Marketing Infant Formula Through Hospitals: the Impact of Commercial Hospital Discharge Packs on Breastfeeding

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Objectives. Commercial hospital discharge packs are commonly given to new mothers at the time of newborn hospital discharge. We evaluated the relationship between exclusive breastfeeding and the receipt of commercial hospital discharge packs in a population-based sample of Oregon women who initiated breastfeeding before newborn hospital discharge.

Methods. We analyzed data from the 2000 and 2001 Oregon Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based survey of postpartum women (n = 3895; unweighted response rate = 71.6%).

Results. Among women who had initiated breastfeeding, 66.8% reported having received commercial hospital discharge packs. We found that women who received these packs were more likely to exclusively breastfeed for fewer than 10 weeks than were women who had not received the packs (multivariate adjusted odds ratio = 1.39; 95% confidence interval = 1.05, 1.84).

Conclusions. Commercial hospital discharge packs are one of several factors that influence breastfeeding duration and exclusivity. The distribution of these packs to new mothers at hospitals is part of a longstanding marketing campaign by infant formula manufacturers and implies hospital and staff endorsement of infant formula. Commercial hospital discharge pack distribution should be reconsidered in light of its negative impact on exclusive breastfeeding. (*Am J Public Health.* 2008;98:290–295. doi:10.2105/AJPH.2006.103218)

The American Academy of Pediatrics recommends exclusive breastfeeding until an infant is 6 months old.[1] Numerous studies have demonstrated the beneficial effects of breastfeeding, including decreased risk of infectious diseases (e.g., diarrhea, ear infections, and respiratory infections) and chronic diseases (e.g., asthma, allergies, and obesity).[2–10] Despite the well-documented evidence that supports breastfeeding, only 66% of US women initiate breastfeeding and only 33% exclusively or partially breastfeed for 6 months.[11] These figures fall short of the *Healthy People 2010* goals to increase the proportion of women who initiate breastfeeding to 75% and who breastfeed for at least 6 months to 50%.[12]

Since the late 19th century, infant formula manufacturers have encouraged mothers to substitute formula for breastmilk. Formula advertisements often claimed or implied that breastmilk alone was not sufficient to raise a healthy infant.[13–17] For more than 40 years, formula manufacturers have supplied US hospitals with free formula and newborn starter pack gifts (most of which contain either formula or coupons for formula) for distribution to new mothers.[17–18] These free starter packs are an efficient and effective marketing method by which formula manufacturers get new mothers to try their company's formula.

Formula manufacturers also have sought to create partnerships and brand loyalty with hospitals and their staff by providing free formula for use in the hospital, support for fellowships and conferences, and funds to support supplies.[17–20] These "gifts" have strings attached, as noted by the ethics committee of one hospital that blocked the routine distribution of free formula company discharge packs because the members viewed such distribution as distorting informed consent, prioritizing financial issues above patient care, exploiting some women's fear of inadequacy, and implying medical endorsement of formula.[21]

The 1970s boycott of Nestlé (because of the company's aggressive marketing of formula, especially in developing countries) led to international discussions about the role of formula manufacturers and ways in which hospitals could increase support for breastfeeding. These discussions culminated in the Baby-Friendly Hospital Initiative, a 1991 codification of practices by the World Health Organization. Some of the Initiative's methods have been incorporated into routine practice in US hospital nurseries. In a 1998 study of newborn hospital breastfeeding support practices in Oregon, we found that more than 60% of Oregon newborn hospital nurseries reported moderate or high compliance with some Baby-Friendly hospital practices, such as providing rooming-in (baby stays in mother's hospital room rather than nursery) on a routine basis, encouraging breastfeeding on demand, and refraining from offering pacifiers to newborns. Hospital practice compliance was low, however, for supplementation (including providing mothers with formula promotion items as well as giving infants formula or water).[22] New mothers who responded to the 1998–1999 Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) survey reported that rooming-in and breastfeeding on demand were common practices (94% and 84%, respectively) in Oregon hospitals and birthing centers. However, only 27% of the women who responded to the PRAMS survey reported that they had not received a commercial hospital discharge pack (CHDP) that contained formula.[23]

We sought to estimate the proportion of new mothers in Oregon who received CHDPs after initiation of breastfeeding and to examine the association between receipt of CHDPs and exclusive breastfeeding duration.

METHODS

We based our study on data from the Oregon PRAMS survey, an ongoing, population-based survey of postpartum women conducted by the state public health department. The protocols for these surveys were modeled after a multistate survey supported by the Centers for Disease Control and Prevention, but data from the 2000 and 2001 Oregon PRAMS surveys were not collected under a Centers for Disease Control and Prevention protocol. Briefly, Oregon PRAMS is a cross-sectional population-based survey of a stratified systematic sample of Oregon-resident mothers who delivered a live-born infant in Oregon. Birth certificates were the source for the sampling frame, with an oversampling of racial/ethnic minorities and non-Hispanic White women who gave birth to a low-birthweight infant. The survey employed a mixed-mode response (mail and telephone). Responses were weighted for oversampling, nonresponse, and noncoverage to be representative of the state's entire population of women who delivered live-born infants. Details of the Oregon PRAMS methods appear elsewhere.[24]

We analyzed Oregon PRAMS data for the years 2000 and 2001 (inclusive of infants born from January 1, 2000, through November 4, 2001). The median number of days from birth to survey response was 104. Of the 5440 women selected to participate in the survey, 3895 completed the survey for an unweighted response rate of 71.6% (weighted response rate=78.8%). Receipt of a CHDP was the only factor about the marketing of formula contained on the PRAMS survey. Therefore, we determined whether women who responded to the survey received CHDPs from their responses to the statement: "The staff [at the hospital or birthing center where your new baby was born] gave you a gift pack with formula." Breastfeeding initiation was determined by responses to the question: "Did you ever breastfeed or pump breastmilk to feed your new baby after delivery?" Duration of exclusive breastfeeding was determined by responses to the question: "How old was your baby the first time you fed him or her anything besides breastmilk? Include formula, baby food, juice, cow's milk, water, sugar water, or anything else."

In addition to the primary independent variable of interest (receipt of a CHDP), we also analyzed demographic and prenatal characteristics of respondents that might have been associated with exclusive breastfeeding. The PRAMS datasets were the source for duration and exclusivity of breastfeeding, annual prepregnancy family income, maternal prepregnancy body mass index (weight in kilograms divided by height in meters squared), and smoking status at the time of the survey. Birth certificate data were used to obtain maternal age, education, and race/ethnicity; parity; marital status; and enrollment in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) program during pregnancy.

Of the 3895 respondents, 1211 were excluded from analysis for the following reasons: infant was deceased or no longer with the birth mother (n=68; per protocol, these respondents were not asked questions about breastfeeding); breastfeeding was not initiated (n=363); failed to respond to the PRAMS question concerning the length of time the infant was breastfed (n=657); and failed to respond to the PRAMS question about receipt of a CHDP (n=123). The final sample for analysis included responses from 2684 women.

We analyzed responses using SPSS version 14.0 (SPSS Inc, Chicago, Ill), SUDAAN version 9.0 (Research Triangle Institute, Research Triangle Park, NC), and SAS version 9.1.3 (SAS Institute Inc, Cary, NC). We used SUDAAN and SAS-callable SUDAAN to account for the complex sample design, which involved a stratified, weighted sample. We examined distributions and frequencies of variables in SPSS. We examined variables singly for an association with exclusive breastfeeding for at least 10 weeks by the use of 2×2 cross-tabulations to determine odds ratios and their corresponding 95% confidence intervals. We examined potential confounders and effect modifiers through single-factor stratified analyses. We used logistic regression to study the relationship between sustained exclusive breastfeeding for at least 10 weeks and the receipt of CHDPs. We performed a similar logistic regression analysis to study the relationship between the receipt of CHDPs and nonexclusive breastfeeding for at least 10 weeks. We estimated variable significance, using weighted data, with the Wald F test statistic, setting the level of significance at less than .05. We used forward stepwise regression procedures to identify the variables with the greatest influence on sustained exclusive breastfeeding and nonexclusive breastfeeding. The final multiple variable models retained the primary independent variable of interest (receipt of a CHDP) as well as all other independent variables that were statistically significant.

RESULTS

Among PRAMS respondents who initiated breastfeeding, 66.8% reported having received a CHDP from the hospital. When we explored the effect of receipt of a CHDP on duration of exclusive breastfeeding among women who initiated breastfeeding, we found that women who received a CHDP were more likely to exclusively breastfeed for shorter durations than were women who did not receive a CHDP (2 weeks postpartum: odds ratio [OR]=1.51, 95% confidence interval [CI]=1.11, 2.05; 6 weeks postpartum: OR= 1.41, 95% CI=1.08, 1.85; 10 weeks postpartum: OR=1.40, 95% CI=1.08, 1.83. [Data not shown.]). Table 1 shows the distribution of selected characteristics of the survey respondents according to whether they had exclusively breastfed their infants for at least 10 weeks duration. We found that women who exclusively breastfed for at least 10 weeks differed on the basis of maternal age, race/ethnicity, education, family income level, marital status, tobacco use, parity, and receipt of a CHDP. No differences were found between women who exclusively breastfed for 10 or more weeks and women who breastfed for less than 10 weeks based on participation in WIC or on maternal prepregnancy body mass index.

Table 2 shows the bivariate and multivariate relative odds of exclusive breastfeeding for less than 10 weeks associated with selected maternal characteristics. After we adjusted for maternal age, race/ethnicity, education, and family income, we found that women who received a CHDP were more

TABLE 1—Selected Sample Characteristics Among Breastfeeding Initiators, by Duration of Exclusive Breastfeeding: Oregon Pregnancy Risk Assessment Monitoring System, 2000 and 2001

Characteristic	Exclusive Breastfeeding <10 Weeks (n = 1598) No. (%)	WD %	Exclusive Breastfeeding ≥10 Weeks (n = 1086) No. (%)	WD %	*P*
Maternal age, y					
<18	77 (4.8)	4.8	23 (2.1)	1.3	.007
18–34	1337 (83.7)	83.8	950 (87.5)	87.0	
>34	184 (11.5)	11.4	113 (10.4)	11.7	
Race/ethnicity					
Hispanic	359 (22.5)	12.5	361 (33.2)	16.8	<.001
American Indian/Alaska Native	183 (11.5)	1.5	119 (11.0)	1.3	
Asian/Pacific Islander	293 (18.3)	5.3	165 (15.2)	4.0	
Non-Hispanic Black	168 (10.5)	1.9	77 (7.1)	1.1	
Nn-Hispanic White	595 (37.2)	78.8	364 (33.5)	76.9	
Education, y					
0–8	114 (7.2)	5.6	129 (12.0)	6.2	<.001
9–11	238 (15.1)	14.2	162 (15.1)	10.6	
12	523 (33.2)	36.5	257 (24.0)	25.3	
>12	700 (44.4)	43.7	525 (48.9)	58.0	
Prepregnancy family income					
<$15 000	420 (28.6)	23.1	286 (28.3)	16.5	<.010
$15 000–$30 000	436 (29.6)	28.4	282 (27.9)	27.4	
>$30 000	615 (41.8)	48.5	443 (43.8)	56.1	
Marital status					
Not married	597 (37.4)	30.0	288 (26.5)	20.4	<.001
Married	1001 (62.6)	70.0	798 (73.5)	79.6	
Smoking status					
Yes	283 (17.8)	20.2	71 (6.6)	6.9	<.001
No	1303 (82.2)	79.8	1004 (93.4)	93.1	
Parity					
Primapara	763 (47.7)	47.1	464 (42.7)	38.8	.009
Multipara	835 (52.3)	52.9	622 (57.3)	61.2	
CHDP					
Received	1177 (73.7)	69.2	700 (64.5)	61.6	.012
Did not receive	421 (26.3)	30.8	386 (35.5)	38.4	
WIC client during pregnancy					
Yes	374 (42.8)	50.3	259 (42.5)	48.7	.091
No	500 (57.2)	49.7	351 (57.5)	51.3	
BMI[a]					
<25.0	889 (59.8)	60.4	607 (64.4)	65.9	.088
≥25.0	597 (40.2)	39.6	336 (35.6)	34.1	

Notes. WD = weighted distribution; CHDP = commercial hospital discharge pack; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; BMI = body mass index.
[a]Maternal prepregnancy body mass index (weight in kilograms divided by height in meters squared).

likely to exclusively breastfeed their infants for less than 10 weeks than were women who did not receive a CHDP (adjusted odds ratio [AOR]=1.39; 95% CI=1.05, 1.84).

We also evaluated the effect of CHDPs on nonexclusive breastfeeding for at least 10 weeks duration. Using similar analytic techniques as described previously, we found that CHDPs did not have a significant effect on nonexclusive breastfeeding for at least 10 weeks (AOR=0.85; 95% CI=0.63, 1.14; Table 3). Factors associated with nonexclusive breastfeeding for at least 10 weeks duration included maternal age, race/ethnicity, education, and family income.

DISCUSSION

We found that almost two thirds of women who initiated breastfeeding in the hospital reported having been given commercial hospital discharge packs by hospital staff. Distribution of CHDPs gives new mothers a mixed message, because hospital staff may verbally discourage formula feeding, encourage initial attempts to breastfeed, and even instruct a woman on the proper technique of latching on. Reiff, for example, found that hospital "modeling" of the use of formula had greater influence on mothers than did verbal instruction that discouraged formula use.[25]

Since the early 1980s, there have been many studies, of widely varying quality and conclusions, of the impact of CHDPs on breastfeeding. The best of these studies compared receipt of discharge packs that contained formula with receipt of no discharge packs or of discharge packs without formula. Snell et al.,[26] who studied 88 low-income Hispanic women in California, found that receipt of a gift pack that contained formula (compared with receipt of no gift pack) was associated with a statistically significant decrease in exclusive breastfeeding at 3 weeks. Frank et al.,[27] who studied 343 low-income women in Boston, found that receipt of a gift pack that contained formula (compared with receipt of a gift pack without formula) was associated with a statistically significant decrease in exclusive breastfeeding at 4 months. By contrast, Evans et al.,[28] Feinstein et al.,[29] and Neifert et al.[30] examined breastfeeding exclusivity and duration among women who were given a gift pack that contained formula compared with women who were given a gift pack that did not contain formula. In these 3 studies, no statistically significant differences were found with regard to breastfeeding duration among the study groups.

There have been several studies[19,31,32] that compared receipt of hospital discharge packs

TABLE 2—Odds of Exclusive Breastfeeding for Less Than 10 Weeks Among Breastfeeding Initiators, by Selected Maternal Characteristics: Oregon Pregnancy Risk Assessment Monitoring System, 2000 and 2001

Characteristic	No.[a]	Breastfed Child for < 10 Weeks, Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Total	2684	57.1		
Received CHDP				
Yes	1877	60.0	1.40 (1.08, 1.83)	1.39 (1.05, 1.84)
No (Ref)	807	51.6	1.00	1.00
Age, y				
< 18	100	82.6	3.71 (1.64, 8.39)	2.89 (1.11, 7.52)
18–34 (Ref)	2287	56.2	1.00	1.00
> 34	297	56.6	1.02 (0.68, 1.51)	1.23 (0.80, 1.89)
Race/ethnicity				
Hispanic	720	49.9	0.73 (0.59, 0.90)	0.53 (0.39, 0.72)
American Indian/Alaska Native	302	61.3	1.16 (0.91, 1.48)	0.96 (0.73, 1.27)
Asian/Pacific Islander	458	63.9	1.30 (1.02, 1.65)	1.47 (1.13, 1.90)
Non-Hispanic Black	245	69.9	1.70 (1.28, 2.26)	1.57 (1.14, 2.17)
Non-Hispanic White (Ref)	959	57.7	1.00	1.00
Education, y				
0–8	243	54.3	1.19 (0.81, 1.75)	1.47 (0.89, 2.41)
9–11	400	64.1	1.79 (1.22, 2.63)	1.69 (1.03, 2.77)
12	780	65.6	1.91 (1.42, 2.58)	1.95 (1.39, 2.73)
> 12 (Ref)	1225	49.9	1.00	1.00
Prepregnancy family income				
< $15 000	706	64.3	1.62 (1.19, 2.22)	1.49 (1.01, 2.21)
$15 000–$30 000	718	57.1	1.20 (0.88, 1.62)	1.11 (0.79, 1.57)
> $30 000 (Ref)	1058	52.6	1.00	1.00
Marital status				
Not married	885	66.3	1.68 (1.26, 2.23)	
Married (Ref)	1799	53.9	1.00	
Smoking status				
Yes	354	79.5	3.41 (2.17, 5.36)	
No (Ref)	2307	53.3	1.00	
Parity				
Primapara	1227	61.8	1.40 (1.09, 1.80)	
Multipara (Ref)	1457	53.5	1.00	
WIC client				
Yes (Ref)	1230	60.6	1.00	
No	1247	59.1	0.80 (0.62, 1.04)	
BMI[b]				
< 25.0 (Ref)	1496	55.6	1.00	
≥ 25.0	933	61.3	1.27 (0.97, 1.67)	

Notes. OR = odds ratio; CI = confidence interval; CHDP = commercial hospital discharge pack; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; BMI = body mass index.
[a]Unweighted number of survey respondents.
[b]Maternal prepregnancy body mass index (weight in kilograms divided by height in meters squared).

that contained formula to receipt of packs that contained manual breast pumps, but these are difficult to interpret because breast pumps may be associated with increased breastfeeding.[33] Another study[34] compared receipt of a discharge pack that contained formula with receipt of no discharge pack and found a nonsignificant decrease in any breastfeeding, but they did not explore exclusive breastfeeding.

Our review of the literature led us to use exclusive breastfeeding as our primary outcome of interest. The PRAMS survey questions, however, allowed us to conduct statistical analyses of the responses on the effect of CHDPs on both exclusive and nonexclusive breastfeeding. We found that there was no association between nonexclusive breastfeeding for at least 10 weeks and the receipt of a CHDP. Other studies also have found no statistical association between nonexclusive breastfeeding and CHDPs.[35] The reason for the lack of an association is not clear.

Limitations

One limitation of our work is the self-report nature of our data. Recall bias is possible because women responded to our survey, on average, about 15 weeks after their infant's birth. A recent review found that maternal recall of breastfeeding was valid and reliable in that time period,[36] but there is no empirical evidence of whether women accurately remember having received a CHDP from the birthing hospital.

We may have underestimated the number of breastfeeding women who received formula promotional material. The PRAMS survey asked mothers whether they had received a "gift pack containing formula" from the birthing hospital. However, there were no questions about whether mothers had received formula manufacturers' coupons or commercially produced literature on infant feeding in lieu of or in addition to the formula sample. This may have led us to underestimate the proportion of new mothers whose breastfeeding decisions were influenced by formula manufacturers' inducements.

Our study is cross-sectional. Many previous studies of the association between discharge packs and breastfeeding were randomized controlled trials. Most were small studies done in urban academic medical centers; many included only low-income participants. The PRAMS survey methods accounted for the underrepresentation of certain sectors of the population (e.g., racial/ethnic minorities), and the data were weighted for nonresponse and noncoverage. However, we cannot say for certain that nonrespondents would have

TABLE 3—Odds of Nonexclusive Breastfeeding for Less Than 10 Weeks Among Breastfeeding Initiators, by Selected Maternal Characteristics: Oregon Pregnancy Risk Assessment Monitoring System, 2000 and 2001

Characteristic	No.[a]	Breastfed Child for < 10 Weeks, Weighted %	Bivariate OR (95% CI)	Multivariate OR (95% CI)
Total	3280	25.5		
Received CHDP				
Yes	2320	24.8	0.89 (0.67, 1.17)	0.85 (0.63, 1.14)
No (Ref)	960	27.1	1.00	1.00
Age, y				
< 18 years	136	48.9	2.89 (1.60, 5.21)	1.81 (0.86, 3.81)
18–34 years (Ref)	2812	24.9	1.00	1.00
> 34 years	332	22.1	0.86 (0.55, 1.34)	1.27 (0.78, 2.09)
Race/ethnicity				
Hispanic	958	23.4	0.88 (0.71, 1.10)	0.55 (0.39, 0.78)
American Indian/Alaska Native	370	31.4	1.32 (1.03, 1.68)	1.04 (0.78, 1.39)
Asian/Pacific Islander	538	22.7	0.85 (0.66, 1.09)	0.94 (0.71, 1.26)
Non-Hispanic Black	342	37.2	1.71 (1.32, 2.21)	1.39 (1.03, 1.88)
Non-Hispanic White (Ref)	1072	25.8	1.00	1.00
Education, y				
0–8	324	27.8	1.77 (1.12, 2.79)	1.83 (1.01, 3.31)
9–11	532	34.0	2.37 (1.61, 3.48)	1.53 (0.92, 2.56)
12	976	31.9	2.16 (1.58, 2.95)	1.90 (1.35, 2.67)
> 12 (Ref)	1396	17.8	1.00	1.00
Prepregnancy family income				
< $15 000	911	34.9	2.39 (1.71, 3.33)	2.31 (1.55, 3.46)
$15 000–$30 000	905	27.1	1.66 (1.19, 2.31)	1.60 (1.10, 2.33)
> $30 000 (Ref)	1175	18.3	1.00	1.00
Marital status				
Not married	1160	38.5	2.42 (1.85, 3.17)	
Married (Ref)	2120	20.5	1.00	
Smoking status				
Yes	453	49.5	3.62 (2.54, 5.15)	
No (Ref)	2799	21.3	1.00	
Parity				
Primapara	1452	27.1	1.16 (0.89, 1.50)	
Multipara (Ref)	1828	24.3	1.00	
WIC client				
Yes (Ref)	1612	31.0	1.00	
No	1443	22.1	0.63 (0.48, 0.82)	
BMI[b]				
< 25.0 (Ref)	1812	24.1	1.00	
≥ 25.0	1132	29.0	1.29 (0.97, 1.70)	

Notes. OR = odds ratio; CI = confidence interval; CHDP = commercial hospital discharge pack; WIC = Special Supplemental Nutrition Program for Women, Infants, and Children; BMI = body mass index.
[a]Unweighted number of survey respondents.
[b]Maternal prepregnancy body mass index (weight in kilograms divided by height in meters squared).

provided answers to PRAMS survey questions similar to those who responded to the survey. Causality cannot be established because the data reported are cross-sectional. Nevertheless, our study is population-based, drawn from a large, stratified, random sample of urban and rural Oregon women from several racial/ethnic populations who had a live birth.

The last limitation of our study is that it cannot be generalized beyond Oregon. According to the 2003 National Immunization Survey (the closest data available to our 2000–2001 birth cohort), more women were exclusively breastfeeding at 3 months in Oregon than in any other state.[37]

Conclusions

The production and sale of infant formula is big business. Although formula was originally produced for infants whose mothers could not nurse, formula is now marketed to almost all women. Formula manufacturers, endeavoring to increase sales, provide free formula to hospitals for in-hospital use in exchange for the opportunity to distribute formula samples to new mothers before they leave the hospital. Even women who have initiated breastfeeding in the hospital have become targets for formula manufacturers' marketing and regularly receive CHDPs at the time of newborn hospital discharge. Some of these women may discontinue exclusive breastfeeding sooner than they would have without the marketing of formula. With rare exceptions, exclusive breastfeeding is the best form of infant feeding for the first 6 months of an infant's life. This study indicates that provision of CHDPs to new mothers who have initiated breastfeeding may be associated with early discontinuation of exclusive breastfeeding. One way to increase exclusive breastfeeding may be to halt the provision of CHDPs at the time of newborn hospital discharge. ■

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Contributors

K.D. Rosenberg originated the study, guided the analyses, and interpreted the results. C.A. Eastham conducted initial data analyses and drafted the initial article. L.J. Kasehagen analyzed the data, revised the article, and interpreted the results. A.P. Sandoval managed the Oregon Pregnancy Risk Assessment Monitoring System datasets, assisted in data analyses, and assisted in the interpretation of Pregnancy Risk Assessment Monitoring System variables.

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Human Participant Protection

The Oregon Pregnancy Risk Assessment Monitoring System study protocols and informed consent procedures were approved by the Oregon State Public Health/Multnomah County Public Health institutional review board.

References

1. American Academy of Pediatrics, Work Group on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics.* 1997;100:1035–1039.

2. Scariati PD, Grummer-Strawn LM, Fein SB. A longitudinal analysis of infant morbidity and the extent of breastfeeding in the United States. *Pediatrics.* 1997; 99(6):E5. Available at: http://www.pediatrics.org/cgi/content/full/99/6/e5. Accessed March 16, 2007.

3. Duncan B, Ey J, Holberg CJ, Wright AL, Martinez FD, Taussig LM. Exclusive breast-feeding for at least 4 months protects against otitis media. *Pediatrics.* 1993; 91:867–872.

4. Wilson AC, Forsyth JS, Greene SA, Irvine L, Hau C, Howie PW. Relation of infant diet to childhood health: seven year follow up of cohort of children in Dundee infant feeding study. *BMJ.* 1998;316:21–25.

5. Gdalevich M, Mimouni D, Mimouni M. Breastfeeding and the risk of bronchial asthma in childhood: a systematic review with meta-analysis of prospective studies. *J Pediatr.* 2001;139:261–266.

6. Dell S, To T. Breastfeeding and asthma in young children: findings from a population-based study. *Arch Pediatr Adolesc Med.* 2001;155:1261–1265.

7. Saarinen UM, Kajosaari M. Breastfeeding as prophylaxis against atopic disease: prospective follow-up study until 17 years old. *Lancet.* 1995;346:1065–1069.

8. Armstrong J, Reilly JJ, Child Health Information Team. Breastfeeding and lowering the risk of childhood obesity. *Lancet.* 2002;359:2003–2004.

9. Gillman MW, Rifas-Shiman SL, Camargo CA Jr, et al. Risk of overweight among adolescents who were breastfed as infants. *JAMA.* 2001;285:2461–2467.

10. Wall G. Outcomes of breastfeeding versus formula feeding. 2006. Available at: http://www.lalecheleague.org/cbi/Biospec.htm. Accessed March 16, 2007.

11. Mothers Survey, Ross Products Division, Abbott Laboratories. Available at: http://abbottnutrition.com/resources/en-US/home/breastfeeding/BF_Trends_2003.pdf. Accessed December 29, 2007.

12. *Healthy People 2010: Understanding and Improving Health* and *Objectives for Improving Health.* Vol 1 and 2. 2nd ed. Washington, DC: US Dept of Health and Human Services; 2000.

13. Apple RD. "Advertised by our loving friends": the infant formula industry and creation of new pharmaceutical markets, 1870–1910. *J Hist Med Allied Sci.* 1986;41:3–23.

14. Apple RD. "To be used only under the direction of a physician": commercial infant feeding and medical practice, 1870–1940. *Bull Hist Med.* 1980;54:402–417.

15. Richter J, Satow E. In the best interest of the child: international regulation of transnational corporations. In: Cornia GA, ed. *Harnessing Globalization for Children: A Report to UNICEF.* April 2001. Available at: http://www.unicef-icdc.org/research/ESP/globalization/globalization_index.html#. Accessed March 16, 2007.

16. Chetley A. *The Politics of Baby Foods: Successful Challenges to an International Marketing Strategy.* New York, NY: St Martin's Press; 1986.

17. Greer FR, Apple RD. Physicians, formula companies, and advertising. A historical perspective. *Am J Dis Child.* 1991;145:282–286.

18. Merewood A, Philipp BL. Becoming Baby-Friendly: overcoming the issue of accepting free formula. *J Hum Lact.* 2000;16:279–282.

19. Bliss MC, Wilkie J, Acredolo C, Berman S, Tebb KP. The effect of discharge pack formula and breast pumps on breastfeeding duration and choice of infant feeding method. *Birth.* 1997;24:90–97.

20. Blaumslag N, Michels DL. *Milk, Money, and Madness: the Culture and Politics of Breastfeeding.* Westport, Conn: Bergin & Garvey; 1995.

21. O'Hara MA, Brenner J. Case report of an effective strategy to reform hospital breastfeeding practices: engaging the ethics committee. Paper presented at: Third International Meeting of the Academy of Breastfeeding Medicine; November 6, 1998; Kansas City, Mo.

22. Adler M, Kasehagen LJ, Stull J, Rosenberg KD, Liu J, Crivelli-Kovach A. Breastfeeding support in the newborn hospitalization: results of a survey of Oregon hospitals. Paper presented at: American Public Health Association 133rd Annual Meeting: Philadelphia, Pa; December 14, 2005.

23. Oregon Pregnancy Risk Assessment Monitoring System Web site. Available at: http://oregon.gov/DHS/ph/pnh/prams/9899qlist.shtml#bf. Accessed March 16, 2007.

24. Oregon Department of Human Services, Health Services. Oregon PRAMS first year report, 1998–99. Portland, Ore: Office of Family Health; 2000. Available at: http://oregon.gov/DHS/ph/pnh/prams/9899/ar9899.shtml. Accessed March 16, 2007.

25. Reiff MI, Essock-Vitale SM. Hospital influences on early infant-feeding practices. *Pediatrics.* 1985; 76:872–879.

26. Snell BJ, Krantz M, Keeton R, Delgado K, Peckham C. The association of formula samples given at hospital discharge with the early duration of breastfeeding. *J Hum Lact.* 1992;8:67–72.

27. Frank DA, Wirtz SJ, Sorenson JR, Heeren T. Commercial discharge packs and breast-feeding counseling: effects on infant-feeding practices in a randomized trial. *Pediatrics.* 1987;80:845–854.

28. Evans CJ, Lyons NB, Killien MG. The effect of infant formula samples on breastfeeding practice. *J Obstet Gynecol Neonatal Nurs.* 1986;15:401–405.

29. Feinstein JM, Berkelhamer JE, Gruszka ME, Wong CA, Carey AE. Factors related to early termination of breast-feeding in an urban population. *Pediatrics.* 1986; 78:210–215.

30. Neifert M, Gray J, Gary N, Camp B. Effect of two types of hospital feeding gift packs on duration of breast-feeding among adolescent mothers. *J Adolesc Health Care.* 1988;9:411–413.

31. Dungy CI, Christensen-Szalanski J, Losch M, Russell D. Effect of discharge samples on duration of breast-feeding. *Pediatrics.* 1992;90(2 pt 1):233–237.

32. Dungy CI, Losch ME, Russell D, Romitti P, Dusdieker LB. Hospital infant formula discharge packages. Do they affect the duration of breast-feeding? *Arch Pediatr Adolesc Med.* 1997;151:724–729.

33. Wennergren M, Wiqvist N, Wennergren G. Manual breast pumps promote successful breast feeding. *Acta Obstet Gynecol Scand.* 1985;64:673–675.

34. Bergevin Y, Dougherty C, Kramer MS. Do infant formula samples shorten the duration of breast-feeding? *Lancet.* 1983;1:1148–1151.

35. Donnelly A, Snowden HM, Renfrew MJ, Woolridge MW. Commercial hospital discharge packs for breastfeeding women. *Cochrane Database Syst Rev.* 2000;2:CD002075; updated 2005.

36. Li R, Scanlon KS, Serdula MK. The validity and reliability of maternal recall of breastfeeding practice. *Nutr Rev.* 2005;63:103–110.

37. Centers for Disease Control and Prevention. Breastfeeding: data and statistics: breastfeeding practices—results from the 2003 National Immunization Survey. Available at: http://www.cdc.gov/breastfeeding/data/NIS_data/data_2003.htm. Accessed March 16, 2007.