding breastmilk	4	5	1
% Difference in written and verbal	20%	0%	0%

Implications/Further Action:

Of the 11 calls made, there was one mother who responded *No* on the survey when asked about ever breastfeeding, but when asked she said she did "try for a few days." It is unclear if this is an isolated incident or if this happened more often.

Since this is the most important question for the project, a further check must be done to assure this question was answered incorrectly no more than 5% of the time. Thus, there will be 10 more calls made. This number was chosen so that a total of 21 calls will be made. If no other mother changes her answer from *No* to *Yes* when asked about breastfeeding, there will be less than a 5% error rate for this question. At the moment, there are 90 mothers in the study who said no to breastfeeding. If one more mother is found to change her answer, all mothers will then be called.

Implementation of Second QA:

Mothers who said *No* to breastfeeding will be chosen using a query of the access table. Sheela will run this query and save it in the database. The mothers will be chosen by randomly selecting every 10th ID #, starting from the bottom of the table.

Actual Outcome of Second QA:

	Singletons	**Twins**	**Triplets**
# Surveys selected	4	5	1
# Mothers called	4	5	1
# Mothers who confirmed never feeding breastmilk	4	5	1
% Difference in written and verbal response	0%	0%	0%

Implications/Further Action:

None needed.

QA Procedure #2

Action: Checking the coding of the returned mailed survey.

Purpose: To ensure accuracy of coding.

Implementation:

As of 3/15/02 there were 223 surveys returned, all of which have been coded. Since the surveys are different, 20% of each subset of surveys (singles, twins, and triplets) will be pulled out of the folders and reviewed.

This selection will be regardless of breastfeeding status. Those to be reviewed will be selected by choosing every 5th ID # to ensure random selection.

The # of singleton surveys to be reviewed is 20 (102 x 20%), the # of twins is 22 (110 x 20%), and the # of triplets is 2 (11 x 20%). Sheela will use a red pen to code directly on the selected survey. Following the completion of re-coding each survey, a comparison will be made between the codes. Any discrepancies will be shown to a third person for confirmation of the correct code. The correct code will be highlighted.

Desired Outcome:

The percentile discrepancy among all the questions will be calculated. Ideally there would be 100% agreement between the initial coding and the re-coding. If there is more than a 5% discrepancy for a particular question, the coding of that particular question will be repeated for all of the surveys.

Actual Outcome:

	Singletons	**Twins**	**Triplets**
# Surveys reviewed	20	22	2
# Variables/Survey	86	91	96
# Variable checked	20 x 86= 1720	22 x 91= 2002	2 x 96 =192
Coding errors in following questions	10, 14, 17, 26, 26, 26, 26,26, 26	10, 17, 22, 31, 31, 31, 31, 31, 31, 44, 45	36
% Coding errors (# errors/# variables)	9/1720= **0.5%**	11/2002= **0.5%**	1/96= **1%**

Implications/Further Action:

Question # 26 on singletons' survey, #31 on the twins' survey, and # 36 on the triplets' survey are the same question. This question asks:

*Which of the following people **did you want to answer** most of your questions about feeding your infant in general? **(Please choose only one answer.)***

This question follows a series of questions where the mother could answer more than one answer. Subsequently, many mothers put more than one answer for this question as well. When the coding was done, a plan of how to handle more than one response to this question had not been decided. The coders left this question without a code (ie: blank).

It has been decided that each one of these questions on every survey must be rechecked. If a mother left the question blank, the coding will obviously stay the same. If there were more than one answer checked for

this question, it will be coded as a "7". Since there are only 6 choices for this question, each time a 7 is noted in the database, it will be obvious this question was answered incorrectly.

QA Procedure #3

Action: Checking the data entry of the returned mailed survey.

Purpose: To ensure accuracy of data entry.

Implementation:

As of 3/15/02 there were 223 surveys returned, all of which have been entered in the database. Since the surveys are different, 20% of each subset of surveys (singles, twins, and triplets) will be pulled out of the folders and reviewed. This selection will be regardless of breastfeeding status. Those to be reviewed will be selected by choosing every 5th ID # to ensure random selection. These charts will be the same as those pulled for the re-coding procedure.

The # of singleton surveys to be reviewed is 20 (102 x 20%), the # of twins is 22 (110 x 20%), and the # of triplets is 2 (11 x 20%). Sheela will print out the data from each of the selected surveys. Sheela will cross through each data point on the printed copy. Any discrepancies will be shown to a third person for confirmation of the correct value to be entered.

Desired Outcome:

The percentile discrepancy among all the questions will be calculated. Ideally there would be 100% agreement between what is printed of the entered data and what is seen on the coding sheet. If there is more than a 5% discrepancy for a particular question, the data entry of that particular question will be repeated for all surveys.

Actual Outcome:

	Singletons	**Twins**	**Triplets**
# Surveys reviewed	20	22	2
# Variables/Survey	86	91	96
# Variable checked	20 x 86= 1720	22 x 91= 2002	2 x 96 =192
Data entry errors in following questions	16, 32, 34, 35	18, 20, 21, 46	37
% Data entry errors (# errors/# variables)	4/1720= **0.2%**	4/2002= **0.2%**	1/96= **1%**

Implications/Further Action: None needed.

QA Procedure #4

Action: Checking the coding of the phone survey.

Purpose: To ensure accuracy of coding.

Implementation:

As of 4/1/02 there were 173 phone surveys completed, all of which have been coded. Since the surveys are different, 20% of each subset of surveys (singles, twins, and triplets) will be pulled out of the folders and reviewed. This selection will be from only those mothers who breastfed. Those to be reviewed will be selected by choosing every 5th ID # to ensure random selection.

The # of singleton surveys to be reviewed is 15 (77 x 20%), the # of twins is 18 (89 x 20%), and the # of triplets is 2 (7 x 20%). Sheela will use a red pen to code directly on the selected survey. Following the completion of re-coding each survey, a comparison will be made between the codes. Any discrepancies will be shown to a third person for confirmation of the correct code. The correct code will be highlighted.

Desired Outcome:

The percentile discrepancy among all the questions will be calculated. Ideally there would be 100% agreement between the initial coding and the re-coding. If there is more than a 5% discrepancy for a particular question, the coding of that particular question will be repeated for all of the surveys.

Actual Outcome:

	Singletons	**Twins**	**Triplets**
# Surveys reviewed	15	18	2
# Variables/Survey	48	76	104
# Variable checked	15 x 48 = 720	18 x 76 = 1368	2 x 104 =208
Data entry errors in following questions	9	None	None
% Data entry errors (# errors/# variables)	1/720= **0.1%**	0/1368= **0%**	0/208= **0%**

Implications/Further Action:

None needed.

QA Procedure #5

Action: Checking the data entry of the phone survey.

Purpose: To ensure accuracy of data entry.

Implementation:

As of 4/1/02 there were 173 phone surveys completed, all of which have been entered in the database. Since the surveys are different, 20% of each subset of surveys (singles, twins, and triplets) will be pulled out of the folders and reviewed. This selection will be from only those mothers who breastfed. Those to be reviewed will be selected by choosing every 5th ID # to ensure random selection. These charts will be the same as those pulled for the re-coding procedure.

The # of singleton surveys to be reviewed is 15 (77 x 20%), the # of twins is 18 (89 x 20%), and the # of triplets is 2 (7 x 20%). Sheela will print out the data from each of the selected surveys. Sheela will cross through each data point on the printed copy. Any discrepancies will be shown to a third person for confirmation of the correct value to be entered.

Desired Outcome:

The percentile discrepancy among all the questions will be calculated. Ideally there would be 100% agreement between what is printed of the entered data and what is seen on the coding sheet. If there is more than a 5% discrepancy for a particular question, the data entry of that particular question will be repeated for all surveys.

Actual Outcome:

	Singletons	**Twins**	**Triplets**
# Surveys reviewed	15	18	2
# Variables/Survey	48	76	104
# Variable checked	15 x 48 = 720	18 x 76 = 1368	2 x 104 =208
Data entry errors in following questions	None	6,8	None
% Data entry errors (# errors/# variables)	0/720= **0%**	2/1368= **0.1%**	0/208= **0%**

Implications/Further Action: None needed.

APPENDIX I
DATA TABLES AND FIGURES

Table 1
Demographic and Maternal Characteristics of the Four Groups

	Term Singletons n=78	Preterm Singletons n=79	Term Multiples n=90 (89 twin mothers, 1 mother of triplets)	Preterm Multiples n=93 (83 twin mothers, 13 mothers of triplets)	p value
Cesarean delivery (%)	22	23	53	56	<0.0001
Pre-delivery days in hospital (%)					<0.0001
<24 hours	56	24	54	23	
1-3 days	39	48	34	22	
4 or more days	5	28	12	55	
Maternal age (y)	29 ± 5.5	29 ± 6.4	32 ± 4.8	30± 5.2	0.001
Married (%)	81	71	92	88	0.001
Work by 6 months after delivery (%)	55	56	39	39	0.025
Previous # of Children (%)					ns
0	39	48	43	53	
1	40	41	30	30	
2 or more	22	11	27	17	
Caucasian (%)	95	87	89	94	ns
Highest level of education (%)					ns
≤high school graduate	18	32	14	24	
some college	35	29	27	30	
≥college graduate	47	39	59	46	
Received free formula (%)	71	65	69	77	ns
Annual household income (%)					ns
<$14,999	11	14	6	7	
$15,000-34,999	23	22	9	16	
$35,000-54,999	12	26	18	19	
$55,000-74,499	21	17	27	24	
>$75,000	33	22	40	34	

Table 2
Adjusted odds ratios for at least some and exclusive breast milk feeding early in the postpartum period and at six months for the four groups

Breast Milk Feeding Classification	Time Postpartum	Adjusted OR# and 95% CI per Group			
		TS n=81	PS n=80	TM n=90 89 twins, 1 triplet	PM n=95 82 twins, 13 triplets
At Least Some					
	24 hours	1.0	0.45* (0.21-0.97)	0.69 (0.32-1.47)	0.27* (0.13-0.58)
	3 Days	1.0	0.95 (0.43-2.10)	0.72 (0.33-1.61)	0.36* (0.17-0.78)
	2 weeks	1.0	1.10 (0.50-2.45)	0.62 (0.28-1.36)	0.49 (0.23-1.06)
	1 Month	1.0	1.08 (0.50-2.37)	0.86 (0.40-1.91)	0.46* (0.22-0.97)
	6 Months	1.0	0.86 (0.40-1.84)	0.78 (0.38-1.41)	0.25* (0.11-0.56)
Exclusive					
	24 hours	1.0	0.47* (0.23-0.99)	0.41* (0.20-0.84)	0.14* (0.06-0.31)
	3 Days	1.0	0.50* (0.25-1.03)	0.30* (0.15-0.62)	0.13* (0.06-0.27)
	2 Weeks	1.0	0.69 (0.34-1.39)	0.28* (0.14-0.58)	0.22* (0.10-0.47)
	1 Month	1.0	0.71 (0.35-1.45)	0.40* (0.20-0.82)	0.18* (0.07-0.39)
	6 Months	1.0	0.69 (0.28-1.73)	0.62 (0.25-1.53)	0.08* (0.02-0.42)

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

Variables included in all models: group (TS, PS, TM, or TS), maternal age, race/ethnic origin, marital status, education, annual household income, route of delivery, receipt of free formula, and working by six months postpartum

Table 3
Logistic Regression, Backward Elimination[&] for
At Least Some Breast Milk Feeding at 2 Weeks Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	0.12	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.36	0.25	--	1.08	0.48-2.38
TM vs. TS	-0.22	0.23	--	0.60	0.28-1.30
PM vs. TS	-0.42	0.22	--	0.49	0.24-1.03
INCOME	--	--	0.01	--	--
≤$14,999	--	--	--	1.0	--
$15,000-34,999 vs. ≤$14,999	-0.54	0.28	--	1.24	0.44-3.47
$35,000-54,999 vs. ≤$14,999	-0.07	0.26	--	1.97	0.70-5.60
$55,000-74,499 vs. ≤$14,999	0.67	0.27	--	4.11*	1.39-12.22
≥$75,000 vs. ≤$14,999	0.68	0.27	--	4.18*	1.41-12.33
EDUCATION	--	--	0.0014	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.08	0.19	--	2.25*	1.13-4.47
≥College graduate vs. ≤ high school graduate	0.65	0.21	--	4.00*	1.88-8.40
WORK BY 6 MONTHS	--	--	<0.0001	--	--
No work vs. work	0.55	0.10	--	3.02*	1.76-5.17

[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, route of delivery, and receipt of free formula

Table 4
Logistic Regression, Backward Elimination[&] for
At Least Some Breast Milk Feeding at 6 Months Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	0.0049	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.27	0.24	--	0.88	0.42-1.83
TM vs. TS	0.24	0.21	--	0.85	0.43-1.67
PM vs. TS	-0.92	0.19	--	0.27*	0.12-0.59
EDUCATION	--	--	<0.0001	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.03	0.22	--	2.5	0.99-6.43
≥College graduate vs. ≤ high school graduate	0.99	0.20	--	7.00*	3.00-16.59
WORK BY 6 MONTHS	--	--	0.015	--	--
No work vs. work	0.33	0.13	--	1.93*	1.14-3.27

[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, annual household income, route of delivery, and receipt of free formula

Table 5
Logistic Regression, Backward Elimination[&] for
Exclusive Breast Milk Feeding at 2 Weeks Postpartum

Variable	β Estimate	Standard Error	p value for Overall Analysis of Effect	Adjusted OR[#]	95% CI
GROUP	--	--	<0.0001	--	--
TS	--	--	--	1.0	--
PS vs. TS	0.34	0.21	--	0.62	0.31-1.23
TM vs. TS	-0.47	0.21	--	0.28*	0.14-0.54
PM vs. TS	-0.67	0.21	--	0.23*	0.11-0.45
EDUCATION	--	--	0.0004	--	--
≤high school graduate	--	--	--	1.0	--
Some college vs.≤high school graduate	0.14	0.19	--	2.44*	1.17-5.06
≥College graduate vs. ≤ high school graduate	0.62	0.17	--	3.93*	2.00-7.79
WORK BY 6 MONTHS	--	--	0.0081	--	--
No work vs. work	0.33	0.12	--	1.94*	1.19-3.17

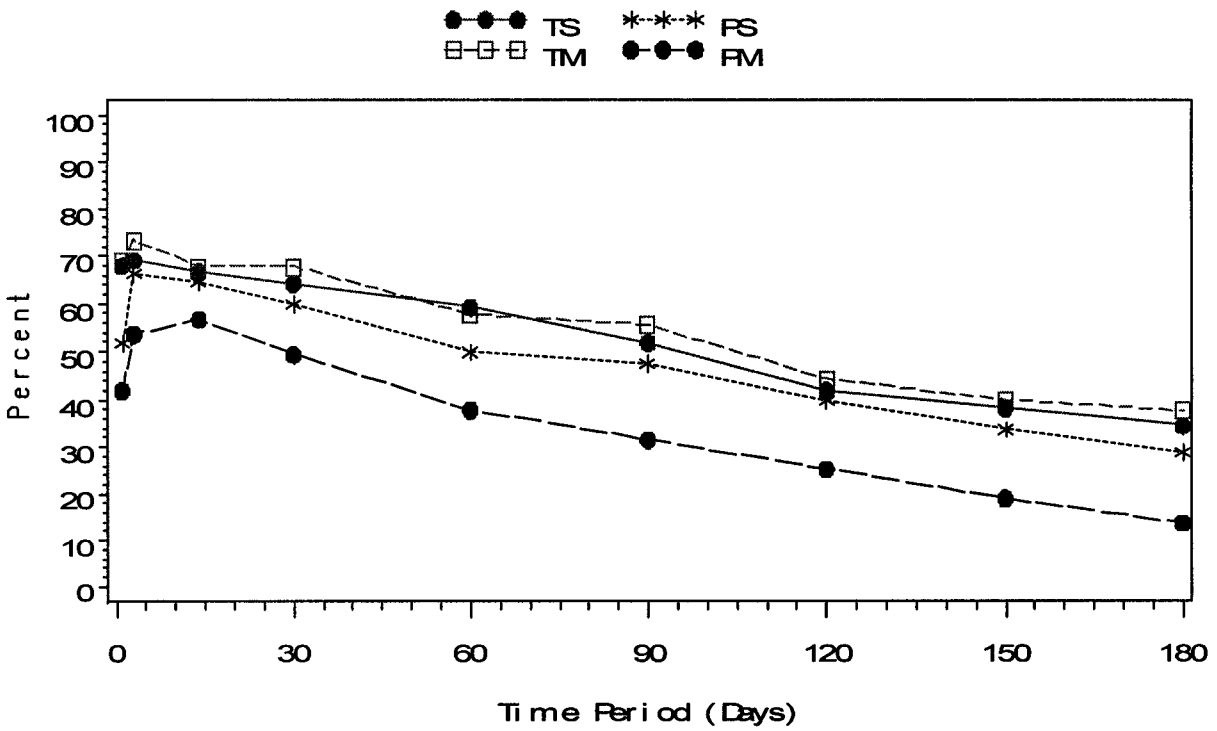
[&]Level of significance for backward elimination procedure was 0.05.

TS = Mothers of term singletons, PS = Mothers of preterm singletons, TM = Mothers of term multiples, PS = Mothers of preterm multiples

* Statistically significant (95% CI does not include 1.0)

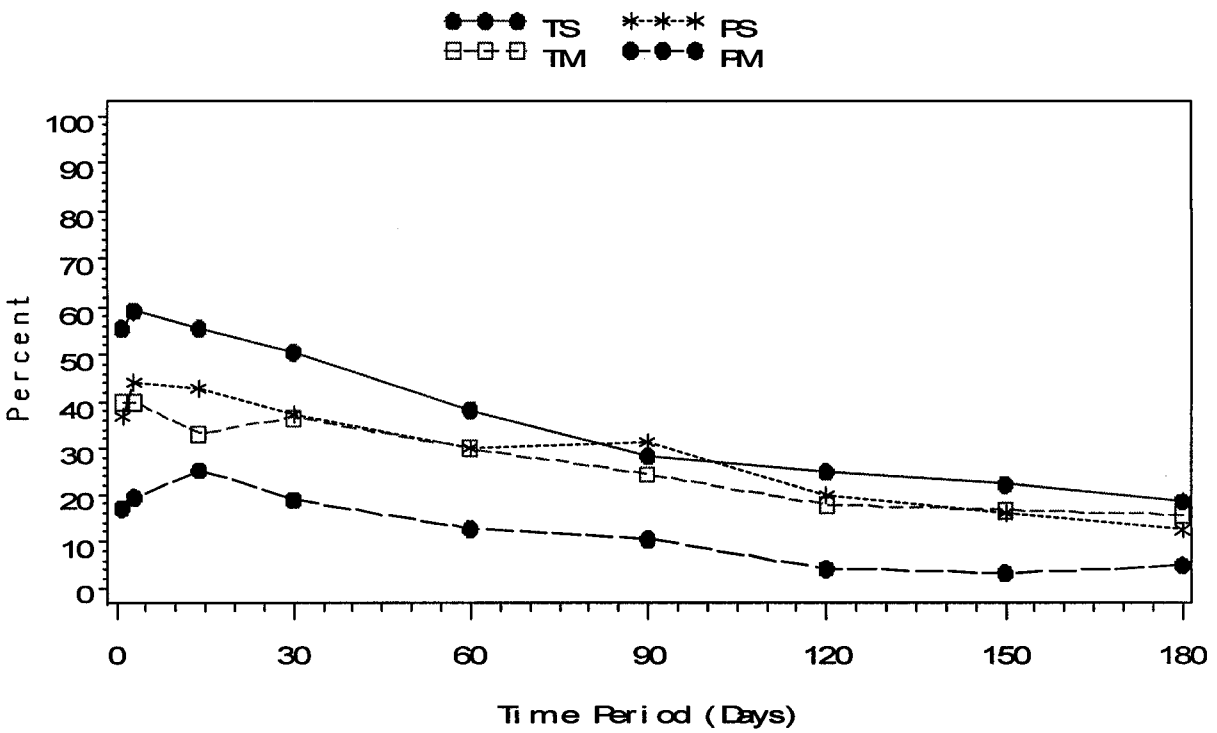
[#] Variables excluded from this model: maternal age, race/ethnic origin, marital status, annual household income, route of delivery, and receipt of free formula

Figure 1
Proportion of At Least Some Breast Milk Feeding Per Group Per time Period



TS=Mothers of term singletons, PS=Mothers of preterm singletons, TM=Mothers of term multiples, PM=Mothers of preterm multiples

Figure 2
Proportion of Exclusive Breast Milk Feeding Per Group per Time Period



TS=Mothers of term singletons, PS=Mothers of preterm singletons, TM=Mothers of term multiples, PM=Mothers of preterm multiples

APPENDIX J
LOGISTIC REGRESSION MODELING

Models 1-5:	Full Model, At Least Some Breast Milk
Models 5-10:	Full Model, Exclusive
Models 10-15:	Backward Elimination, At Least Some Breast Milk
Models 15-20:	Backward Elimination, Exclusive

Logistic Regression Modeling included the following variables (with codes):

Group
- 1 Term Singletons
- 2 Preterm Singletons
- 3 Term Multiples
- 4 Preterm Multiples

Delivery_collapse
- 0 Vaginal
- 1 C-Section

White_vs_Nonwhite
- 0 Non-white
- 1 White

Married_vs_Not_Married
- 0 Not Married
- 1 Married

Free_Formula
- 0 No
- 1 Yes

Income
- 1 <$14,999
- 2 $15,000-34,999
- 3 $35,000-54,999
- 4 $55,000-74,499
- 5 >$75,000

Education
- 1 ≤high school graduate
- 2 some college
- 3 ≥college graduate

Work_by_6_months
- 0 No
- 1 Yes

Maternal Age
- Continuous

Logistic Regression Output, Backward Elimination, 24 hours, Exclusive

Response Profile

Ordered Value	h24_ What_1	Total Frequency
1	5	119
2	1	196

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	27.0238	<.0001
Married_vs_Not_	1	5.7643	0.0164
Education	2	9.4665	0.0088

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-1.0823	0.2133	25.7463	<.0001
Group	2	1	0.1974	0.2284	0.7470	0.3874
Group	3	1	-0.0342	0.2061	0.0276	0.8680
Group	4	1	-1.0814	0.2440	19.6486	<.0001
Married_vs_Not	0	1	-0.5244	0.2184	5.7643	0.0164
Education	2	1	0.3424	0.1962	3.0456	0.0810
Education	3	1	0.4069	0.1846	4.8565	0.0275

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.486	0.239	0.991
Group	3 vs 1	0.386	0.198	0.750
Group	4 vs 1	0.135	0.063	0.289
Married_vs_Not	0 vs 1	0.350	0.149	0.825
Education	2 vs 1	2.979	1.348	6.583
Education	3 vs 1	3.178	1.486	6.796

Logistic Regression Output, Backward Elimination, 24 hours, At Least Some Breast Milk

Response Profile

Ordered Value	h24_ What_1	Total Frequency
1	2	186
2	1	129

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	13.1301	0.0044
Education	2	20.1485	<.0001

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.2213	0.1272	3.0241	0.0820
Group	2	1	-0.1776	0.2173	0.6687	0.4135
Group	3	1	0.3305	0.2093	2.4935	0.1143
Group	4	1	-0.6256	0.2028	9.5187	0.0020
Education	2	1	0.0863	0.1784	0.2343	0.6284
Education	3	1	0.6614	0.1655	15.9746	<.0001

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.522	0.256	1.065
Group	3 vs 1	0.867	0.432	1.742
Group	4 vs 1	0.333	0.168	0.660
Education	2 vs 1	2.303	1.193	4.444
Education	3 vs 1	4.092	2.207	7.588

Logistic Regression Output, Full Model, 24 hours, Exclusive (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.473	0.227	0.986
Group	3 vs 1	0.410	0.201	0.836
Group	4 vs 1	0.141	0.064	0.311
Mom_Age		1.011	0.955	1.070
Delivery_coll	0 vs 1	1.425	0.807	2.515
White_vs_Non	0 vs 1	0.556	0.178	1.734
Married_vs_Not	0 vs 1	0.343	0.099	1.192
Free_formu	0 vs 1	0.910	0.506	1.638
Income	2 vs 1	0.439	0.104	1.857
Income	3 vs 1	0.667	0.132	3.371
Income	4 vs 1	0.847	0.164	4.378
Income	5 vs 1	0.531	0.100	2.810
Education	2 vs 1	2.650	1.155	6.081
Education	3 vs 1	3.000	1.250	7.199
Work_by_6_m	0 vs 1	0.971	0.577	1.632

Logistic Regression Output, Full Model, 24 hours, Exclusive

Response Profile

Ordered Value	h24_ What_1	Total Frequency
1	5	119
2	1	196

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	23.5161	<.0001
Mom_Age	1	0.1422	0.7061
Delivery_c	1	1.4925	0.2218
White_vs_N	1	1.0239	0.3116
Married_vs_Not	1	2.8365	0.0921
Free_form	1	0.0986	0.7535
Income	4	3.6588	0.4541
Education	2	6.6814	0.0354
Work_by_6_m	1	0.0127	0.9103

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-1.6794	0.9528	3.1071	0.0780
Group	2	1	0.1525	0.2391	0.4071	0.5234
Group	3	1	0.00857	0.2166	0.0016	0.9684
Group	4	1	-1.0617	0.2512	17.8636	<.0001
Mom_Age		1	0.0109	0.0288	0.1422	0.7061
Delivery_coll	0	1	0.1771	0.1450	1.4925	0.2218
White_vs_No	0	1	-0.2936	0.2902	1.0239	0.3116
Married_vs_ N	0	1	-0.5353	0.3179	2.8365	0.0921
Free_formula_	0	1	-0.0471	0.1500	0.0986	0.7535
Income	2	1	-0.4173	0.3442	1.4697	0.2254
Income	3	1	0.000074	0.3143	0.0000	0.9998
Income	4	1	0.2395	0.3074	0.6067	0.4360
Income	5	1	-0.2275	0.3169	0.5154	0.4728
Education	2	1	0.2836	0.2063	1.8888	0.1693
Education	3	1	0.4075	0.2219	3.3717	0.0663
Work_by_6_m	0	1	-0.0149	0.1326	0.0127	0.9103

Logistic Regression Output, Full Model, 24 hours, At Least Some Breast Milk (cont.)

Work_by_6_months	0	1	0.2464	0.1313	3.5229	0.0605

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.454	0.212	0.973
Group	3 vs 1	0.687	0.321	1.470
Group	4 vs 1	0.273	0.129	0.577
Mom_Age		1.004	0.952	1.059
Delivery_	0 vs 1	1.414	0.822	2.431
White_vs_No	0 vs 1	1.569	0.585	4.209
Married_vs_Not	0 vs 1	0.698	0.258	1.887
Free_formula_	0 vs 1	0.978	0.556	1.720
Income	2 vs 1	0.582	0.181	1.874
Income	3 vs 1	1.772	0.455	6.902
Income	4 vs 1	1.487	0.369	5.992
Income	5 vs 1	1.418	0.347	5.795
Education	2 vs 1	1.949	0.953	3.985
Education	3 vs 1	2.980	1.378	6.443
Work_by_6_m	0 vs 1	1.637	0.978	2.739

Logistic Regression Output, Full Model, 24 hours, At Least Some Breast Milk

Response Profile

Ordered Value	h24_ What_1	Total Frequency
1	2	186
2	1	129

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	14.1559	0.0027
Mom_Age	1	0.0224	0.8810
Delivery_	1	1.5668	0.2107
White_vs_	1	0.8020	0.3705
Married_vs_Not	1	0.5025	0.4784
Free_formula_	1	0.0059	0.9389
Income	4	5.9380	0.2038
Education	2	7.7275	0.0210
Work_by_6_	1	3.5229	0.0605

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.0959	0.8587	0.0125	0.9111
Group	2	1	-0.1736	0.2350	0.5457	0.4601
Group	3	1	0.2405	0.2209	1.1855	0.2762
Group	4	1	-0.6825	0.2167	9.9162	0.0016
Mom_Age		1	0.00405	0.0270	0.0224	0.8810
Delivery_	0	1	0.1731	0.1383	1.5668	0.2107
White_vs_	0	1	0.2254	0.2516	0.8020	0.3705
Married_vs_	0	1	-0.1799	0.2538	0.5025	0.4784
Free_formula_	0	1	-0.0110	0.1439	0.0059	0.9389
Income	2	1	-0.6972	0.3041	5.2557	0.0219
Income	3	1	0.4168	0.2948	1.9992	0.1574
Income	4	1	0.2414	0.2926	0.6808	0.4093
Income	5	1	0.1942	0.2967	0.4284	0.5128
Education	2	1	0.0809	0.1924	0.1767	0.6743
Education	3	1	0.5056	0.2103	5.7820	0.0162

Logistic Regression Output, Full Model, 3 days, At Least Some Breast Milk

Response Profile

Ordered Value	d3_What_1	Total Frequency
1	2	216
2	1	108

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	9.1877	0.0269
Mom_Age	1	0.1811	0.6704
Delivery_colla	1	0.1128	0.7369
White_vs_No	1	0.1696	0.6804
Married_vs_Not	1	0.2510	0.6164
Free_formul	1	0.5382	0.4632
Income	4	9.1084	0.0584
Education	2	7.1144	0.0285
Work_by_6_m	1	13.6523	0.0002

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.8570	0.8649	0.9819	0.3217
Group	2	1	0.2926	0.2501	1.3691	0.2420
Group	3	1	0.0258	0.2361	0.0120	0.9129
Group	4	1	-0.6676	0.2228	8.9783	0.0027
Mom_Age		1	-0.0117	0.0274	0.1811	0.6704
Delivery_colla	0	1	0.0476	0.1416	0.1128	0.7369
White_vs_No	0	1	0.1061	0.2577	0.1696	0.6804
Married_vs_Not	0	1	-0.1194	0.2384	0.2510	0.6164
Free_formula_	0	1	-0.1067	0.1455	0.5382	0.4632
Income	2	1	-0.8158	0.2923	7.7874	0.0053
Income	3	1	0.1250	0.2841	0.1935	0.6600
Income	4	1	0.3398	0.2994	1.2882	0.2564
Income	5	1	0.6276	0.3086	4.1348	0.0420
Education	2	1	0.0269	0.1952	0.0190	0.8903
Education	3	1	0.5121	0.2174	5.5500	0.0185
Work_by_6_m	0	1	0.5154	0.1395	13.6523	0.0002

Logistic Regression Output, Full Model, 3 days, At Least Some Breast Milk (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.945	0.425	2.101
Group	3 vs 1	0.724	0.325	1.613
Group	4 vs 1	0.362	0.168	0.780
Mom_Age		0.988	0.937	1.043
Delivery_colla	0 vs 1	1.100	0.631	1.916
White_vs_No	0 vs 1	1.237	0.450	3.396
Married_vs_No	0 vs 1	0.788	0.309	2.005
Free_formula_	0 vs 1	0.808	0.457	1.429
Income	2 vs 1	0.583	0.189	1.800
Income	3 vs 1	1.494	0.407	5.490
Income	4 vs 1	1.852	0.475	7.227
Income	5 vs 1	2.470	0.620	9.837
Education	2 vs 1	1.761	0.874	3.549
Education	3 vs 1	2.861	1.321	6.194
Work_by_6_	0 vs 1	2.803	1.622	4.843

Logistic Regression Output, Full Model, 3 days, Exclusive

Response Profile

Ordered Value	d3_What_1	Total Frequency
1	5	132
2	1	192

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	28.6630	<.0001
Mom_Age	1	0.1010	0.7506
Delivery_colla	1	0.9395	0.3324
White_vs_No	1	0.2502	0.6169
Married_vs_Not	1	1.1472	0.2841
Free_formula_	1	0.5656	0.4520
Income	4	4.9487	0.2926
Education	2	6.3857	0.0411
Work_by_6_m	1	4.4799	0.0343

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.9406	0.8708	1.1667	0.2801
Group	2	1	0.3037	0.2263	1.8004	0.1797
Group	3	1	-0.2117	0.2126	0.9917	0.3193
Group	4	1	-1.0812	0.2374	20.7347	<.0001
Mom_Age		1	0.00866	0.0272	0.1010	0.7506
Delivery_colla	0	1	0.1323	0.1365	0.9395	0.3324
White_vs_Non	0	1	0.1261	0.2521	0.2502	0.6169
Married_vs_Not	0	1	-0.2880	0.2689	1.1472	0.2841
Free_formula_	0	1	-0.1085	0.1443	0.5656	0.4520
Income	2	1	-0.2418	0.3118	0.6013	0.4381
Income	3	1	0.3591	0.2897	1.5361	0.2152
Income	4	1	0.2385	0.2968	0.6454	0.4218
Income	5	1	-0.3258	0.3042	1.1468	0.2842
Education	2	1	0.1525	0.1974	0.5964	0.4400
Education	3	1	0.4495	0.2147	4.3843	0.0363
Work_by_6_m	0	1	0.2758	0.1303	4.4799	0.0343

Logistic Regression Output, Full Model, 3 days, Exclusive (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.504	0.246	1.030
Group	3 vs 1	0.301	0.147	0.615
Group	4 vs 1	0.126	0.058	0.273
Mom_Age		1.009	0.956	1.064
Delivery_colla	0 vs 1	1.303	0.763	2.225
White_vs_Non	0 vs 1	1.287	0.479	3.456
Married_vs_Not	0 vs 1	0.562	0.196	1.613
Free_formula_	0 vs 1	0.805	0.457	1.417
Income	2 vs 1	0.809	0.223	2.935
Income	3 vs 1	1.475	0.345	6.314
Income	4 vs 1	1.308	0.290	5.889
Income	5 vs 1	0.744	0.163	3.403
Education	2 vs 1	2.126	0.984	4.595
Education	3 vs 1	2.862	1.258	6.510
Work_by_6_m	0 vs 1	1.736	1.042	2.893

Logistic Regression Output, Backward Elimination, 3 days, At Least Some Breast Milk

Response Profile

Ordered Value	d3_What_1	Total Frequency
1	2	216
2	1	108

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	10.1986	0.0170
Income	4	11.7361	0.0194
Education	2	6.8913	0.0319
Work_by_6_m	1	14.9238	0.0001

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.5349	0.1386	14.8911	0.0001
Group	2	1	0.2980	0.2446	1.4849	0.2230
Group	3	1	0.0155	0.2304	0.0045	0.9463
Group	4	1	-0.6747	0.2155	9.8052	0.0017
Income	2	1	-0.8148	0.2840	8.2328	0.0041
Income	3	1	0.1326	0.2625	0.2550	0.6136
Income	4	1	0.3913	0.2694	2.1098	0.1464
Income	5	1	0.6556	0.2738	5.7342	0.0166
Education	2	1	0.00400	0.1914	0.0004	0.9833
Education	3	1	0.5057	0.2144	5.5648	0.0183
Work_by_6_m	0	1	0.5295	0.1371	14.9238	0.0001

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.939	0.426	2.071

Logistic Regression Output, Backward Elimination, 3 days, At Least Some Breast Milk

Group	3 vs 1	0.708	0.326	1.538
Group	4 vs 1	0.355	0.169	0.746
Income	2 vs 1	0.638	0.237	1.713
Income	3 vs 1	1.644	0.604	4.479
Income	4 vs 1	2.130	0.751	6.040
Income	5 vs 1	2.774	0.969	7.943
Education	2 vs 1	1.671	0.844	3.311
Education	3 vs 1	2.760	1.293	5.891
Work_by_6_m	0 vs 1	2.884	1.685	4.935

Logistic Regression Output, Backward Elimination, 3 days, Exclusive

Response Profile

Ordered Value	d3_What_1	Total Frequency
1	5	132
2	1	192

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	30.7190	<.0001
Education	2	11.9273	0.0026
Work_by_6_	1	5.4115	0.0200

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.5514	0.1355	16.5662	<.0001
Group	2	1	0.3403	0.2168	2.4625	0.1166
Group	3	1	-0.1937	0.2040	0.9017	0.3423
Group	4	1	-1.0673	0.2286	21.8062	<.0001
Education	2	1	0.1985	0.1852	1.1494	0.2837
Education	3	1	0.4924	0.1697	8.4198	0.0037
Work_by_6_	0	1	0.2925	0.1257	5.4115	0.0200

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.560	0.282	1.111
Group	3 vs 1	0.328	0.168	0.639
Group	4 vs 1	0.137	0.066	0.283
Education	2 vs 1	2.434	1.188	4.986
Education	3 vs 1	3.265	1.668	6.392
Work_by_6_m	0 vs 1	1.795	1.096	2.938

Logistic Regression Output, Full Model, 2 weeks, At Least Some Breast Milk

Response Profile

Ordered Value	w2_What_1	Total Frequency
1	2	213
2	1	115

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	5.4844	0.1396
Mom_Age	1	0.0031	0.9554
Delivery_colla	1	0.0447	0.8326
White_vs_Non	1	0.0025	0.9601
Married_vs_Not	1	0.1257	0.7229
Free_formula_	1	1.0337	0.3093
Income	4	8.0796	0.0887
Education	2	12.5991	0.0018
Work_by_6_m	1	14.8426	0.0001

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.2947	0.8639	0.1163	0.7330
Group	2	1	0.3729	0.2516	2.1972	0.1383
Group	3	1	-0.2095	0.2336	0.8041	0.3699
Group	4	1	-0.4379	0.2233	3.8446	0.0499
Mom_Age		1	-0.00154	0.0275	0.0031	0.9554
Delivery_colla	0	1	0.0301	0.1422	0.0447	0.8326
White_vs_No	0	1	-0.0125	0.2499	0.0025	0.9601
Married_vs_No	0	1	-0.0843	0.2377	0.1257	0.7229
Free_formula_	0	1	-0.1464	0.1440	1.0337	0.3093
Income	2	1	-0.5239	0.2671	3.3304	0.0680
Income	3	1	-0.1014	0.2800	0.1310	0.7173
Income	4	1	0.5864	0.3056	3.6828	0.0550
Income	5	1	0.6379	0.3061	4.3439	0.0371
Education	2	1	0.0965	0.1948	0.2455	0.6203
Education	3	1	0.6379	0.2124	9.0156	0.0027
Work_by_6_m	0	1	0.5395	0.1400	14.8426	0.0001

Logistic Regression Output, Full Model, 2 weeks, At Least Some Breast Milk (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	1.103	0.496	2.454
Group	3 vs 1	0.616	0.279	1.360
Group	4 vs 1	0.490	0.228	1.056
Mom_Age		0.998	0.946	1.054
Delivery_colla	0 vs 1	1.062	0.608	1.855
White_vs_No	0 vs 1	0.975	0.366	2.598
Married_vs_Not	0 vs 1	0.845	0.333	2.145
Free_formula_	0 vs 1	0.746	0.424	1.312
Income	2 vs 1	1.078	0.335	3.470
Income	3 vs 1	1.645	0.430	6.295
Income	4 vs 1	3.272	0.800	13.389
Income	5 vs 1	3.445	0.835	14.219
Education	2 vs 1	2.295	1.135	4.640
Education	3 vs 1	3.944	1.843	8.439
Work_by_6_	0 vs 1	2.942	1.699	5.093

Logistic Regression Output, Full Model, 2 weeks, Exclusive

Response Profile

Ordered Value	w2_What_1	Total Frequency
1	5	129
2	1	199

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	20.5308	0.0001
Mom_Age	1	0.0202	0.8870
Delivery_colla	1	0.5243	0.4690
White_vs_Non	1	0.7033	0.4017
Married_vs_Not_	1	0.4458	0.5043
Free_formula_	1	1.3745	0.2410
Income	4	2.9470	0.5667
Education	2	5.6812	0.0584
Work_by_6_mont	1	5.6374	0.0176

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.9384	0.8757	1.1485	0.2839
Group	2	1	0.4082	0.2267	3.2419	0.0718
Group	3	1	-0.4883	0.2180	5.0191	0.0251
Group	4	1	-0.7070	0.2214	10.1970	0.0014
Mom_Age		1	-0.00388	0.0273	0.0202	0.8870
Delivery_colla	0	1	0.0983	0.1357	0.5243	0.4690
White_vs_Non	0	1	-0.2260	0.2694	0.7033	0.4017
Married_vs_Not	0	1	-0.1752	0.2624	0.4458	0.5043
Free_formula_	0	1	-0.1686	0.1438	1.3745	0.2410
Income	2	1	-0.2138	0.3044	0.4930	0.4826
Income	3	1	-0.2236	0.2946	0.5764	0.4477
Income	4	1	0.3958	0.2920	1.8376	0.1752
Income	5	1	0.1767	0.2974	0.3531	0.5524
Education	2	1	0.1452	0.1963	0.5474	0.4594
Education	3	1	0.4174	0.2072	4.0564	0.0440

Logistic Regression Output, Full Model, 2 weeks, Exclusive (Cont.)

Work_by_6_months	0	1	0.3064	0.1290	5.6374	0.0176

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.685	0.337	1.391
Group	3 vs 1	0.279	0.136	0.575
Group	4 vs 1	0.224	0.108	0.465
Mom_Age		0.996	0.944	1.051
Delivery_colla	0 vs 1	1.217	0.715	2.072
White_vs_Non	0 vs 1	0.636	0.221	1.830
Married_vs_Not	0 vs 1	0.704	0.252	1.970
Free_formula_	0 vs 1	0.714	0.406	1.254
Income	2 vs 1	0.924	0.251	3.399
Income	3 vs 1	0.915	0.208	4.024
Income	4 vs 1	1.701	0.375	7.718
Income	5 vs 1	1.366	0.296	6.298
Education	2 vs 1	2.030	0.933	4.413
Education	3 vs 1	2.664	1.187	5.982
Work_by_6_m	0 vs 1	1.845	1.113	3.060

Logistic Regression Output, Backward Elimination, 2 weeks, At Least Some Breast Milk

Response Profile

Ordered Value	w2_What_1	Total Frequency
1	2	213
2	1	115

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	5.9292	0.1151
Income	4	13.0540	0.0110
Education	2	13.1589	0.0014
Work_by_6_	1	16.2223	<.0001

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.3484	0.1421	6.0142	0.0142
Group	2	1	0.3608	0.2461	2.1492	0.1426
Group	3	1	-0.2244	0.2278	0.9703	0.3246
Group	4	1	-0.4229	0.2155	3.8491	0.0498
Income	2	1	-0.5338	0.2780	3.6881	0.0548
Income	3	1	-0.0676	0.2581	0.0685	0.7935
Income	4	1	0.6668	0.2747	5.8937	0.0152
Income	5	1	0.6823	0.2689	6.4380	0.0112
Education	2	1	0.0803	0.1906	0.1773	0.6737
Education	3	1	0.6503	0.2091	9.6697	0.0019
Work_by_6_m	0	1	0.5528	0.1373	16.2223	<.0001

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	1.077	0.488	2.379
Group	3 vs 1	0.600	0.279	1.290

Logistic Regression Output, Backward Elimination, 2 weeks, At Least Some Breast Milk

Group	4 vs 1	0.492	0.235	1.031
Income	2 vs 1	1.238	0.441	3.477
Income	3 vs 1	1.974	0.696	5.600
Income	4 vs 1	4.115	1.385	12.220
Income	5 vs 1	4.179	1.416	12.330
Education	2 vs 1	2.250	1.130	4.478
Education	3 vs 1	3.978	1.883	8.403
Work_by_6_m	0 vs 1	3.021	1.764	5.174

Logistic Regression Output, Backward Elimination, 2 weeks, Exclusive

Response Profile

Ordered Value	w2_What_1	Total Frequency
1	5	129
2	1	199

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	22.9936	<.0001
Education	2	15.7014	0.0004
Work_by_6_m	1	7.0106	0.0081

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.6462	0.1366	22.3683	<.0001
Group	2	1	0.3361	0.2147	2.4502	0.1175
Group	3	1	-0.4755	0.2088	5.1879	0.0227
Group	4	1	-0.6727	0.2128	9.9944	0.0016
Education	2	1	0.1373	0.1855	0.5474	0.4594
Education	3	1	0.6160	0.1694	13.2245	0.0003
Work_by_6_	0	1	0.3307	0.1249	7.0106	0.0081

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.621	0.314	1.229
Group	3 vs 1	0.276	0.140	0.544
Group	4 vs 1	0.227	0.114	0.452
Education	2 vs 1	2.437	1.174	5.058
Education	3 vs 1	3.933	1.985	7.792
Work_by_6_	0 vs 1	1.938	1.187	3.162

Logistic Regression Output, Full Model, 1 Month, At Least Some Breast Milk

Response Profile

Ordered Value	m1_What_1	Total Frequency
1	2	202
2	1	127

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	6.9423	0.0738
Mom_Age	1	0.1131	0.7367
Delivery_colla	1	2.4118	0.1204
White_vs_Nonwhit	1	0.1664	0.6833
Married_vs_Not_M	1	1.1067	0.2928
Free_formula_	1	3.4264	0.0642
Income	4	5.2062	0.2668
Education	2	12.0166	0.0025
Work_by_6_mont	1	10.1062	0.0015

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	0.1001	0.8641	0.0134	0.9078
Group	2	1	0.2960	0.2447	1.4640	0.2263
Group	3	1	0.0588	0.2297	0.0655	0.7981
Group	4	1	-0.5705	0.2179	6.8541	0.0088
Mom_Age		1	-0.00916	0.0272	0.1131	0.7367
Delivery_colla	0	1	0.2178	0.1403	2.4118	0.1204
White_vs_Non	0	1	-0.1024	0.2510	0.1664	0.6833
Married_vs_Not	0	1	-0.2545	0.2419	1.1067	0.2928
Free_formula_	0	1	-0.2624	0.1417	3.4264	0.0642
Income	2	1	-0.4426	0.2892	2.3424	0.1259
Income	3	1	0.0145	0.2799	0.0027	0.9587
Income	4	1	0.2682	0.2946	0.8291	0.3625
Income	5	1	0.6136	0.3005	4.1694	0.0412
Education	2	1	0.1197	0.1925	0.3869	0.5339
Education	3	1	0.6037	0.2063	8.5648	0.0034
Work_by_6_m	0	1	0.4308	0.1355	10.1062	0.0015

Logistic Regression Output, Full Model, 1 Month, At Least Some Breast Milk (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	1.084	0.496	2.367
Group	3 vs 1	0.855	0.392	1.864
Group	4 vs 1	0.456	0.215	0.965
Mom_Age		0.991	0.939	1.045
Delivery_collap	0 vs 1	1.546	0.892	2.679
White_vs_Nonw	0 vs 1	0.815	0.305	2.179
Married_vs_Not	0 vs 1	0.601	0.233	1.552
Free_formula_	0 vs 1	0.592	0.339	1.031
Income	2 vs 1	1.011	0.307	3.325
Income	3 vs 1	1.597	0.412	6.183
Income	4 vs 1	2.058	0.503	8.416
Income	5 vs 1	2.907	0.700	12.075
Education	2 vs 1	2.324	1.143	4.724
Education	3 vs 1	3.770	1.776	8.004
Work_by_6_m	0 vs 1	2.367	1.392	4.026

Logistic Regression Output, Full Model, 1 Month, Exclusive

Response Profile

Ordered Value	m1_What_1	Total Frequency
1	5	120
2	1	209

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	20.6588	0.0001
Mom_Age	1	0.0439	0.8340
Delivery_collapse	1	0.3250	0.5686
White_vs_Nonwhite	1	1.8784	0.1705
Married_vs_Not_Ma	1	0.3018	0.5827
Free_formula_	1	0.4355	0.5093
Income	4	3.4771	0.4814
Education	2	6.7317	0.0345
Work_by_6_mon	1	7.6632	0.0056

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-1.5171	0.9117	2.7691	0.0961
Group	2	1	0.3967	0.2310	2.9491	0.0859
Group	3	1	-0.1783	0.2174	0.6725	0.4122
Group	4	1	-0.9557	0.2382	16.0969	<.0001
Mom_Age		1	0.00589	0.0281	0.0439	0.8340
Delivery_collap	0	1	0.0797	0.1397	0.3250	0.5686
White_vs_Non	0	1	-0.3899	0.2845	1.8784	0.1705
Married_vs_Not	0	1	-0.1501	0.2732	0.3018	0.5827
Free_formula_	0	1	-0.0969	0.1469	0.4355	0.5093
Income	2	1	0.1364	0.3100	0.1936	0.6600
Income	3	1	-0.4339	0.3122	1.9313	0.1646
Income	4	1	0.1902	0.3009	0.3997	0.5272
Income	5	1	0.2567	0.3071	0.6988	0.4032
Education	2	1	0.1049	0.2023	0.2690	0.6040
Education	3	1	0.5133	0.2159	5.6516	0.0174
Work_by_6_m	0	1	0.3668	0.1325	7.6632	0.0056

Logistic Regression Output, Full Model, 1 Month, Exclusive (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.711	0.350	1.447
Group	3 vs 1	0.400	0.196	0.817
Group	4 vs 1	0.184	0.086	0.394
Mom_Age		1.006	0.952	1.063
Delivery_colla	0 vs 1	1.173	0.678	2.028
White_vs_Non	0 vs 1	0.459	0.150	1.398
Married_vs_	0 vs 1	0.741	0.254	2.161
Free_formula_	0 vs 1	0.824	0.463	1.465
Income	2 vs 1	1.331	0.340	5.213
Income	3 vs 1	0.752	0.156	3.625
Income	4 vs 1	1.405	0.286	6.909
Income	5 vs 1	1.501	0.300	7.511
Education	2 vs 1	2.061	0.910	4.666
Education	3 vs 1	3.101	1.317	7.299
Work_by_6_mon	0 vs 1	2.083	1.239	3.501

Logistic Regression Output, Backward Elimination, 1 Month, At Least Some Breast Milk

Ordered Value	Total m1_What_1	Frequency
1	2	202
2	1	127

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	8.6362	0.0345
Married_vs_Not	1	6.5583	0.0104
Free_formula_	1	4.2259	0.0398
Education	2	21.8657	<.0001
Work_by_6_mo	1	8.4478	0.0037

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.1085	0.1789	0.3678	0.5442
Group	2	1	0.2956	0.2350	1.5832	0.2083
Group	3	1	0.0437	0.2207	0.0392	0.8430
Group	4	1	-0.6043	0.2088	8.3794	0.0038
Married_vs_Not	0	1	-0.4712	0.1840	6.5583	0.0104
Free_formula_	0	1	-0.2812	0.1368	4.2259	0.0398
Education	2	1	0.1016	0.1835	0.3067	0.5797
Education	3	1	0.7461	0.1805	17.0906	<.0001
Work_by_6_m	0	1	0.3796	0.1306	8.4478	0.0037

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	1.031	0.484	2.196
Group	3 vs 1	0.802	0.384	1.671
Group	4 vs 1	0.419	0.207	0.851
Married_vs_Not	0 vs 1	0.390	0.189	0.802
Free_formula_	0 vs 1	0.570	0.333	0.974
Education	2 vs 1	2.584	1.312	5.090
Education	3 vs 1	4.922	2.522	9.606
Work_by_6_m	0 vs 1	2.136	1.280	3.564

Logistic Regression Output, Backward Elimination, 1 Month, Exclusive

Response Profile

Ordered Value	m1_What_1	Total Frequency
1	5	120
2	1	209

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	23.4259	<.0001
Education	2	16.7410	0.0002
Work_by_6_month	1	9.4526	0.0021

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-0.8221	0.1432	32.9611	<.0001
Group	2	1	0.3119	0.2192	2.0256	0.1547
Group	3	1	-0.1846	0.2078	0.7897	0.3742
Group	4	1	-0.9298	0.2304	16.2908	<.0001
Education	2	1	0.1006	0.1921	0.2746	0.6003
Education	3	1	0.6756	0.1742	15.0443	0.0001
Work_by_6_m	0	1	0.3937	0.1280	9.4526	0.0021

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.612	0.308	1.219
Group	3 vs 1	0.373	0.190	0.730
Group	4 vs 1	0.177	0.085	0.366
Education	2 vs 1	2.403	1.120	5.159
Education	3 vs 1	4.271	2.094	8.712
Work_by_6_m	0 vs 1	2.198	1.330	3.630

Logistic Regression Output, Full Model, 6 Months, At Least Some Breast Milk

Response Profile

Ordered Value	m6_What_1	Total Frequency
1	2	96
2	1	232

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	13.0103	0.0046
Mom_Age	1	0.6330	0.4263
Delivery_collapse	1	0.1341	0.7142
White_vs_Nonwhit	1	0.0557	0.8134
Married_vs_Not_M	1	0.2154	0.6426
Free_formula_	1	0.8042	0.3699
Income	4	2.0987	0.7176
Education	2	10.9961	0.0041
Work_by_6_mont	1	5.0157	0.0251

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-2.3917	1.0099	5.6088	0.0179
Group	2	1	0.2965	0.2469	1.4427	0.2297
Group	3	1	0.2070	0.2219	0.8701	0.3509
Group	4	1	-0.9507	0.2657	12.8030	0.0003
Mom_Age		1	0.0243	0.0305	0.6330	0.4263
Delivery_collap	0	1	0.0541	0.1478	0.1341	0.7142
White_vs_Non	0	1	0.0685	0.2903	0.0557	0.8134
Married_vs_No	0	1	-0.1532	0.3301	0.2154	0.6426
Free_formula_	0	1	-0.1439	0.1604	0.8042	0.3699
Income	2	1	0.2047	0.3953	0.2680	0.6047
Income	3	1	0.2470	0.3777	0.4277	0.5131
Income	4	1	0.4993	0.3710	1.8107	0.1784
Income	5	1	0.2913	0.3755	0.6018	0.4379
Education	2	1	-0.0632	0.2343	0.0728	0.7873
Education	3	1	0.7826	0.2360	10.9924	0.0009
Work_by_6_m	0	1	0.3112	0.1389	5.0157	0.0251

Logistic Regression Output, Full Model, 6 Months, At Least Some Breast Milk (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.860	0.401	1.843
Group	3 vs 1	0.787	0.378	1.635
Group	4 vs 1	0.247	0.107	0.569
Mom_Age		1.025	0.965	1.088
Delivery_colla	0 vs 1	1.114	0.624	1.989
White_vs_Nonw	0 vs 1	1.147	0.368	3.578
Married_vs_Not	0 vs 1	0.736	0.202	2.685
Free_formula_	0 vs 1	0.750	0.400	1.407
Income	2 vs 1	4.250	0.412	43.841
Income	3 vs 1	4.433	0.367	53.522
Income	4 vs 1	5.705	0.465	70.038
Income	5 vs 1	4.634	0.375	57.322
Education	2 vs 1	1.927	0.719	5.167
Education	3 vs 1	4.490	1.667	12.098
Work_by_6_m	0 vs 1	1.863	1.081	3.212

Logistic Regression Output, Full Model, 6 Months, Exclusive

Response Profile

Ordered Value	m6_What_1	Total Frequency
1	5	40
2	1	288

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	9.3507	0.0250
Mom_Age	1	0.0037	0.9512
Delivery_collapse	1	0.1220	0.7268
White_vs_Nonwhit	1	1.1493	0.2837
Married_vs_Not_Ma	1	0.9272	0.3356
Free_formula_	1	0.0071	0.9327
Income	4	0.4066	0.9819
Education	2	5.0919	0.0784
Work_by_6_mont	1	2.8886	0.0892

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-3.4531	1.4410	5.7422	0.0166
Group	2	1	0.4522	0.3473	1.6951	0.1929
Group	3	1	0.3358	0.3271	1.0538	0.3046
Group	4	1	-1.6106	0.5617	8.2233	0.0041
Mom_Age		1	0.00256	0.0418	0.0037	0.9512
Delivery_collap	0	1	0.0709	0.2031	0.1220	0.7268
White_vs_Non	0	1	-0.5826	0.5434	1.1493	0.2837
Married_vs_No	0	1	-0.4760	0.4943	0.9272	0.3356
Free_formula_	0	1	0.0181	0.2137	0.0071	0.9327
Income	2	1	0.2693	0.4877	0.3050	0.5808
Income	3	1	0.00270	0.4712	0.0000	0.9954
Income	4	1	-0.1531	0.4736	0.1045	0.7465
Income	5	1	-0.0211	0.4706	0.0020	0.9643
Education	2	1	-0.5740	0.3404	2.8433	0.0918
Education	3	1	0.6252	0.3221	3.7666	0.0523
Work_by_6_	0	1	0.3227	0.1899	2.8886	0.0892

Logistic Regression Output, Full Model, 6 Months, Exclusive (Cont.)

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.690	0.275	1.733
Group	3 vs 1	0.615	0.247	1.529
Group	4 vs 1	0.088	0.018	0.418
Mom_Age		1.003	0.924	1.088
Delivery_collap	0 vs 1	1.152	0.520	2.555
White_vs_Non	0 vs 1	0.312	0.037	2.625
Married_vs_Not	0 vs 1	0.386	0.056	2.680
Free_formula_	0 vs 1	1.037	0.449	2.396
Income	2 vs 1	1.444	0.108	19.210
Income	3 vs 1	1.106	0.066	18.661
Income	4 vs 1	0.946	0.054	16.558
Income	5 vs 1	1.080	0.061	19.240
Education	2 vs 1	0.593	0.163	2.156
Education	3 vs 1	1.967	0.571	6.769
Work_by_6_m	0 vs 1	1.907	0.906	4.013

Logistic Regression Output, Backward Elimination, 6 Months, At Least Some Breast Milk

Response Profile

Ordered Value	m6_What_1	Total Frequency
1	2	96
2	1	232

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	12.9030	0.0049
Education	2	25.5318	<.0001
Work_by_6_	1	5.9811	0.0145

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-1.3367	0.1721	60.3264	<.0001
Group	2	1	0.2740	0.2355	1.3530	0.2448
Group	3	1	0.2419	0.2129	1.2900	0.2560
Group	4	1	-0.9188	0.2576	12.7252	0.0004
Education	2	1	-0.0317	0.2232	0.0202	0.8870
Education	3	1	0.9894	0.1959	25.5084	<.0001
Work_by_6_m	0	1	0.3292	0.1346	5.9811	0.0145

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.879	0.422	1.831
Group	3 vs 1	0.851	0.429	1.687
Group	4 vs 1	0.267	0.121	0.590
Education	2 vs 1	2.524	0.991	6.429
Education	3 vs 1	7.009	2.962	16.585
Work_by_6_m	0 vs 1	1.932	1.140	3.274

Logistic Regression Output, Backward Elimination, 6 Months, Exclusive

Response Profile

Ordered Value	m6_What_1	Total Frequency
1	5	40
2	1	288

Type III Analysis of Effects

Effect	DF	Wald Chi-Square	Pr > ChiSq
Group	3	10.5406	0.0145
Education	2	7.3692	0.0251
Work_by_6_month	1	4.1118	0.0426

Analysis of Maximum Likelihood Estimates

Parameter		DF	Estimate	Standard Error	Chi-Square	Pr > ChiSq
Intercept		1	-2.4921	0.2628	89.9553	<.0001
Group	2	1	0.4114	0.3361	1.4982	0.2209
Group	3	1	0.3229	0.3152	1.0496	0.3056
Group	4	1	-1.6197	0.5561	8.4825	0.0036
Education	2	1	-0.5355	0.3292	2.6460	0.1038
Education	3	1	0.6567	0.2512	6.8366	0.0089
Work_by_6_m	0	1	0.3720	0.1835	4.1118	0.0426

Odds Ratio Estimates

Effect		Point Estimate	95% Wald Confidence Limits	
Group	2 vs 1	0.622	0.252	1.535
Group	3 vs 1	0.570	0.245	1.326
Group	4 vs 1	0.082	0.018	0.376
Education	2 vs 1	0.661	0.198	2.201
Education	3 vs 1	2.177	0.832	5.698
Work_by_6_	0 vs 1	2.104	1.025	4.319

APPENDIX K
SAS PROGRAM

```
*APPENDIX J: SAS PROGRAM;

libname lib 'r:all\sheela\survey files';run;

*All Responders-At Least Some Breast Milk Feeding;
data responders;
set lib.table8_20_02;
if any_bf>=0;*keeps only those with survey information;
l_weeks=log(longest_weeks_duration);
sq_weeks=sqrt(longest_weeks_duration);
at_6_months_all=bf_at_6_months_;
if at_6_months_all =. and initiate_bf ne . then at_6_months_all=0;
if education=2 then education=1;
if education=3 then education=1;
if education=4 then education=2;
if education=5 then education=3;
if education=6 then education=3;
if parity_all=4 then parity_all=3;
if pre_delivery_hosp_days=4 then pre_delivery_hosp_days=3;
if delivery_collapse=1 then delivery_collapse=0;
if delivery_collapse=2 then delivery_collapse=1;
if white_vs_nonwhite=1 then white_vs_nonwhite=0;
if white_vs_nonwhite=2 then white_vs_nonwhite=1;
if married_vs_not_married=1 then married_vs_not_married=0;
if married_vs_not_married=2 then married_vs_not_married=1;
format _all_;

if h24_how_1=3 then h24_how_1=2;
if d3_how_1=3 then d3_how_1=2;
if w2_how_1=3 then w2_how_1=2;
if m1_how_1=3 then m1_how_1=2;
if m2_how_1=3 then m2_how_1=2;
if m3_how_1=3 then m3_how_1=2;
if m4_how_1=3 then m4_how_1=2;
if m5_how_1=3 then m5_how_1=2;
if m6_how_1=3 then m6_how_1=2;

if h24_what_1=1 then h24_what_1=1;
if h24_what_1=2 then h24_what_1=2;
if h24_what_1=3 then h24_what_1=2;
if h24_what_1=4 then h24_what_1=2;
if h24_what_1=5 then h24_what_1=2;
if h24_what_1=6 then h24_what_1=.;

if d3_what_1=1 then d3_what_1=1;
if d3_what_1=2 then d3_what_1=2;
```

```
if d3_what_1=3 then d3_what_1=2;
if d3_what_1=4 then d3_what_1=2;
if d3_what_1=5 then d3_what_1=2;
if d3_what_1=6 then d3_what_1=.;

if w2_what_1=1 then w2_what_1=1;
if w2_what_1=2 then w2_what_1=2;
if w2_what_1=3 then w2_what_1=2;
if w2_what_1=4 then w2_what_1=2;
if w2_what_1=5 then w2_what_1=2;
if w2_what_1=6 then w2_what_1=.;

if m1_what_1=1 then m1_what_1=1;
if m1_what_1=2 then m1_what_1=2;
if m1_what_1=3 then m1_what_1=2;
if m1_what_1=4 then m1_what_1=2;
if m1_what_1=5 then m1_what_1=2;
if m1_what_1=6 then m1_what_1=.;

if m2_what_1=1 then m2_what_1=1;
if m2_what_1=2 then m2_what_1=2;
if m2_what_1=3 then m2_what_1=2;
if m2_what_1=4 then m2_what_1=2;
if m2_what_1=5 then m2_what_1=2;
if m2_what_1=6 then m2_what_1=.;

if m3_what_1=1 then m3_what_1=1;
if m3_what_1=2 then m3_what_1=2;
if m3_what_1=3 then m3_what_1=2;
if m3_what_1=4 then m3_what_1=2;
if m3_what_1=5 then m3_what_1=2;
if m3_what_1=6 then m3_what_1=.;


if m4_what_1=1 then m4_what_1=1;
if m4_what_1=2 then m4_what_1=2;
if m4_what_1=3 then m4_what_1=2;
if m4_what_1=4 then m4_what_1=2;
if m4_what_1=5 then m4_what_1=2;
if m4_what_1=6 then m4_what_1=.;


if m5_what_1=1 then m5_what_1=1;
if m5_what_1=2 then m5_what_1=2;
if m5_what_1=3 then m5_what_1=2;
if m5_what_1=4 then m5_what_1=2;
```

```
if m5_what_1=5 then m5_what_1=2;
if m5_what_1=6 then m5_what_1=.;

if m6_what_1=1 then m6_what_1=1;
if m6_what_1=2 then m6_what_1=2;
if m6_what_1=3 then m6_what_1=2;
if m6_what_1=4 then m6_what_1=2;
if m6_what_1=5 then m6_what_1=2;
if m6_what_1=6 then m6_what_1=.;
format _all_;
proc print;
run;


proc contents data=responders position; run;

proc freq data=responders;
tables (group)*(    at_6_months_all __living
                    weeks_pregnant
                    term__
                    any_bf
                    initiate_bf
                    bf_at_6_months_
                    delivery_collapse
                    white_vs_nonwhite          pre_delivery_hosp_days
                    married_vs_not_married     free_formula_
                    income
                    education
                    parity_collapse
                    work_by_6_months
               )/chisq;run;

proc means n mean std median q1 q3 min max data=responders;
class group; var mom_age; run;

proc glm; class group;run;
model mom_age=group;
means group/SNK;
run;


proc freq data=responders;
tables (group)*(    initiate_bf
               )/chisq;run;

proc freq data=responders;
```

```
tables (initiate_bf)*(  __living
                    weeks_pregnant
                    term__
                    any_bf
                    bf_at_6_months_
                    at_6_months_all              delivery_collapse
                    white_vs_nonwhite            pre_delivery_hosp_days
                    married_vs_not_married       free_formula_
                    income
                    education
                    parity_collapse
                    work_by_6_months
                )/chisq;run;


proc freq data=responders;
tables (at_6_months_all)*(  __living
                    weeks_pregnant
                    term__
                    any_bf
                    initiate_bf
                    bf_at_6_months_              delivery_collapse
                    white_vs_nonwhite            pre_delivery_hosp_days
                    married_vs_not_married       free_formula_
                    income
                    education
                    parity_collapse
                    work_by_6_months
                )/chisq;run;

proc freq data=responders;
tables (group)* (h24_what_1 d3_what_1 w2_what_1 m1_what_1  m2_what_1 m3
                m4_what_1 m5_what_1 m6_what_1
                )/chisq;run;

proc NPar1way wilcoxon;
class group;
var h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*not Sig;
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*Sig;
```

```
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*Sig;
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*Sig;
class group;
var  d3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  d3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  d3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  w2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*NSig*;
class group;
var  w2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  w2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m2_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
```

```
class group;
var  m2_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m3_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m3_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m4_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m4_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m4_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
```

```
var  m5_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m5_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m5_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m6_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m6_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m6_what_1;
run;



proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m6_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m6_what_1;
run;
```

```
proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m6_what_1;
run;



*Twins Only-At Least Some Breast Milk Feeding;
data responders_twins_only;
set lib.table8_20_02;
if __living<=2;
if any_bf>=0;*keeps only those with survey information;
l_weeks=log(longest_weeks_duration);
sq_weeks=sqrt(longest_weeks_duration);
at_6_months_all=bf_at_6_months_;
if at_6_months_all =. and initiate_bf ne . then at_6_months_all=0;
if education=2 then education=1;
if education=3 then education=1;
if education=4 then education=2;
if education=5 then education=3;
if education=6 then education=3;
if parity_all=4 then parity_all=3;
if pre_delivery_hosp_days=4 then pre_delivery_hosp_days=3;
if delivery_collapse=1 then delivery_collapse=0;
if delivery_collapse=2 then delivery_collapse=1;
if white_vs_nonwhite=1 then white_vs_nonwhite=0;
if white_vs_nonwhite=2 then white_vs_nonwhite=1;
if married_vs_not_married=1 then married_vs_not_married=0;
if married_vs_not_married=2 then married_vs_not_married=1;
format _all_;

if h24_how_1=3 then h24_how_1=2;
if d3_how_1=3 then d3_how_1=2;
if w2_how_1=3 then w2_how_1=2;
if m1_how_1=3 then m1_how_1=2;
if m2_how_1=3 then m2_how_1=2;
if m3_how_1=3 then m3_how_1=2;
if m4_how_1=3 then m4_how_1=2;
if m5_how_1=3 then m5_how_1=2;
if m6_how_1=3 then m6_how_1=2;

if h24_what_1=1 then h24_what_1=1;
if h24_what_1=2 then h24_what_1=2;
if h24_what_1=3 then h24_what_1=2;
if h24_what_1=4 then h24_what_1=2;
if h24_what_1=5 then h24_what_1=2;
```

```
if h24_what_1=6 then h24_what_1=.;

if d3_what_1=1 then d3_what_1=1;
if d3_what_1=2 then d3_what_1=2;
if d3_what_1=3 then d3_what_1=2;
if d3_what_1=4 then d3_what_1=2;
if d3_what_1=5 then d3_what_1=2;
if d3_what_1=6 then d3_what_1=.;

if w2_what_1=1 then w2_what_1=1;
if w2_what_1=2 then w2_what_1=2;
if w2_what_1=3 then w2_what_1=2;
if w2_what_1=4 then w2_what_1=2;
if w2_what_1=5 then w2_what_1=2;
if w2_what_1=6 then w2_what_1=.;

if m1_what_1=1 then m1_what_1=1;
if m1_what_1=2 then m1_what_1=2;
if m1_what_1=3 then m1_what_1=2;
if m1_what_1=4 then m1_what_1=2;
if m1_what_1=5 then m1_what_1=2;
if m1_what_1=6 then m1_what_1=.;

if m2_what_1=1 then m2_what_1=1;
if m2_what_1=2 then m2_what_1=2;
if m2_what_1=3 then m2_what_1=2;
if m2_what_1=4 then m2_what_1=2;
if m2_what_1=5 then m2_what_1=2;
if m2_what_1=6 then m2_what_1=.;

if m3_what_1=1 then m3_what_1=1;
if m3_what_1=2 then m3_what_1=2;
if m3_what_1=3 then m3_what_1=2;
if m3_what_1=4 then m3_what_1=2;
if m3_what_1=5 then m3_what_1=2;
if m3_what_1=6 then m3_what_1=.;


if m4_what_1=1 then m4_what_1=1;
if m4_what_1=2 then m4_what_1=2;
if m4_what_1=3 then m4_what_1=2;
if m4_what_1=4 then m4_what_1=2;
if m4_what_1=5 then m4_what_1=2;
if m4_what_1=6 then m4_what_1=.;
```

```
if m5_what_1=1 then m5_what_1=1;
if m5_what_1=2 then m5_what_1=2;
if m5_what_1=3 then m5_what_1=2;
if m5_what_1=4 then m5_what_1=2;
if m5_what_1=5 then m5_what_1=2;
if m5_what_1=6 then m5_what_1=.;

if m6_what_1=1 then m6_what_1=1;
if m6_what_1=2 then m6_what_1=2;
if m6_what_1=3 then m6_what_1=2;
if m6_what_1=4 then m6_what_1=2;
if m6_what_1=5 then m6_what_1=2;
if m6_what_1=6 then m6_what_1=.;
format _all_;
proc print;
run;

*EARLY POSTPARTUM-AT LEAST SOME;
*1) All responders, at least some, at 24 hrs;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income (ref='1')
                    education (ref='1')
                    work_by_6_months;
model h24_what_1=   group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*2) Backwards stepwise of all responders, at least some, 24 hrs;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income  (ref='1')
                    education (ref='1')
                    work_by_6_months;
model h24_what_1=   group
                    mom_age                     delivery_collapse
```

```
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months / selection = backward include=1;
run;


*3) All responders, at least some, at 3 days;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income  (ref='1')
                    education (ref='1')
                    work_by_6_months;
model d3_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*4) Backwards stepwise of all responders, at least some, 3 days;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model d3_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months / selection = backward include=1;
run;
*5) All responders, at least some, at 2 weeks;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
```

```
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income  (ref='1')
                    education (ref='1')
                    work_by_6_months;
model w2_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*6) Backwards stepwise of all responders, at least some, at 2 weeks;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model w2_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months / selection = backward include=1;
run;
*7) All responders, at least some, at 1 month;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m1_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
```

```
run;
*8) Backwards stepwise of all responders, at least some, at 1 month;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m1_what_1=    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
                    education
                    work_by_6_months / selection = backward include=1;
run;
*9) All responders, at least some, at 6 months;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education(ref='1')
                    work_by_6_months;
                    ;
model m6_what_1=group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
                    education
                    work_by_6_months;
run;
*10)Backwards stepwise of all responders, at least some, at 6 months;
proc logistic descending data=responders;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education(ref='1')
                    work_by_6_months;
                    ;
```

```
model m6_what_1=group
                    mom_age                         delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married          free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;
run;

------------------------------------------------------------------;

* Twins only, at least some, initiation;
proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                                    delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married          free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model h24_what_1=   group
                    mom_age                         delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married          free_formula_
                    income
                    education
                    work_by_6_months;
run;

proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                                    delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married          free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model d3_what_1=    group
                    mom_age                         delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married          free_formula_
                    income
                    education
                    work_by_6_months;
run;
proc logistic descending data=responders_twins_only;*all;
```

```
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model w2_what_1=    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
                    education
                    work_by_6_months;
run;

proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m1_what_1=    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
                    education
                    work_by_6_months;
run;

proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m2_what_1=    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
```

```
                    education
                    work_by_6_months;
run;
proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m6_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;

proc logistic descending data=responders_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income (ref='1')
                    education(ref='1')
                    work_by_6_months;
                    ;
model m6_what_1=group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;

*All Responders-Exclusive Breast Milk Feeding;
data responders_exclusive;
set lib.table8_20_02;
if any_bf>=0;*keeps only those with survey information;
l_weeks=log(longest_weeks_duration);
sq_weeks=sqrt(longest_weeks_duration);
at_6_months_all=bf_at_6_months_;
if at_6_months_all =. and initiate_bf ne . then at_6_months_all=0;
```

```
if h24_what_1=1 then h24_what_1=1;
if h24_what_1=2 then h24_what_1=1;
if h24_what_1=3 then h24_what_1=1;
if h24_what_1=4 then h24_what_1=1;
if h24_what_1=6 then h24_what_1=.;

if d3_what_1=1 then d3_what_1=1;
if d3_what_1=2 then d3_what_1=1;
if d3_what_1=3 then d3_what_1=1;
if d3_what_1=4 then d3_what_1=1;
if d3_what_1=6 then d3_what_1=.;

if w2_what_1=1 then w2_what_1=1;
if w2_what_1=2 then w2_what_1=1;
if w2_what_1=3 then w2_what_1=1;
if w2_what_1=4 then w2_what_1=1;
if w2_what_1=6 then w2_what_1=.;

if m1_what_1=1 then m1_what_1=1;
if m1_what_1=2 then m1_what_1=1;
if m1_what_1=3 then m1_what_1=1;
if m1_what_1=4 then m1_what_1=1;
if m1_what_1=6 then m1_what_1=.;

if m2_what_1=1 then m2_what_1=1;
if m2_what_1=2 then m2_what_1=1;
if m2_what_1=3 then m2_what_1=1;
if m2_what_1=4 then m2_what_1=1;
if m2_what_1=6 then m2_what_1=.;

if m3_what_1=1 then m3_what_1=1;
if m3_what_1=2 then m3_what_1=1;
if m3_what_1=3 then m3_what_1=1;
if m3_what_1=4 then m3_what_1=1;
if m3_what_1=6 then m3_what_1=.;


if m4_what_1=1 then m4_what_1=1;
if m4_what_1=2 then m4_what_1=1;
if m4_what_1=3 then m4_what_1=1;
if m4_what_1=4 then m4_what_1=1;
if m4_what_1=6 then m4_what_1=.;


if m5_what_1=1 then m5_what_1=1;
```

```
if m5_what_1=2 then m5_what_1=1;
if m5_what_1=3 then m5_what_1=1;
if m5_what_1=4 then m5_what_1=1;
if m5_what_1=6 then m5_what_1=.;

if m6_what_1=1 then m6_what_1=1;
if m6_what_1=2 then m6_what_1=1;
if m6_what_1=3 then m6_what_1=1;
if m6_what_1=4 then m6_what_1=1;
if m6_what_1=6 then m6_what_1=.;

if education=2 then education=1;
if education=3 then education=1;
if education=4 then education=2;
if education=5 then education=3;
if education=6 then education=3;
if parity_all=4 then parity_all=3;
if pre_delivery_hosp_days=4 then pre_delivery_hosp_days=3;
if delivery_collapse=1 then delivery_collapse=0;
if delivery_collapse=2 then delivery_collapse=1;
if white_vs_nonwhite=1 then white_vs_nonwhite=0;
if white_vs_nonwhite=2 then white_vs_nonwhite=1;
if married_vs_not_married=1 then married_vs_not_married=0;
if married_vs_not_married=2 then married_vs_not_married=1;
if h24_how_1=3 then h24_how_1=2;
if d3_how_1=3 then d3_how_1=2;
if w2_how_1=3 then w2_how_1=2;
if m1_how_1=3 then m1_how_1=2;
if m2_how_1=3 then m2_how_1=2;
if m3_how_1=3 then m3_how_1=2;
if m4_how_1=3 then m4_how_1=2;
if m5_how_1=3 then m5_how_1=2;
if m6_how_1=3 then m6_how_1=2;
format _all_;
proc print;
run;

*Twins Only-Exclusive Breast Milk Feeding;
data responders_exclusive_twins_only;
set lib.table8_20_02;
if any_bf>=0;*keeps only those with survey information;
if __living<=2;
l_weeks=log(longest_weeks_duration);
sq_weeks=sqrt(longest_weeks_duration);
at_6_months_all=bf_at_6_months_;
if at_6_months_all =. and initiate_bf ne . then at_6_months_all=0;
```

```
if h24_what_1=1 then h24_what_1=1;
if h24_what_1=2 then h24_what_1=1;
if h24_what_1=3 then h24_what_1=1;
if h24_what_1=4 then h24_what_1=1;
if h24_what_1=6 then h24_what_1=1;

if d3_what_1=1 then d3_what_1=1;
if d3_what_1=2 then d3_what_1=1;
if d3_what_1=3 then d3_what_1=1;
if d3_what_1=4 then d3_what_1=1;
if d3_what_1=6 then d3_what_1=1;

if w2_what_1=1 then w2_what_1=1;
if w2_what_1=2 then w2_what_1=1;
if w2_what_1=3 then w2_what_1=1;
if w2_what_1=4 then w2_what_1=1;
if w2_what_1=6 then w2_what_1=1;

if m1_what_1=1 then m1_what_1=1;
if m1_what_1=2 then m1_what_1=1;
if m1_what_1=3 then m1_what_1=1;
if m1_what_1=4 then m1_what_1=1;
if m1_what_1=6 then m1_what_1=1;

if m2_what_1=1 then m2_what_1=1;
if m2_what_1=2 then m2_what_1=1;
if m2_what_1=3 then m2_what_1=1;
if m2_what_1=4 then m2_what_1=1;
if m2_what_1=6 then m2_what_1=1;

if m3_what_1=1 then m3_what_1=1;
if m3_what_1=2 then m3_what_1=1;
if m3_what_1=3 then m3_what_1=1;
if m3_what_1=4 then m3_what_1=1;
if m3_what_1=6 then m3_what_1=1;


if m4_what_1=1 then m4_what_1=1;
if m4_what_1=2 then m4_what_1=1;
if m4_what_1=3 then m4_what_1=1;
if m4_what_1=4 then m4_what_1=1;
if m4_what_1=6 then m4_what_1=1;


if m5_what_1=1 then m5_what_1=1;
```

```
if m5_what_1=2 then m5_what_1=1;
if m5_what_1=3 then m5_what_1=1;
if m5_what_1=4 then m5_what_1=1;
if m5_what_1=6 then m5_what_1=1;

if m6_what_1=1 then m6_what_1=1;
if m6_what_1=2 then m6_what_1=1;
if m6_what_1=3 then m6_what_1=1;
if m6_what_1=4 then m6_what_1=1;
if m6_what_1=6 then m6_what_1=1;

if education=2 then education=1;
if education=3 then education=1;
if education=4 then education=2;
if education=5 then education=3;
if education=6 then education=3;
if parity_all=4 then parity_all=3;
if pre_delivery_hosp_days=4 then pre_delivery_hosp_days=3;
if delivery_collapse=1 then delivery_collapse=0;
if delivery_collapse=2 then delivery_collapse=1;
if white_vs_nonwhite=1 then white_vs_nonwhite=0;
if white_vs_nonwhite=2 then white_vs_nonwhite=1;
if married_vs_not_married=1 then married_vs_not_married=0;
if married_vs_not_married=2 then married_vs_not_married=1;
if h24_how_1=3 then h24_how_1=2;
if d3_how_1=3 then d3_how_1=2;
if w2_how_1=3 then w2_how_1=2;
if m1_how_1=3 then m1_how_1=2;
if m2_how_1=3 then m2_how_1=2;
if m3_how_1=3 then m3_how_1=2;
if m4_how_1=3 then m4_how_1=2;
if m5_how_1=3 then m5_how_1=2;
if m6_how_1=3 then m6_how_1=2;
format _all_;
proc print;
run;

proc freq data=responders_exclusive;
tables (group)*(h24_what_1)/chisq;
proc freq data=responders_exclusive;*exclusive initiation;
tables (group)*(d3_what_1)/chisq;
proc freq data=responders_exclusive;
tables (group)*(w2_what_1)/chisq;run;
proc freq data=responders_exclusive;
tables (group)*(m1_what_1)/chisq;
proc freq data=responders_exclusive;
```

```
tables (group)*(m2_what_1)/chisq;
proc freq data=responders_exclusive;
tables (group)*(m3_what_1)/chisq;
proc freq data=responders_exclusive;
tables (group)*(m4_what_1)/chisq;
proc freq data=responders_exclusive;
tables (group)*(m5_what_1)/chisq;
proc freq data=responders_exclusive;*exclusive at 6 mo;
tables (group)*(m6_what_1)/chisq;run;


proc NPar1way wilcoxon;
class group;
var h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*not Sig;
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*Sig;
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*Sig;
class group;
var  h24_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*Sig;
class group;
var  d3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  d3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  d3_what_1;
run;
```

```
proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  w2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=4;*NSig*;
class group;
var  w2_what_1;
run;
proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  w2_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m1_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m1_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m1_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m2_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m2_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m2_what_1;
run;
```

```
proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m3_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m3_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m3_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m4_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m4_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m4_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m5_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m5_what_1;
run;
```

```
proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m5_what_1;
run;

proc NPar1way wilcoxon;where group=1 or group=3;*NSig*;
class group;
var  m6_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=4;*SIG;
class group;
var  m6_what_1;
run;


proc NPar1way wilcoxon;where group=1 or group=2;*NSig*;
class group;
var  m6_what_1;
run;

*EARLY POSTPARTUM-EXCLUSIVE;

*1) All responders, exclusive, at 24 hrs;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                              delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model h24_what_1   =group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married    free_formula_
                    income
                    education
                    work_by_6_months;
run;
*2) All responders, exclusive, 24h backward stepwise;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                              delivery_collapse
```

```
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model h24_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;
run;
*3) All responders, exclusive, at 3 days;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income  (ref='1')
                    education (ref='1')
                    work_by_6_months;
model d3_what_1    =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*4)Backwards stepwise of all responders, exclusive, at 3 days;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model d3_what_1    =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;
```

```
run;
*5) All responders, exclusive, at 2 weeks;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model w2_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*6)Backwards stepwise of all responders, exclusive, at 2 weeks;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model w2_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;
run;
*7) All responders, exclusive, at 1 month;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income   (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m1_what_1   =group
                    mom_age                     delivery_collapse
```

```
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*8)Backwards stepwise of all responders, exclusive, 1 month;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m1_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;
run;
*9) All responders, exclusive, at 6 months;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m6_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
*10)Backwards stepwise of all responders, exclusive, at 6 months;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
```

```
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m6_what_1=    group
                    mom_age                      delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married       free_formula_
                    income
                    education
                    work_by_6_months /selection = backward include=1;;
run;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                 delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married       free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m2_what_1=    group
                    mom_age                      delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married       free_formula_
                    income
                    education
                    work_by_6_months;
run;
proc logistic descending data=responders_exclusive;*all;
class               group (ref='1')
                                                 delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married       free_formula_
                    income    (ref='1')
                    education (ref='1')
                    work_by_6_months;
model m3_what_1=    group
                    mom_age                      delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married       free_formula_
                    income
                    education
                    work_by_6_months;
run;


*3) Twins only, exclusive, at 3 days;
```

```
proc logistic descending data=responders_exclusive_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model h24_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;


proc logistic descending data=responders_exclusive_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model m1_what_1    =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
proc logistic descending data=responders_exclusive_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model d3_what_1    =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
```

```
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;

proc logistic descending data=responders_exclusive_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model w2_what_1   =group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;
-------------------------------------------------------------------;

*AT 6 MONTHS-EXCLUSIVE;

*3) Twins only, exclusive, at 6 months;
proc logistic descending data=responders_exclusive_twins_only;*all;
class               group (ref='1')
                                                delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model m6_what_1=    group
                    mom_age                     delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
run;

*HOW TO DECIDE TO USE SQUARE ROOT TRANSFORMATION;
proc univariate plot normal data=responders;
```

```
var longest_weeks_duration l_weeks sq_weeks;
run;
*SQUARE ROOT TRANSFORMATION AND UNADJUSTED MEAN THE SAME;
proc glm data=responders; class group;
model sq_weeks=group;
means group/SNK;
run;

*unadjusted square root weeks;
proc sort data=responders; where initiate_bf=1;by group;
proc means noprint data=responders;where initiate_bf=1; by group;
var  sq_weeks;
output out=l_weeks_back mean= sq_weeks stderr= ssq_weeks;
run;
data l_weeks_back; set l_weeks_back;
sqweeks=sq_weeks**2;
lcisqweeks= (sq_weeks-(1.96*ssq_weeks))**2;
ucisqweeks= (sq_weeks+(1.96*ssq_weeks))**2;
proc print;
run;

proc glm data=responders;
class               group
                                          delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model sq_weeks=group
                    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
                    lsmeans group/pdiff stderr;run;

data responders_weeks;*square root transformation to weeks;
input group m se;
mean=m**2;
lci=(m-(1.96*se))**2;
uci=(m+(1.96*se))**2;
datalines;
1 4.359 0.427
```

```
2 4.095 0.376
3 4.092 0.390
4 3.012 0.386
;
proc print;run;

proc glm data=responders_twins_only;
class               group
                                          delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
model sq_weeks=group
                    group
                    mom_age                   delivery_collapse
                    white_vs_nonwhite
                    married_vs_not_married      free_formula_
                    income
                    education
                    work_by_6_months;
                    lsmeans group/pdiff stderr;run;

data responders_twins_only_weeks;*square root transformation to weeks;
input group m se;
mean=m**2;
lci=(m-(1.96*se))**2;
uci=(m+(1.96*se))**2;
datalines;
1 4.294 0.431
2 4.032 0.381
3 4.048 0.397
4 2.999 0.396
;
proc print;run;

*Compare multiples to singletons in results section;
data result_section_comparison;
set lib.table8_20_02;
if any_bf>=0;*keeps only those with survey information;
l_weeks=log(longest_weeks_duration);
sq_weeks=sqrt(longest_weeks_duration);
at_6_months_all=bf_at_6_months_;
if group=1 then group=5;
if group=2 then group=5;
```

```
if group=3 then group=6;
if group=4 then group=6;
if at_6_months_all =. and initiate_bf ne . then at_6_months_all=0;
if education=2 then education=1;
if education=3 then education=1;
if education=4 then education=2;
if education=5 then education=3;
if education=6 then education=3;
if parity_all=4 then parity_all=3;
if pre_delivery_hosp_days=4 then pre_delivery_hosp_days=3;
if delivery_collapse=1 then delivery_collapse=0;
if delivery_collapse=2 then delivery_collapse=1;
if white_vs_nonwhite=1 then white_vs_nonwhite=0;
if white_vs_nonwhite=2 then white_vs_nonwhite=1;
if married_vs_not_married=1 then married_vs_not_married=0;
if married_vs_not_married=2 then married_vs_not_married=1;
if h24_how_1=3 then h24_how_1=2;
if d3_how_1=3 then d3_how_1=2;
if w2_how_1=3 then w2_how_1=2;
if m1_how_1=3 then m1_how_1=2;
if m2_how_1=3 then m2_how_1=2;
if m3_how_1=3 then m3_how_1=2;
if m4_how_1=3 then m4_how_1=2;
if m5_how_1=3 then m5_how_1=2;
if m6_how_1=3 then m6_how_1=2;
format _all_;run;
proc print;run;
proc freq data=result_section_comparison;
tables (group)*(
                 married_vs_not_married

               work_by_6_months
               pre_delivery_hosp_days delivery_collapse
               )/chisq;run;
proc means n mean std median q1 q3 min max data=result_section_comparis
class group; var mom_age; run;

proc glm; class group;
model mom_age=group;
means group/SNK;
run;

*4/28 data 6=.";
data  graph_at_least_some;
input time_period TS PS TM PM;
datalines;
```

```
1   67.9 52.0 68.9 42.0
3   69.1 66.2 73.3 53.7
14  66.7 64.6 67.8 56.8
30  64.2 60.0 67.8 49.5
60  59.3 50.0 57.8 37.9
90  51.9 47.5 55.6 31.6
120 42.0 40.0 44.4 25.3
150 38.3 33.8 40.0 19.0
180 34.6 28.8 37.8 13.8
;
proc gplot data=graph_at_least_some;
legend1 position=(center top)
        across=2
        label=none;
* Proportion of At Least Some Breast Milk Feeding Per Group by Time Per
axis1 order=0 to 100 by 10
      label=(a=90 'Percent');
axis2 order=0 to 180 by 30
      label=('Tim e Period (Days)')
      /*value = (t=1 '24h' t=3 '3day' t=14 '2wk' t=30 '1mo' t=60 '2mo'
               t=90 '3mo' t=120 '4mo' t=150 '5mo' t=180 '6mo')*/;
symbol1 v=dot l=1 i=join c=red;
symbol2 v=star l=2 i=join c=blue;
symbol3 v=square l=3 i=join c=green;
symbol4 v=dot l=4 i=join c=black;
plot TS*time_period PS*time_period
TM*time_period PM*time_period / overlay
     haxis=axis2 vaxis=axis1 legend=legend1;
run;

*4/28 data 6=.";
data  graph_exclusive;
input time_period TS PS TM PM;
datalines;
1   55.6 37.0 40 17.1
3   59.3 44.2 40 19.4
14  55.6 43 33.3 25.3
30  50.6 37.5 36.7 18.9
60  38.3 30 30 12.7
90  28.4 31.3 24.4 10.5
120 25 20 17.8 4.2
150 22.2 16.2 16.7 3.2
180 18.5 12.5 15.6 4.9
;
proc gplot data=graph_exclusive;
legend1 position=(center top)
```

```
        across=2
        label=none;
* Proportion of At Least Some Breast Milk Feeding Per Group by Time Per
axis1 order=0 to 100 by 10
      label=(a=90 'Percent');
axis2 order=0 to 180 by 30
      label=('Tim e Period (Days)')
      /*value = (t=1 '24h' t=3 '3day' t=14 '2wk' t=30 '1mo' t=60 '2mo'
               t=90 '3mo' t=120 '4mo' t=150 '5mo' t=180 '6mo')*/;
symbol1 v=dot l=1 i=join c=red;
symbol2 v=star l=2 i=join c=blue;
symbol3 v=square l=3 i=join c=green;
symbol4 v=dot l=4 i=join c=black;
plot TS*time_period PS*time_period
TM*time_period PM*time_period / overlay
     haxis=axis2 vaxis=axis1 legend=legend1;
run;
```

APPENDIX L
CONTRIBUTORS TO PROJECT

The following parts of this project were developed/managed by myself:

- original hypotheses
- literature review
- methodology/study design
- questionnaire development, pre-testing, and pilot testing
- approval from the IRB at Cincinnati Children's Hospital Medical Center and the University of Cincinnati
- mailings/correspondence
- running of SAS programming and data analysis

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- Ashwini Roy-Chaudhury, MPH, for helping create and organize the Access databases and performing data entry

- Rubina Dosani, MS, for conducting all the phone questionnaires and performing data entry

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