

# Duration of Breast Milk Expression Among Working Mothers Enrolled in an Employer-Sponsored Lactation Program

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**Background:** Maternal employment has been one of the greatest barriers to breastfeeding. Women are increasingly solving this problem by expressing milk at work and taking it home to their infants.

**Purpose:** The objective was to determine duration of breast milk expression among working mothers enrolled in an employer-sponsored lactation program.

**Design and Methods:** Retrospective reviews were conducted on the lactation records of 462 women employed by 5 corporations in order to describe and characterize their experiences. The lactation program included the employees' choice of (a) a class on the benefits of breastfeeding; (b) services of a certified lactation consultant (CLC); and (c) private room in the workplace with equipment for pumping.

**Results:** Breastfeeding was initiated by 97.5% of the participants, with 57.8% continuing for at least 6 months. Of the 435 (94.2%) who returned to work after giving birth, 343 (78.9%) attempted pumping milk at work, and 336 (98%) were successful. They expressed milk in the workplace for a mean of 6.3 months ( $SD = 3.9$ , range 2 weeks to 21 months). The mean age of infants when the mothers stopped pumping at work was 9.1 months ( $SD = 4.1$ , range 1.9 to 25 months). Most of the women who pumped their milk at work were working full time (84.2%). The mean postnatal maternity leave was 2.8 months. The proportion of women who chose to pump at work was higher among women who were salaried than among those who were paid hourly wages ( $p < 0.01$ ).

**Conclusions:** Company-sponsored lactation programs can enable employed mothers to provide breast milk for their infants as long as they wish, thus helping the nation attain the Healthy People 2010 goals of 50% of mothers breastfeeding until their infants are 6-months-old.

Research has demonstrated the numerous, positive health benefits breastfeeding offers to both infant and mother. As a result, the American Academy of Pediatrics (AAP) policy statement, Breastfeeding and the Use of Human Milk, recommends exclusive breast milk for the first 6 months of life and breast milk plus the gradual introduction of iron-enriched solids from 6 months to 1 year (AAP, 1997). The U. S. Department of Health and Human Services Healthy People 2010 objective for breastfeeding is that 75% of women leave the hospital breastfeeding, with 50% of babies receiving breast milk until 6 months of age (Healthy People 2010, 2000). Although breastfeeding rates in the United States are increasing, they still fall short of these goals. In 1995, the percentage of 6-month-old infants being breastfed (defined as feeding human milk or a combination of human milk and formula or cow's

milk) was estimated at 21.6% (Ryan, 1997), whereas in 2001 it was 32.5% (Ryan, Wenjun, & Acosta, 2002).

One reason for early weaning is the mother working outside of the home (Fein & Roe, 1998; Gielen, Faden, O'Campo, Brown, & Paige, 1991; Roe, Whittington, Fein, & Teisl, 1999; Ryan & Martinez, 1989; Visness & Kennedy, 1997). Women of childbearing age comprise a large sector of the workforce. In 1997, 73% to 78% of women ages 20 to 44 were either working or looking for work (Women's Bureau, 1998). In 1995, 59% percent of women who were married and had a child 1 year of age or younger returned to the work force (U.S. Census Bureau, 1996).

Lack of support and knowledge regarding management of breastfeeding while employed, a non-supportive work environment, and problems pumping breast milk are frequently given as reasons that working women wean early (Auerbach & Guss, 1984;

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Dodgson & Duckett, 1997; Katcher & Lanese, 1985; Miller, Miller & Chism, 1996; Thompson & Bell, 1997). Since work is often a barrier to breastfeeding, and many mothers return to work a short time after giving birth, it will be difficult for the nation to meet the Healthy People 2010 breastfeeding objectives without providing workplace lactation support (Kurinij, Shiono, Ezrine & Rhoads, 1989). Healthy People 2010, the AAP, and the Department of Health and Human Services Office on Women's Health all address the importance of supporting breastfeeding mothers who return to the work force. They recommend providing appropriate facilities and adequate time for breast pumping in the workplace (AAP, 1997; Department of Health and Human Services Office on Women's Health, 2000; Healthy People 2010, 2000).

Several states have already enacted work-site lactation accommodation policies. Additional legislative efforts are in progress at both the state and federal levels to secure the rights of mothers to pump their milk in the workplace (Baldwin & Friedman, 2003; Maloney, 2000). The companies in this study have voluntarily instituted programs and policies supporting lactating mothers. If successful, such programs could help the nation achieve the Healthy People 2010 goals for breastfeeding rates.

## Purpose

A retrospective study within a comprehensive corporate lactation program (CLP) measured the rate of initiation and duration of breast milk expression and provided a characterization of participants.

## Methods

**Overview.** This retrospective study reviewed the lactation consultants' charts of women who had enrolled in a CLP paid for by their employers, as part of company employee benefits packages, under contract with Limerick, Inc. The program was offered to all female, full-time employees. The employers were five corporations with 1,200 to 18,000 employees: two accounting firms, one entertainment industry company, one incorporated city government, and one service corporation. Breastfeeding is defined in this paper as feeding human milk or a combination of human milk and formula or cow's milk.

**The CLP.** The CLP consisted of services provided directly by the employer and services under contract with Limerick's certified lactation

consultants (CLCs). Corporate management policies assured that employees who decided to breastfeed would be supported. The CLCs consulted with management to educate supervisors on the needs of lactating women and assure them that the program was designed to avoid interference with the productive workday by using employees' regular breaks and lunch time for expressing breast milk. The companies provided private, locked rooms in the workplace for pumping. To enable the employee to pump her milk efficiently, the CLP provided lightweight, electric, auto-cycling, breast pumps with accessories that enabled both breasts to be pumped simultaneously. In order to become comfortable with pumping and to store milk prior to returning to work, each mother was provided with a pump for 2 weeks before maternity leave ended. Instructions on the use of the breast pumps were provided in person or by phone.

Accessories included an insulated tote bag with ice packs to transport milk, bottles to collect and transport milk, flanges that fit over the breast, and pump tubing. Although in some cases several women shared the same pump, each woman had her own set of accessories. Women who traveled as part of their job were given a larger insulated tote bag to carry both the pump and milk. A battery pack and 12-volt adapter made pumping easier for mothers away from the office. All but one company paid for pumping accessories for individual employees. This was the only way in which the program varied between companies. The companies paid all other costs: pump rental, classes, and CLC consultation.

During the prenatal period, the CLCs offered each employee two 1-hour breastfeeding classes, usually during the lunch hour. On rare occasions when a class could not be given over lunch, arrangements were made so that it did not take time from the workday.

Two CLCs recorded all information on the subjects and on the counseling provided in lactation charts. From the prenatal period through weaning, they provided breastfeeding education and lactation consultation in person and by telephone. When the employee joined the program, she was contacted by a CLC for personal introductions and to set up the breastfeeding class. The CLC contacted the employee again around the expected date of birth. Employees who participated in the CLP were phoned weekly

the first month after the baby was born and also the first month the mother was back at work. During the remainder of the program, monthly phone calls from the CLC offered support and answered questions. The CLC was available to accept calls from the employees 7 days per week, 24 hours per day, during the entire time the mothers were enrolled in the program. The services of the CLC and the pumping facilities could be used for as long as the mother chose. When employees who did not express milk at work decided they no longer needed the service of the CLC, or when employees who expressed milk at work discontinued pumping, the contract requirements with the employer was completed. No further contact with the employee was required or made; therefore no further data were recorded in the CLC charts.

**Subjects.** Five service-oriented corporations employed the 462 participants. Information about the CLP was provided in literature covering employee benefits and in company newsletters. When the women notified their human resource department that they would be taking maternity leave, they were again informed of the CLP and offered the breastfeeding class. The class was offered regardless of whether the employee intended to use the pumping options. Subjects were defined as enrolled in the CLP if they had signed up for the program prior to maternity leave. Subjects had the choice of attending the prenatal breastfeeding class and/or using the services of the lactation consultant with or without choosing to express milk at work. The 462 women in the study gave birth between 4/19/93 and 12/31/97 and were followed until the last infant was weaned in August of 1999. Charts were kept by CLCs from the day the employee joined the CLP until the day she decided she no longer needed the services of the program. Telephone consults and onsite contacts with the participants were recorded in the CLCs' charts. Four companies provided demographic data on the ethnicity of the mother, whether she was salaried or paid by the hour, and whether she returned to work full-time or part-time. All women were employed full-time before taking maternity leave. Demographic information is presented in Table 1.

## Analysis

The following data were analyzed:

- Length of postnatal maternity leave (from birth of baby to the day the employee

**Table 1**  
**Characteristics of Employees Who Expressed Milk at Work**  
**Versus Those Who Did Not**

Demographics*	N	Pumped at Work	Did Not Pump at Work
Mean age, years		31.5	31.4
N	105	80	25
Statistics (t-test)			NS**, p = 0.82
Part-time***	55	35	20
Full-time	295	221	74
Statistics (Chi-square)			NS
Salaried	194	154	40
Hourly	157	104	53
Statistics (Chi-square)			P ≤ 0.01
American Indian****	2	2	0
Asian/Pacific Islander	50	33	17
African American	22	15	7
Hispanic	95	66	29
White	185	144	41
Statistics (Chi-square)			NS

Notes: \* Only 4 of the 5 companies provided demographic data.

\*\* NS = Not significant

\*\*\* All women worked full-time before going on maternity leave.

\*\*\*\* Omitted from Chi-square

returned to work)

- Percent of mothers who were breastfeeding when discharged from the hospital
- Percent of mothers who did not return to work at all
- Percent of mothers who successfully expressed their milk at work (defined as pumping for more than 2 weeks, because it gave mothers time to develop a routine)
- Number of months the women expressed milk at work
- Ages of the babies when the mothers stopped expressing milk at work
- Percentage of women working part-time versus full-time directly following maternity leave
- Percentage of women who were salaried versus earning hourly wages

All mothers who returned to work, but left the program while still lactating because they changed employ-

ment were eliminated from the calculation of duration of expressing milk at work, as the CLC did not know if they continued to express milk. Mothers with twins or triplets were counted only once. Thirty-two mothers enrolled in the CLP twice because they had two pregnancies while working for the same employer. One had four. Each pregnancy was entered into the database separately.

Because of the nature of retrospective studies, some information was not available in all charts. Total duration of breastfeeding could not be calculated because contact with the employee was ended when she felt she no longer needed the services of the CLC or when pumping at work ceased. Therefore, phone calls and chart notes were discontinued. Many mothers still continued to provide some breast milk to their infants, making the exact date of complete weaning unknown to the CLC. Therefore, the results reported represent the minimum time employees provided breast milk to their infants. Because the pumps were provided by

the CLC, exact duration of breast milk expression at work was known in all cases.

Using Microsoft Access 95, a custom database application was designed to store data on the subjects and to perform calculations. Data was exported to Microsoft Excel for comparison of groups using two-tailed t-tests and ANOVA with statistical significance set at a p-value of 0.05. Chi square analysis was performed using the Georgetown University Web Chi Square Calculator.

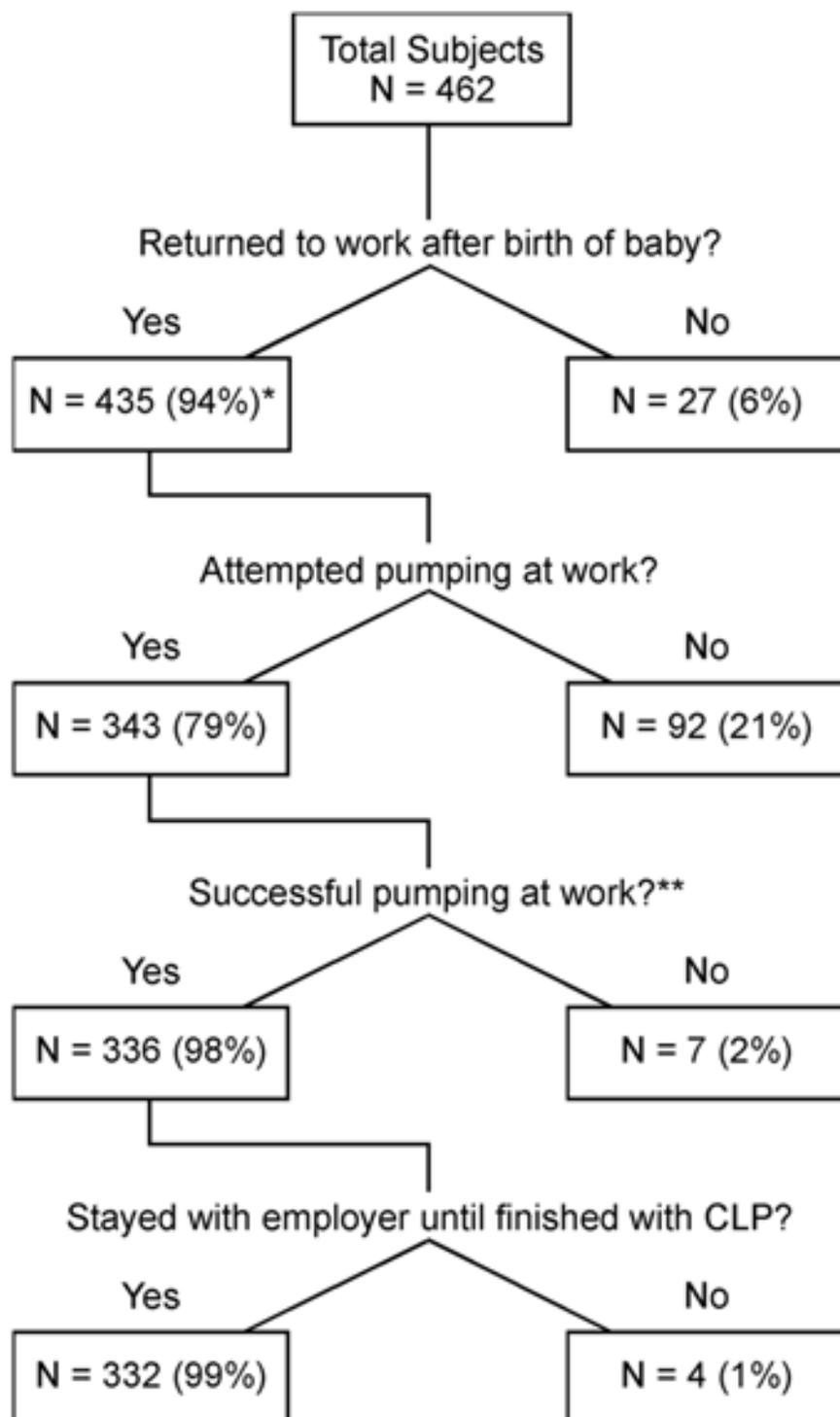
## Results

The combined data for all 462 women showed that breastfeeding was initiated by 97.5% of the CLP participants, with 57.8% breastfeeding for at least 6 months. The women were divided into groups based on whether they returned to work after maternity leave and, if they returned to work, whether they utilized the pumping option of the CLP (see Figure 1). Of the 462 women studied, 94.2% returned to their jobs, and 5.8% did not return to work.

The study criteria for successful expression of milk at work was defined as being able to pump for at least 2 weeks after returning to work. Based on the CLCs' experiences, this was sufficient time for mothers to comfortably incorporate pumping into their daily work schedule. Of the 435 who returned to work, 79% attempted to express milk at work and 98% of them succeeded (see Figure 1). Only seven attempted pumping at work but discontinued within 2 weeks. For the 336 mothers who successfully expressed milk at work, the mean postnatal leave was 2.8 months ( $SD = 1.44$ ), with a median of 2.5 months. Ninety percent had returned to work before their babies were 5 months of age.

The age of the baby when pumping at work was discontinued and the number of months pumped at work was calculated for only 332 women, because four women left the CLP for a reason unrelated to breastfeeding — accepting a job with another firm. The mean age of the babies when these 332 mothers discontinued pumping at work was 9.1 months ( $SD = 4.11$ ) with a median of 8.3 months and a range of 1.9 to 25.4 months. The mean number of months they expressed milk at work was 6.3 ( $SD = 3.87$ , median 5.3 months, range 0.5 to 21 months) (see Table 2). Of these 332 women, 246 (74.1%) expressed milk until the baby was at least 6 months old, and 81 (24.4%) expressed milk until the baby was at

Figure 1. Distribution of Subjects



\*Percentages reflect the numbers within each of the four subgroups.

\*\*The criteria for successful expression of milk at work was defined as being able to pump for at least two weeks after returning to work.

least 12 months old (see Figure 2). When the subjects discontinued expressing milk at work, some said they would continue to breastfeed at home, but the duration was not documented in the CLC chart. Data collection ended when pumping at work was stopped.

The majority of the mothers who did not attempt to express milk at work did breast-feed for a time. Of the 27 who did not return to work at all, 6 were lost to follow-up, 1 breast-fed for 2 days and 20 breast-fed for 2 weeks to 11 months. Of the 92 who returned to work but did not pump milk, 71 breast-fed for 1 day to 5.6 months before dropping the CLP. Forty-five women stated that they would continue breast-feeding after dropping the program.

Four of the five employers provided demographic data on the working mothers (see Tables 1 and 2). The ages of 105 (22.7%) mothers were available. The mean age was 31.5 years ( $SD = 4.43$ , range 21 to 41). There was no relationship between the age of the mother and duration of expressing milk at work (correlation coefficient = 0.18). A t-test showed that there was no difference in age between those who expressed their milk at work, 31.5 years, and those who did not, 31.4 years ( $p = 0.82$ ) (see Table 1).

All women worked full-time before giving birth. Full-time versus part-time post-maternity leave employment information was available for 350 (75.8%) subjects. Most of the women returned to work full-time: 295 (84.3%) full-time versus 55 (15.7%) part-time. When comparing women who expressed milk at work with women who did not, the distribution between part-time and full-time employees did not differ statistically (see Table 1). For women who expressed milk at work, there was no statistical difference between full-time and part-time workers in duration of pumping at work and the age of the baby when the mother stopped pumping (see Table 2).

Wage information was available for 351 (76.0%) employees: 194 (55.3%) employees were salaried and 157 (44.7%) were paid by the hour. When comparing women who expressed milk at work with women who did not, a chi square analysis showed that salaried women were more likely to express milk at work than hourly employees ( $p < 0.01$ ) (see Table 1). For women who expressed milk at work, neither the duration of pumping at work nor the age of the baby when

**Table 2**  
**Breast Milk Expression by Working Mothers**

Demographics*	Age of Baby when Pumping Ended (Months)			Duration of Pumping at Work (Months)			
	N	Mean	Median	SD	Mean	Median	SD
All subjects	332	9.1	8.3	4.11	6.3	5.3	3.87
Full-time**	221	9.0	8.0	4.26	6.2	5.1	4.03
Part-time	35	8.6	9.1	2.95	5.1	4.0	2.82
Statistics (t-test)		NS***, $p = 0.72$			NS, $p = 0.20$		
Salaried	154	8.7	8.0	3.94	5.8	5.0	3.66
Hourly	104	9.3	8.1	4.51	6.5	5.4	4.18
Statistics (t-test)		NS, $p = 0.31$			NS, $p = 0.17$		
American Indian****	2	10.4	n/a	4.48	8.4	n/a	5.33
Asian/Pacific Islander	33	8.4	8.0	3.62	5.3	4.33	3.45
African American	15	9.6	8.1	5.42	6.3	5.13	4.14
Hispanic	66	9.5	8.9	3.94	7.1	6.6	3.94
White	144	8.7	7.8	4.13	5.7	4.8	3.85
Statistics (ANOVA)		NS, $p = 0.47$			NS, $p = 0.08$		

Notes: \* Only 4 of the 5 companies provided demographic data.

\*\* All women worked full-time before going on maternity leave.

\*\*\* NS = Not significant

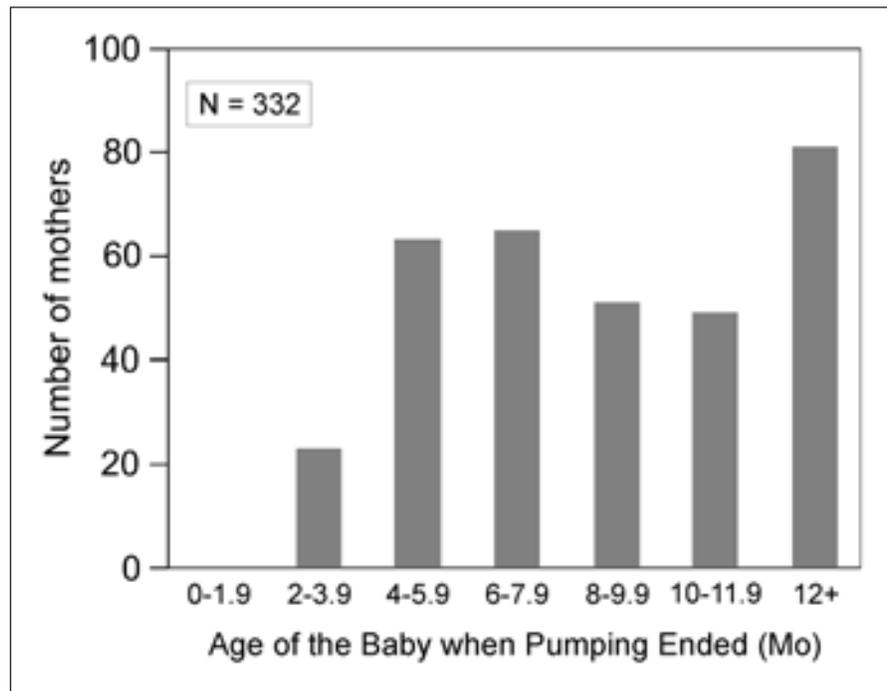
\*\*\*\* Omitted from ANOVA

the mother stopped pumping differed statistically between salaried and hourly workers (see Table 2).

Data on the ethnicity of 354 (76.6%) mothers were available. When comparing women who expressed milk at work with women who did not, there was no statistical difference in ethnicity (see Table 1). The duration of expressing milk at work and the age when the mother stopped pumping did not differ by ethnicity (see Table 2). Native American mothers were not included in the statistical analysis due to the low number of subjects.

Medical reasons for not breastfeeding or for early weaning were reported by 14 women: abnormal pap smear, lupus medication, mastitis, cimetidine for severe vomiting after delivery, carpal tunnel syndrome, thrush, miscellaneous infections, renal failure, infant weight loss greater than 10% and asthma. One mother had 3 breast infections before deciding to wean. Two subjects discontinued expressing milk at work because they were pregnant again. One mother had a retained placenta, which can cause early lactation failure (Neifert, McDonough & NeVill, 1981).

**Figure 2. Breast Milk Expression Among Women who Pumped at Work**



Four of the women who expressed milk at work had twins. Three mothers who did not breastfeed had twins and another had triplets. One of these women did not provide breast milk for her infants because they were hospitalized for a time following birth. One mother with twins breastfed at home but did not express her milk at work. The lactation class was attended by 267 women (58.2%).

## Discussion

The study population is composed of women who have traditionally been considered the least likely to breastfeed: working mothers (Fein & Roe 1998; Gielen et al., 1991; Roe et al., 1999; Ryan & Martinez, 1989; Visness & Kennedy, 1997). The view that working mothers cannot provide breast milk for their infants may foster a self-fulfilling prophecy: Mothers who have been led to believe that pumping at work cannot be done without considerable stress might, therefore, not even consider the possibility. Yet 98% of the women who attempted to express milk at work while enrolled in a CLP succeeded. They expressed milk in the workplace for a mean of 6.3 months and up to 21 months.

The AAP policy statement, *Breastfeeding and the Use of Human Milk*, recommends exclusive breast milk for the first 6 months of life (AAP, 1997). The Healthy People 2010 objective for breastfeeding is that 75% of women breastfeed in the early postpartum period, and at least 50% continue breastfeeding until their babies are 6 months old (Healthy People 2010, 2000). However, the federal Family and Medical Leave Act (FMLA) of 1993 provides only 12 weeks of leave for new mothers (U. S. Department of Labor, 2001). The Census Bureau reports that in 2002, 55.2% of mothers of infants were in the workforce (Bachu & O'Connell, 2001). Under these circumstances, it will be difficult to meet the above goals without effective lactation programs in the workplace. Indeed, the 2001 Ross Laboratories Mothers Survey found that although 69.5% of their study population left the hospital breastfeeding, only 32.5% of mothers were breastfeeding their 6-month-old infants (Ryan et al, 2002). The present study showed that 97.5% of mothers enrolled in a CLP left the hospital breastfeeding, with 57.8% breastfeeding at 6 months and 18.2% at 1 year. The demographics differ; the present study's subjects were all working full-time prior to giving birth and had signed up for a lactation pro-

gram, whereas the Ross study subjects were a random sample of mothers.

Several studies show that returning to work full-time versus part-time significantly shortens the duration of breastfeeding (Gielen et al., 1991; Kurinij et al., 1998; Miller et al., 1996; Roe et al., 1999). Fein and Roe (1998) found working full-time at 3 months postpartum decreased breastfeeding duration by an average of 8.6 weeks relative to not working. They concluded that working part-time increased the length of breastfeeding. Ryan and Martinez (1989) found that working full-time had a substantial impact on breastfeeding duration; only 10% of full-time employed mothers were breastfeeding at 6 months. The 2001 Ross Laboratories Mothers Survey found that at 6 months, 25.1% of full-time employed mothers were breastfeeding versus 34.0% of part-time workers (Ryan et al, 2002). In the present study 84% of the women who expressed milk at work were employed full-time and 74% of women who pumped at work were still breast-feeding at 6 months. One difference between the present study and the others was that the present study included only mothers whose employers provided lactation support. This study's authors speculate that the company support, lactation counseling, and provision of equipment were factors in the employees' success. The corporations studied were not required by law to provide lactation programs or to allow women to pump milk at work. Corporate representatives stated several reasons why they thought the CLP was important to their businesses. Having the CLP is seen as an incentive in recruiting women of childbearing age.

Employee retention is considered less expensive and more productive than hiring new employees and a supportive work environment is thought to strengthen commitment to the company (Bond, Galinsky, & Swanberg, 1998). Corporate representatives reported that employees in the CLP often return to work rather than quit to stay home breastfeeding if they have the option of pumping at work. In the present study, 94.2% of the women returned to work at the same company after the birth of their baby. One of the major reasons cited by the companies for continuing to offer this program is that mothers stay working for the company, even through two or more births.

Working mothers are aware that

breastfeeding provides numerous health benefits (Ball & Wright, 1999; Beaudry, Dufour, & Marcoux, 1995; Dewey, Heinig, & Nommsen-Rivers, 1995; Duffy, Faden, Wasielewski, Wolf, & Krystofik, 1997). CLPs enable mothers to provide the health benefits of breast milk to their infants even when working outside of the home. Two studies of infants in large managed care health systems found decreased frequency of office visits and hospitalizations cost savings from \$331 to \$475 per year when infants were breastfed (Ball & Wright, 1999; Hoey & Ware, 1997). Because breast-fed babies have fewer illnesses and lower health care costs, this study's authors speculate parents should have to take fewer sick days to care for a sick child, which could be beneficial to employees.

Women who chose to express milk while employed were compared with those who did not (see Table 1). There was no difference in age, ethnicity, or part-time versus full-time work between the two groups. When comparing hourly and salaried workers, there was a statistically significant difference between the groups. The salaried workers decided to express milk at work at a higher rate than women paid by the hour. Breastfeeding rates have sometimes been shown to vary with educational level and economic status (Ryan, 1997; Ryan & Martinez, 1989; Ryan, Wysong, Martinez, & Simon, 1990; Visness & Kennedy, 1997). Salaried workers are often in management positions and frequently have higher education and rates of pay than hourly workers. All of the women in the present study were employed full-time before taking maternity leave. Although data on the income of entire households rather than just the mothers would be necessary to establish the economic class of these subjects, this study's authors speculate that few subjects had incomes at or near the poverty level. One reason that the salaried workers are more likely to express milk at work may be that they go back to work at higher rates. The Census Bureau found that women with at least 1 year of college are more likely to return to work while caring for an infant than mothers who have a high school degree or less education (Bachu & O'Connell, 2001).

One of the major reasons for weaning is returning to work. Roe et al. (1999), using data from the U.S. Food and Drug Administration's Infant Feeding Practices Study, found

that working outside the home decreased the duration of breastfeeding unless the mother had "developed a strategy to balance breastfeeding and working." They also found that women who felt embarrassment about breastfeeding weaned their infants an average of 10 weeks earlier than those who felt comfortable. Guttman & Zimmerman (2000) concluded that fear of ridicule was one reason for women to use formula even though they felt guilt over the choice. Losch et al. (1995) proposed that members of a woman's social network must be educated on breastfeeding. This highlights the importance of companies actively providing a supportive environment for their lactating employees. This study's authors speculate that if an employee has privacy for pumping and knows that pumping at work is accepted, she is less likely to feel embarrassed or uncomfortable. By providing a lactation program, companies enable employees to plan their breastfeeding strategies well in advance of returning to work, thus smoothing the transition.

Prenatal education provided in the CLP program addressed the benefits of breastfeeding and provided the information needed to successfully breastfeed immediately following delivery and the first few weeks after delivery. Arora et al. (2000) found the most important reasons given by parents for initiating breastfeeding included benefits to the infant's health, naturalness, and strengthening bonding with their infants. They also believed that the reasons given by clients for initiating breastfeeding needed to be reinforced through prenatal education and suggested that education on the use of the breast pump and creating a breastfeeding-friendly environment would be beneficial. Pugin et al. (1996) found prenatal breastfeeding skills group education is an additive, significant and important component of breastfeeding support, especially among women who have no previous breastfeeding experience. In the present study, 58.2% of the subjects took the CLP lactation class, but many others stated that they had breastfeeding education elsewhere.

Although education is important, the advice and support of health care professionals has been shown to be an essential element in a mother's decision to breastfeed (Arora et al., 2000; Philipp, Merewood, & O'Brien, 2001; Ryan, 1997; Register, Eren, Lowdermilk, Hammond, & Tully,

2000). Intensive support is vitally important for the early stages of establishing the breastfeeding relationship. A study of 2,017 parents found that women were four times more likely to breastfeed if they were encouraged to do so by a nurse or physician (Lu, Lange, Slusser, Hamilton, & Halfon, 2001). Kuan et al. (1999) found that consistent, high-quality information on breastfeeding and access to a lactation consultant is an important factor for success even in the highly motivated mothers. The CLCs in the current study provided prenatal breastfeeding education and frequent lactation consultation in-person and by telephone. The high rate of mothers who succeeded in expressing milk at work in the present study (98%) supports Kuan's assertion. Increasing health care professionals' understanding of the dynamics of expressing milk at work could result in fewer mothers being advised to wean early to return to work.

Fourteen women cited medical reasons for weaning, a small number (3%) given the size of the study. While not all of the reasons were in themselves contraindications to breast-feeding, 11 mothers weaned because of excessive stress related to the medical condition. Three women reported weaning earlier than they would have liked because of advice by physicians regarding medical conditions or medications. An AAP survey found that pediatricians often recommend weaning because of treatments known not to preclude breastfeeding (Schanler, O'Connor, & Lawrence, 1999). The AAP Committee on Drugs has recently published guidelines for pharmacological treatment of nursing mothers, stating that advice to stop breastfeeding may be unwarranted in some cases (AAP Committee on Drugs, 2001). Health care workers should be encouraged to find approaches to care that would promote or maintain the breastfeeding relationship while not interfering with medical treatment.

The corporations in this study provided a supportive work environment by developing an informed management, providing private pumping facilities, and contracting with CLCs who were available to employees from the prenatal period through weaning. The authors speculate that part of the success of the CLP presented here is due to the positive attitude the CLCs helped to create among supervisors. Meetings were held to answer questions about the

program and to arrange for locating pumping rooms that would be both convenient for employees and not hinder the companies' efficient use of space. Mothers with private offices did not need separate pumping rooms, so no extra space needed to be provided. The cost of a refrigerator for milk storage was not incurred because each mother received her own insulated tote where the milk could be stored, preventing any confusion, contamination, or tampering.

An ideal CLP provides an employee with accurate breastfeeding information, efficient equipment, privacy, and adequate time, without interfering with the productivity of her workday (Dodgson & Duckett, 1997; Katcher & Lanese, 1985; Miller et al., 1996; Thompson & Bell, 1997). Pumping intervals spaced approximately every 3 hours should maintain a woman's milk supply and prevent any discomfort and medical problems (Register et al., 2000). Adequate expression of milk in a limited time is, however, dependent upon the availability of efficient equipment and pump rooms in close proximity to the work area. Providing facilities with an electric breast pump and accessories to pump both breasts simultaneously, allows the expression of breast milk to easily be completed during the conventional workday time allotted for breaks and lunch. Some women on the study were on strict work schedules and were able to pump while still adhering closely to their break and lunch periods. Even those women who traveled as a part of their job were able to express milk successfully, as the pumps were lightweight and could be operated using a battery pack. Thus, participation in a CLP need not result in decreased employee productivity.

The strengths of this study are its duration (the births occurred over 4.5 years), its large sample size (462 women), and the real-world setting at five companies with different work environments. One limitation of the study is that it did not include all employees who took maternity leave at the study companies. Because the benefits departments of these corporations code maternity leave as disability or sick leave, the total number of pregnancies among the employees was unobtainable. Therefore, the study population does not reflect the population of pregnant employees, but rather it is composed of mothers who indicated, by signing up for a CLP, they were open to the possibility of breastfeeding and/or pumping milk

at work. The total number of employees giving birth is data that could only be gathered prospectively.

A second limitation is inherent in descriptive studies, that is, the lack of a control group prevents us from stating that the support provided lengthened duration of breastfeeding or expression of milk at work. Although several authors have stressed the importance of support in initiating and sustaining breastfeeding (Arora et al., 2000; Pugin et al., 1996; Kuan et al., 1999; Lu et al., 2001) a prospective, controlled study is necessary to measure the effect of employers providing CLCs, efficient pumps, and supportive work environments. With legislative efforts at both the state and federal level securing mothers' rights to pump milk in the workplace, such studies could be undertaken on a large scale. This would provide valuable information for policy makers. The study presented here simply demonstrates that mothers working full-time can express milk successfully.

Returning to work is one of the greatest barriers to breastfeeding (Auerbach & Guss, 1984; Fein & Roe, 1998; Gielen et al., 1991; Roe et al., 1999; Ryan & Martinez, 1989; Visness & Kennedy, 1997). The present study has demonstrated that working mothers can overcome this barrier. The results show that even full-time working mothers can provide their infants with human milk, allowing them to reach their breastfeeding goals. The Healthy People 2010 goals and the AAP recommend that employers provide facilities for mothers to pump their milk (AAP, 1997; Healthy People 2010, 2000). This study's authors speculate that the following three interventions would increase the number of women who succeed: prenatal education, ongoing support from a CLC, and a supportive work environment that provides both privacy and efficient breast pumps. Providing comprehensive lactation programs at the worksite could assist the nation in reaching the Healthy People 2010 goals.

### Implications for Nursing Practice

New parents need education and support by knowledgeable health care providers in their decision to breastfeed. Nurses are influential in mothers' feeding decisions. They are in a unique position to provide parents with information about breastfeeding and to support them in their feeding decisions. Pediatric nurses

who have expanded their skills to include lactation services have an opportunity to provide a valued benefit to a medical and hospital practice. CLCs can play a valuable role in helping mothers reach their breastfeeding goals.

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