DISSERTATION

DEVELOPING AND EVALUATING A WEBSITE ON INFANT FEEDING, SPECIFICALLY BREASTFEEDING, FOR CHILD CARE PROVIDERS

Submitted by

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WE HEREBY RECOMMEND THAT THE DISSERTATION PREPARED UNDER OUR SUPERVISION BY ALENA MICHELLE CLARK ENTITLED **DEVELOPING AND EVALUATING A WEBSITE ON INFANT FEEDING, SPECIFICALLY BREASTFEEDING, FOR CHILD CARE PROVIDERS** BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY.

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ABSTRACT OF DISSERTATION

DEVELOPING AND EVALUATING A WEBSITE ON INFANT FEEDING, SPECIFICALLY BREASTFEEDING, FOR CHILD CARE PROVIDERS

Research studies have shown that breastfeeding provides a multitude of benefits to infants, mothers and communities. Yet, many women cease breastfeeding before the recommended times. A common reason women cease breastfeeding is because of returning to work or school. Because child care providers often provide care to these infants, further research on the role of child care providers on infant feeding practices, specifically breastfeeding, is warranted.

This research project occurred in three phases. First, a needs assessment survey was conducted to determine the knowledge, attitudes, behaviors and training needs of child care providers on infant feeding, specifically breastfeeding, in child care centers. The most appropriate medium to integrate best practice information and provide educational tools to child care providers was also examined. Based on the first phase of this project, a website for child care providers on infant feeding, specifically breastfeeding, was determined to be the desired medium for child care providers.

Because no other infant feeding website for child care providers was available, **InfaNET Nutrition for Child Care Providers** website was developed during the second phase of this project based upon the needs assessment results and facilitated group discussions' feedback. The Social Learning Theory was used as the theoretical framework for the development of the content information on the website. A process evaluation with infant feeding experts, child care providers and web design experts deemed the website ready to be tested.

Thirdly, a quasi-experimental research design with a control and intervention group was completed. The target population viewed the website as a well-liked and effective means to provide infant feeding information. Results also showed that between the pre- and post-test intervention, the intervention group had more statistically significant positive changes in attitude and behaviors than the control group. Child care providers' already possessed a desirable level of knowledge in regards to storing, preparing and feeding infants' breastmilk and formula, but not in distinguishing hunger cues or introducing solid foods. The behavior and attitude changes were not sustained at follow-up, but results showed there was a non-significant positive trend in knowledge for the intervention group.

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CHAPTER 1

INTRODUCTION AND PROJECT OVERVIEW

Rationale for Research

In the fall 2005 issue of John Hopkins' University Public Health Newsletter (1), a list of the "Top 10 Cheap Ways to Save the World" was determined by the faculty and researchers of this institution. Breastfeeding was determined to be one of the top ten. Breastmilk is considered the "gold standard" of infant feeding (2-4). Despite this being true, breastfeeding initiation and duration rates are not at the levels where United States health professionals and breastfeeding advocates would deem them to be acceptable (5).

The Healthy People 2010 objectives for breastfeeding were established because of the increased evidence that breastfeeding and the use of breastmilk provided a multitude of benefits to the mother-infant breastfeeding pair (6). These benefits include not only nutritional and immunological benefits to the infants, but decreased incidence of disease for both the mother and infant (2-4).

Breastfeeding has been linked to a decrease in cancer in both breastfed infants and their mothers (7, 8), osteoporosis in mothers who breastfed their

infants (9) and obesity among children who were breastfed (10). Obesity, cancer and osteoporosis affect many Coloradoans as shown by the data below.

- ✓ In 2002, 117,200 (10%) women aged 50 and over were diagnosed with osteoporosis (11);
- ✓ In 1997-2001, of a total of 88,942 cancers affecting Coloradoans (12):
    - o 18.5% were breast cancer cases, 3.6% were lymphoma cases and 2.6% were leukemia cases.
- ✓ In 2003, 16% of Colorado adults were obese (13);
- ✓ In 2003, 9.5% of Colorado adolescents in grades 9-12 were categorized as overweight (13);
- ✓ If current trends continue, by 2020, 47% of Coloradoans will be overweight, 39% will be obese and only 23% of the population will be at a healthy weight (13). These rates do not meet the Healthy People 2010 Objectives for a healthier America.

If breastfeeding is linked even to a small decrease in the incidence of each of these diseases, it is important to find creative new approaches to increase breastfeeding initiation and duration rates. This is indeed a complex, yet exciting challenge.

Colorado exceeds the Healthy People 2010 recommendations for initiation of breastfeeding, thus focus should be placed on increasing breastfeeding duration rates (5). One of the challenges often faced by women who return to work after having an infant is to continue breastfeeding. This is due to the time spent apart from their infant and the difficulty that many women face when expressing their

breastmilk at the worksite (14). The number of working women in the United States continues to increase (15) and an escalating number of parents are enrolling their infants into child care (16). Because of the increasing number of infants enrolled in child care centers, this area deserves more study (15, 16). It is important to not only understand the role that child care providers play in supporting working mothers who desire to continue to breastfeed their infants, but also ways child care providers, especially infant room teachers, can possess the self-efficacy and knowledge which will lead to behaviors that promote and support the use of breastmilk in their centers.

Project Objectives and Hypothesis

This research project occurred in two phases. The first phase consisted of conducting a needs assessment survey to determine the knowledge, attitudes, behaviors and training needs of child care providers on infant feeding, specifically breastfeeding, in child care centers. The most appropriate medium to integrate best practice information and provide educational tools to enable a more supportive infant feeding environment, especially for breastfeeding working mothers and their infants, was also examined. No other needs assessment of this kind known to the researchers has been conducted with the target population of child care directors and infant room teachers. Based on the first phase of this project, a website for child care providers on infant feeding, specifically breastfeeding, was determined to be the most appropriate and desired medium for child care providers. Because no other infant feeding website specific to child

care providers was available, **InfaNET Nutrition for Child Care Providers** website was developed utilizing the results of the needs assessment and facilitated group discussions' feedback. The Social Learning Theory was used as the theoretical framework for the development of the content information on the website (17). A process evaluation with infant feeding experts, child care providers and web design experts deemed the website ready to be tested. A quasi-experimental research design with a control and intervention group was completed. Figure 1.1 depicts the timeline of this project.

The anticipated outcomes of this research project include: an increase in the child care providers' knowledge on infant feeding best practices (specifically on breastfeeding/use of breastmilk); an increase in the child care providers' perceived attitudes of the importance of infant feeding best practices (specifically of breastfeeding/use of breastmilk); and an increase in child care providers' behaviors relative to supporting infant feeding best practices (specifically contributing to a supportive breastfeeding/use of breastmilk environment).

Figure 1.1 – Timeline of Project

The overall hypothesis of this research project was a website addressing infant feeding, specifically breastfeeding and the use of breastmilk, could be developed which would yield improvements in child care providers' knowledge, attitudes and behaviors of infant feeding, specifically breastfeeding.

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CHAPTER 2

LITERATURE REVIEW

Benefits of Breastfeeding and Breastmilk

Breastfeeding and the use of breastmilk have been shown to provide health, nutritional, immunological, developmental, psychological, social, economic and environmental benefits (1-3). Breastmilk is also associated with reduced morbidity in infancy, and may reduce the risk of chronic diseases later in life (1). The United States Department of Health and Human Services (HHS) and the American Academy of Pediatrics (AAP) recommends that infants receive only breastmilk for the first 6 months of life and continue to be fed breastmilk for at least the first year of life with the introduction of appropriate solid foods at 6 months (2, 3). Each of the above organizations has a position/policy statement supporting these recommendations. The World Health Organization (WHO) recommends that infants be breastfed until at least the age of two (4). Exclusive breastfeeding is the "gold standard" to which all other methods of infant feeding are compared (1-3). Table 2.1 describes the breastfeeding recommendations of national and world health organizations.

Table 2.1 – National and World Health Organizations Breastfeeding Recommendations (1, 2, 3, 4)		
Organization	**Duration of *Exclusive* Breastfeeding**	**Duration of *Any* Breastfeeding**
WHO (2001)	6 months	≥2 years
HHS (2003)	6 months	≥12 months
AAP (2005)	6 months	≥12 months

Components of Breastmilk. The composition of breastmilk evolves to meet the changing nutritional needs of growing infants (e.g. colostrum for the newborn to mature milk for the older infant) as shown in Table 2.2 (5, 6).

Table 2.2 – Average Composition of Human Colostrum and Mature Breastmilk (6)		
Nutrient (per 100 ml)	**Colostrum 1-5 days**	**Mature >30 days**
Energy (kcal)	58.0	70.0
Protein (gm)	2.3	0.9
Fat (gm)	2.9	4.2
Lactose (gm)	5.3	7.3
Sodium (mg)	48.0	18.0
Calcium (mg)	23.0	28.0
Iron (μg)	45.0	40.0
Vitamin A (μg)	89.0	67.0
Vitamin C (mg)	4.4	4.0

The nutrients in breastmilk are both easily digestible and bioavailable. Breastmilk provides a unique balance and adequate amounts of carbohydrates and fatty acids (5, 6). Breastmilk is relatively low in protein (does not provide a large amount of nitrogen) and is appropriate for infants' kidneys. The protein in breastmilk is largely alpha-lactalbumin, an easily digestible whey protein.

Minerals in breastmilk are balanced to enhance bioavailability. Breastmilk is also low in sodium, so infants' renal solute loads are not increased (5, 6).

The concentrations of macronutrients (protein and carbohydrate) in breastmilk are not affected by the mother's diet; however, fatty acids are the exception (e.g. DHA) (5). Selenium and iodine concentrations in breastmilk are related to maternal diet, but other trace minerals are not related. Increasing maternal energy intake has been linked with an increase in breastmilk production (6). Researchers completed a double-blind, supplementation trial with 102 lactating, undernourished Guatemalan women. The participants were given either a high-energy or a low-energy supplement six days a week from week 5 to week 25 of lactation. Among the 53 women who were considered severely malnourished, infant milk and milk energy intakes were 10% higher in the high-energy supplement group than in the low-energy group even after controlling for other confounders ($p < 0.04$) (6). This data is further supported by the LINKAGES Project. LINKAGES is a United States Agency for International Development. LINKAGES provides technical information, assistance, and training to organizations on breastfeeding, related complementary feeding and maternal dietary practices, and lactational amenorrhea or loss of menstrual cycle during breastfeeding (7).

Vitamin content of breastmilk is dependent upon the mother's current vitamin intake and stores. Strength of this relationship varies with each vitamin. The content of some nutrients in breastmilk may be maintained at a satisfactory level at the expense of maternal stores (e.g. folate and calcium) (5).

With breastmilks' rich composition of nutrients and other unknown components, it provides a multitude of benefits to the infant, mother and the community.

Benefits of Breastfeeding and Breastmilk to Infants. Breastmilk is the optimal nutrition for infants (1-3). In developed and developing countries, there is strong evidence that feeding breastmilk to infants decreases the risk of infectious diseases including diarrhea, necrotizing enterocolitis (acute inflammatory disorder that may lead to perforation of the bowel), urinary tract infections, otitis media (ear infection), bacterial meningitis, respiratory tract infections, bacteremia (presence of bacteria in the blood), and late onset sepsis (systemic infection) in preterm infants (1, 3). The following research studies support the benefits of breastmilk's role in the decreased risk of certain infectious diseases.

Kramer et al. (9) conducted an observational cohort study nested within a large randomized trial. They compared 2,862 infants who were exclusively breastfed for 3 months and continued to be fed with mixed feedings, both breastmilk and formula, through 6 months to 621 infants who were exclusively breastfed for at least 6 months. A significant reduction in the incidence of gastrointestinal infections was observed during the 3 to 6 month period in the 6 month breastfed group (OR (odds ratio) =.35; $p<.001$). Exclusive breastfeeding for 6 months was associated with a lower risk of gastrointestinal infection in the first year of life (9). Results from other research studies also support the positive effects of breastfeeding on the prevalence of diarrhea and necrotizing enterocolitis (10-14).

Researchers in Sweden investigated the protective effect of breastfeeding against urinary tract infection (UTI) in children (15). Two hundred cases aged 0-6 years who presented with UTI for the first time were enrolled. Three hundred and thirty six cases were matched for age and gender. Ongoing exclusive breastfeeding demonstrated a lower risk of UTI in the case children and this was most strongly predicted right after birth (15). Researchers in Italy found similar results with a case-control (N=128 in each group) study in Italy with children aged birth to 6 months; breastfeeding was protective against UTI in infants (16).

Monobe et al. (17) studied 73 children in Japan who were diagnosed with otitis media. Correlations between early recurrence and potential risk factors relating to otitis media were analyzed. Children who had not received breastmilk experienced early recurrence (reappearance of signs and symptoms within 1 month after initial improvement) of otitis media more frequently (p=.005) (17). Dewey et al. conducted work in California on 46 breastfed infants and 41 formula fed infants and found similar results (18). The researchers collected weekly data during the first two years of life on infection rates. The results suggested that the mean durations of episodes of otitis media were longer in formula fed infants than in breastfed infants (8.8 days versus 3.5 days) (18).

Respiratory illness and infections have been found to be lower in infants who were breastfed. Istre et al. in Colorado conducted a case-control study on influenza infection. There were 121 cases and 196 age-matched controls. Children who were infected with influenza were more likely to attend child care. After controlling for enrollment in child care centers, children younger than 6

months of age who were infected with influenza were significantly less likely to have ever been breastfed (19). In Rhode Island, researchers gathered data on 39 premature infants (weighing less than or equal to 2,000 grams at birth). Results showed infants who received breastmilk had fewer days of upper respiratory illness at 1 month after discharge ($p<.025$) and at 7 months gestationally corrected age ($p<.025$) (20). Other researchers in both the United States and other countries found similar results (13, 21-25).

Breastfed infants appear to respond more efficiently to immunizations as well (3). In 1998, infant mortality rates in the United States were reduced by approximately 21% among breastfed infants (26). In 2004, using the 1988 National Maternal and Health Survey data, researchers investigated the effect of breastfeeding on postneonatal mortality in the United States (26). Cases included 1,204 infants who died between 28 days and 1 year from causes other than congenital anomalies or cancerous tumors. Controls were 7,740 children who were alive at 1 year. Children who were ever breastfed had a 21% decreased risk (statistically significant) of mortality as compared to infants who were never breastfed. Longer periods of breastfeeding decreased the risk of death even more (26).

Studies also suggest that older children and adults who were breastfed have a decreased incidence of type 1 and type 2 diabetes, lymphoma, leukemia, Hodgkin's disease, overweight and obesity, hypercholesterolemia and asthma compared to individuals who were formula fed (1, 3). The following research

studies support the benefits of breastmilk's role in the decreased incidence of certain diseases.

In 2004, researchers observed that longer durations of breastfeeding were negatively associated with an increased area under the glucose curve. This demonstrated that longer durations of breastfeeding may lead to increased levels of insulin sensitivity, which is a positive mechanism (27). Saduaskaite-Kuehne et al. (28) conducted a study with 517 children from Sweden and 286 children from Lithuania 15 years of age or younger with Type 1 diabetes. The researchers' aim was to investigate whether type of feeding (e.g. breastmilk vs. formula) was an independent risk factor for diabetes despite other life events. Exclusive breastfeeding longer than 5 months (OR=0.54) and total breastfeeding longer than 7 months (OR=0.56) or 9 months (OR=0.61) were protective against diabetes when adjusted for all other risk factors among the infants in Sweden. In Lithuania, exclusively breastfeeding infants for longer than 2 months (OR=0.58) was protective against diabetes when adjusted for other factors. Longer exclusive and total breastfeeding in both Sweden and Lithuania appeared to have an independent protective factor against Type 1 diabetes (28). Similar findings were found by researchers Gerstein et al. and Kostraba et al. Findings from their research studies showed that early exposure of cow's milk and lower incidences of breastmilk feedings were associated with a higher risk of Type 1 diabetes (29, 30).

Breastmilk has also been shown to have a protective effect against leukemia, lymphomas and Hodgkin's disease. Bener et al. conducted a case-

control study with 117 patients aged 2 to 14 years who had leukemia, lymphoma or Hodgkin's disease. The 117 patients were matched for age, sex and ethnicity with 117 controls. The patients (cases) were breastfed shorter than their control counterparts (statistically significant). For each diagnosis, breastfeeding less than 6 months as compared with breastfeeding longer than 6 months was associated with an increased odds ratio of 2.47 for leukemia, 3.75 for Hodgkin's disease and 4.06 for lymphoma (31). Smulevich et al. found in 593 Moscow children aged 0 to 14 years that decreased amounts of breastfeeding increased the risk of leukemia, Hodgkin's disease and lymphoma combined ($p<.05$) (32).

Breastfeeding and breastmilk's role with obesity has been investigated. Grummer-Strawn et al. (33) conducted a prospective study with 12,587 children to examine whether increasing the duration of breastfeeding was associated with a lowered risk of overweight in a low-income population of 4-year-olds in the United States. They assessed duration of breastfeeding and weight status at four years of age. Among non-Hispanic whites, the odds ratio of overweight by breastfeeding for 6 to 12 months versus never breastfed was 0.70 and for 12 months or longer versus never breastfed was 0.49 ($p<.05$). Prolonged breastfeeding was associated with a reduced risk of overweight among non-Hispanic white children. The researchers concluded that breastfeeding longer than 6 months provided health benefits to children well beyond the period of breastfeeding (33). In 2002, researchers in Scotland investigated the relationship of breastfeeding and obesity in a population-based sample of 32,200 children from the ages of 39 to 42 months (3 to 3-½ years). Even after adjusting

for potential confounders (e.g. socioeconomic status, birth weight and sex), the prevalence of obesity was significantly lower in the children who had been breastfed as an infant (OR=.70) (34).

The association between hypercholesterolemia and breastmilk feedings has been examined. Sighnal et al. investigated the association of breastmilk and lipoprotein profiles among 216 preterm infants in the United Kingdom. Preterm infants were randomly assigned to receive donated breastmilk or infant formula specially formulated for preterm infants. The researchers followed up with the infants when they were between the ages of 13 to 16 (35). Results of the study indicated that those subjects who had received breastmilk had a lower LDL to HDL ratio (p=.04) than subjects who received preterm formula (35).

Oddy et al. in Australia found there was a significant reduction in the risk of childhood asthma at the age of 6 years if the child was breastfed for at least 4 months (p=.05). There was no significant relationship between breastfeeding and maternal asthma status (36). Researchers in Israel, Australia and the United States also found similar results if infants were breastfed for at least 3 months (37-39).

In addition, there appears to be decreased rates of sudden infant death syndrome (SIDS) in the first year of life among breastfed infants (1, 3). In 2000, McVea et al. conducted a meta-analysis on 23 studies on the relationship between breastfeeding and SIDS incidence. The combined analysis indicated that bottle-fed infants were twice as likely to die from SIDS (pooled OR=2.11) (40).

Breastfed infants have also shown to have increased incidence of correct development of jaws, teeth and speech patterns (41, 42). Palmer, a dentist from Kansas City, wrote a commentary as well as conducted his own research on the effects of breastfeeding on the oral cavity (41). Breastfed babies when feeding with a "good latch" have a tongue action which appears to be a rolling or peristaltic motion. Contrary to this motion, the tongues of formula fed infants are more like a piston-like or squeezing motion. In order to stop the flow of formula from the bottle, the infant is forced to hold the tongue up against the hole of the bottle. This motor activity is considered abnormal and referred to as a tongue thrust or a deviated swallow. Many adults do not outgrow this condition. Breastfeeding encourages mandibular development with a strengthening of the jaw muscles. Also, breastfeeding requires less suction than bottle feeding. Forceful suction causes the infant's cheeks to draw in, which puts pressure on the gums and teeth affecting their position. The flexibility of the human breast benefits the shaping of the palate as the palate is quite soft during the beginning stages of oral cavity development. Breastfeeding enables the development of a U-shaped palate which has adequate space for the infant's growing mouth. Palmer investigated the role of breastfeeding on the oral cavity by studying ancient skulls of people who would have been exclusively breastfed due to the unavailability of formula and bottles (41). He conducted two studies. The first study included 210 skulls from India. Of the 210 skulls, only 4 contained signs of malocclusion. Malocclusions include the undesirable effects of tongue thrusts and non-U-shaped palates. He also looked at 370 skulls from prehistoric Native

American Plains Indians (bottles and formula not readily available) and contemporary American skulls from the 1920s and 1940s (bottles and formula available). The prehistoric skulls contained fewer malocclusions (41). Labbok and Henershot also conducted a retrospective cohort study of 9,698 children between 3 and 17 years of age. Children who were bottle fed were 1.84 times more likely to have malocclusions than children who were breastfed (42).

In 2006, researchers from Robert Wood Johnson Medical School in New Jersey conducted a case-control study to assess if children who wet their beds were less likely to have been breastfed during infancy. Participants included 55 children 5 to 13 years of age who were enrolled in a incontinence center and had experienced a lifetime of bedwetting. The cases were compared to 117 controls who did not exhibit lifetime bedwetting practices. The results showed that after adjusting for potential confounders (e.g. race, income, and family size), case studies were significantly less likely than the controls to be breastfed during infancy (OR=0.28) (43).

Breastfeeding has also been associated with slightly improved neurodevelopment as seen in an improvement on cognitive ability tests (1, 3). Smith et al. (44) studied the relationship between breastfeeding and childhood cognitive development among 439 school-aged children in Massachusetts, New York and New Jersey aged 6 to 8 years who weighed 1,500 grams or less at birth. Measures of cognitive function included overall intellectual function, verbal ability, visual-spatial skills (e.g. drawing, matching, fine motor skills) and memory. After covariate adjustments for confounders (e.g. home environment, maternal

verbal ability, composite measure of parental education and occupation, and length of hospitalization), the researchers found that breastfed children performed higher on drawing, matching and fine motor skills. Breastfed children scored 3.6 intelligence quotients (IQ) points higher for overall intellectual functioning and 2.3 IQ points higher for verbal ability after adjusting for potential confounders (44).

Benefits of Breastfeeding to Mothers. Health outcomes and benefits for mothers who breastfeed for any length of time include decreased postpartum bleeding and more rapid uterine involution, decreased menstrual blood loss and increased child spacing due to the effects of luteinizing hormone (1, 3-5). Breastfeeding and the process of lactation delays ovulation and normal menstrual cycle, but ovulation will eventually resume (45).

Additional maternal benefits include earlier return to prepregnancy weight, decreased risk of breast and ovarian cancers and possible decreased risk of hip fractures and osteoporosis in the postmenopausal period (1, 3). The following research studies support the benefits of breastmilk's role in weight loss and decreased risk of disease.

It is recommended that women who breastfeed consume an additional 500 kilocalories per day (8, 9). In a research study comparing weight loss among women who breastfed with women who had formula-fed, researchers found that weight loss from 1 to 12 months postpartum was significantly greater in women who breastfed versus women who formula fed their infants (4.4 vs. 2.4 kg). Mothers who were breastfeeding their infants also had a greater loss in triceps-

skinfold thickness where as mothers who were formula feeding their infants showed an increase in skinfold thickness (46).

Jernstrom et al. (47) conducted a case-control study among 965 subjects diagnosed with breast cancer and 965 control subjects in Sweden who had no history of breast or ovarian cancer. Total duration of breastfeeding was associated with a reduced risk of breast cancer for each month of breastfeeding (OR=.89; P<.001). A research study was conducted in Los Angeles County in 1998. The researchers completed a population based case-control study with women who had breast cancer (N=974) versus women with no history of breast cancer (N=973). The subjects were between the ages of 55 to 64 years old. Women who had breastfed at least 16 months had a reduced odds of breast cancer relative to women who had never breastfed (OR=.73) (48). Newcomb et al. also completed a case-control study using statewide tumor registries from Wisconsin, Massachusetts, Maine and New Hampshire. After controlling for potential confounders, 5,878 case subjects and 8,216 controls remained in the study. Results showed that with increased rates of total breastfeeding, premenopausal women who had breastfed their infants had a decreased risk of breast cancer ($p<0.001$); this was not found in postmenopausal women. This data provided evidence that breastfeeding may be protective against breast cancer among premenopausal women who had breastfed their children (49).

Breastfeeding and the use of breastmilk have not only been shown to lower the risk of breast cancer, but also ovarian cancer. The relationship between breastfeeding and the risk of epithelial ovarian cancer was assessed in

data from seven countries. The data were collected between 1979 and 1998. The researchers compared 393 cases to 2,565 controls. A nonsignificant reduction in risk of ovarian cancer was found in women who had breastfed short-term (at least 6 months) (50).

Bone health is important for women and breastfeeding may help to decrease the risk of fractures. Paton et al. (51) conducted a case-control study among elderly women 65 years and older living in Australia (Cases=174; Controls=137). There was a dose-response relationship between average duration of breastfeeding per child and risk of hip fracture. This study suggested that breastfeeding may protect parous elderly women aged 65 years and older against hip fractures ($p<.01$). Cummings et al. found similar results (52).

Other benefits to both the father and mother of the infant include saving money (e.g. cost savings of ~$700/year/infant on formula), saving time (e.g. breast milk is always available and ready to eat), improved bonding with infant and enhanced self-esteem in the maternal role (1, 3). It has been estimated that infant formula and equipment costs to feed the infant formula can cost up to $900 in the first year of life (53).

Benefits of Breastfeeding and Breastmilk to Community. The benefits of breastfeeding to the community are often overlooked, but equally important. Decreases in the amount of annual health care costs in the United States have been associated with an increase in breastfeeding (some estimates are in the billions) (1). The United States Department of Agriculture (USDA) estimated that at least $3.6 billion could be saved in health care costs if breastfeeding rates

were increased from current levels to the recommended levels by AAP and HHS (75% of all United States infants initiate breastfeeding, at least 50% continue breastfeeding for 6 months, and at least 25% are breastfed until 1 year of age) (54). This dollar amount represents the cost savings from otitis media and gastrointestinal disorders only (54). Other researchers investigated the financial costs of lower respiratory illnesses, otitis media, and gastrointestinal illnesses in formula-fed infants after adjusting for potential confounders in Arizona. Infants were classified as never breastfed, partially breastfed, or exclusively breastfed at 3 months of age. Results included more than 2,000 excess office visits, 200 excess days of hospitalization and 600 excess prescriptions for the three above illnesses. The three additional illnesses cost the health care services roughly $300 to $475 for the first year of life in each never breastfed infant (55).

A decrease in costs for public health programs such as the Supplemental Nutrition Program for Women, Infants and Children (WIC) would likely occur with increases in breastfeeding due to a decrease in the amount of money spent on formula. It was estimated that $30 million would be saved if all of the women enrolled in WIC breastfed for 1 month. This savings would allow more money for program planning and serving more women and children (1). Employers also reap the benefits from breastfeeding including a decrease in parental employee absenteeism due to less illness in the breastfed infant (56). Families benefit from a decrease in associated loss of family income due to a decrease in infant sickness days and parents missing work (57).

The environment can be positively affected by breastfeeding due to a decreased amount of waste disposal from formula cans and bottles, decreased energy demands for production and transport of infant formula feeding products and decreased pollution to the environment from the manufacturing of infant formula (54).

Contraindications to Breastfeeding. Although breastfeeding provides a multitude of benefits, there are a few contraindications for breastfeeding. If an infant has galactosemia, in which galactose is not metabolized, the infant should not be breastfed (1, 2, 3). Galactosemia, if undiagnosed, can lead to failure to thrive and mental retardation.

If the mother has any of the following diagnoses, partakes in any of the following behaviors or has been exposed to any of the following elements, she should not breastfeed (1-3):

- ✓ Active, Untreated Tuberculosis (once treated for 2 weeks, permissible to start breastfeeding)
- ✓ Human T-cell Lymphotropic Virus (e.g. leukemia, lymphoma)
- ✓ Exposure to Radioactive Materials (e.g. radiation)
- ✓ Chemotherapeutic Agents (e.g. undergoing chemotherapy for cancer)
- ✓ "Street Drugs" (e.g. methamphetamine, cocaine, marijuana)
- ✓ Small Number of Prescription and Over-the-Counter Medications (check with physician or lactation consultant first before discontinuing breastfeeding – many medications are not contraindicated when breastfeeding)
- ✓ Herpes Simplex Lesions on Breast
- ✓ HIV/AIDS (in the United States)

HIV/AIDS is transmitted through breastmilk. In 2003, the WHO developed a report on HIV and Infant Feeding stating "when replacement feeding is acceptable, feasible, affordable, sustainable and safe, avoidance of all

breastfeeding by HIV-infected mothers is recommended. Otherwise, exclusive breastfeeding is recommended during the first months of life" (58).

Breastfeeding Research. Studies on breastfeeding/use of breastmilk in the past have been criticized for methodological and analytical flaws (59). However, professional health organizations (American Dietetic Association (ADA), AAP, and APHA) continue to stand behind their recommendations. The definition of breastfeeding is often not standardized among researchers and the exact mechanism for why breastmilk produces its benefits is unknown. The WHO and UNICEF (United Nation's Children's Fund) along with other agencies involved with infant feeding have agreed upon the following definitions for breastfeeding/use of breastmilk (60):

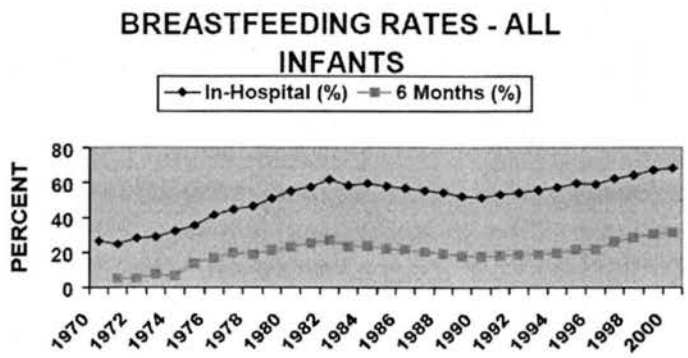
- ✓ Breastfeeding: The infant/child has received breastmilk direct from the breast or expressed.
- ✓ Exclusive Breastfeeding: The infant/child has received only breastmilk from the mother or a wet nurse, or expressed breastmilk, and no other liquids or solids with the exception of drops or syrups consisting of vitamins, mineral supplements, or medicines.
- ✓ Predominant Breastfeeding: The infant/child's predominant source of nourishment has been breastmilk. However, the infant may also have received water and water-based drinks (e.g. sweetened and flavored water, teas, fruit juice), drop and syrup forms of vitamins, minerals and medicines, and ritual fluids (herbal teas) in limited quantities. With the exception of fruit juice and sugar water, no food-based fluid is allowed under this definition.
- ✓ Full Breastfeeding: Exclusive breastfeeding and predominant breastfeeding together constitute full breastfeeding.
- ✓ Complementary Feeding: The infant/child has received both breastmilk and solid or semi-solid food.
- ✓ Bottle Feeding: The infant/child has received liquid or semi-solid food from a bottle with a nipple/teat.

For the purpose of this research study, breastfeeding was defined as receiving breastmilk directly from the breast or expressed breastmilk (not exclusive).

Analysis of Needs

Breastfeeding Trends in the United States. Breastfeeding rates in the United States are lower than in most nations, both developed and developing countries. Around the globe, approximately 79% of infants are breastfed for 12 months compared to 17-20% in the United States (2). Figure 2.1 depicts the United States breastfeeding rates from 1970 to 2000. Please note that this information is from the Ross's Mothers' Survey, which is the producer of Similac infant formula.

Figure 2.1. Breastfeeding Rates of All Infants from the 2001 Ross's Mothers' Survey



According to Ryan et al., breastfeeding rates reached an all-time low in the United States in 1971 with only 24% of mothers initiating breastfeeding (61). This decline is attributed to the increase and availability of other milk substitutes

(e.g. evaporated cow's milk and infant formula). Because of the low incidence of breastfeeding, in the 1970s, HHS set national goals for breastfeeding initiation and duration rates. Breastfeeding rates exceeded past levels in the 1980s (see Figure 2.1) and then slowly decreased again in the 1990s. Since then breastfeeding rates have increased annually, yet are not to the desired goal (54).

The Center for Disease Control (CDC) conducts the National Immunization Survey (NIS) annually to obtain national, state and selected urban-area estimates of vaccination coverage rates for United States children. In 2001, CDC researchers analyzed data from the NIS to assess if states were meeting the Healthy People 2010 objectives (see Table 2.3) for breastfeeding (62).

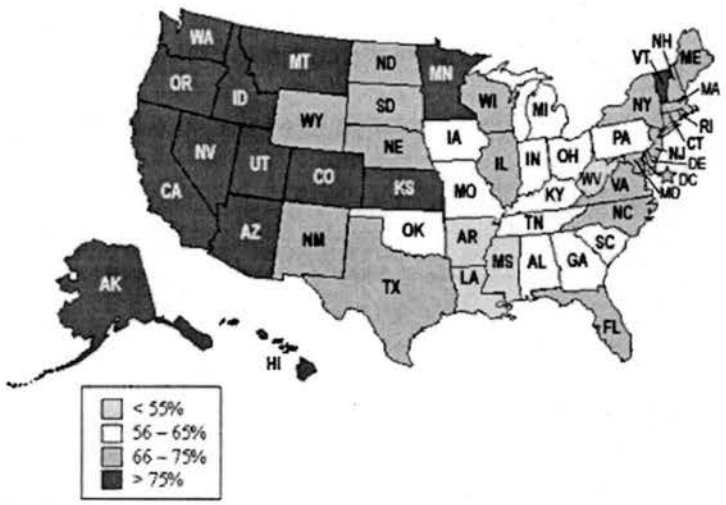
Table 2.3 – Healthy People 2010 Breastfeeding Objectives (62, 63)

Increase in Mothers who Breastfeed:	National Goals (2010)	Colorado (2001)
In early postpartum period (initiated in the hospital)	75%	83% (↑)
At 6 months	50%	46% (↓)
At 1 year	25%	21% (↓)

Nationally, fourteen states met the Healthy People 2010 objectives for initiation of breastfeeding (see Figure 2.2). According to the NIS, at 6 months postpartum, approximately 35% of both Hispanic women and white women were breastfeeding their infants, both below the goal of 50% (62). In addition, mothers of infants who received WIC benefits during the first year of life were less likely to initiate or maintain breastfeeding than were mothers whose infants were not enrolled in WIC. Also, infants enrolled in WIC were less likely to be exclusively

breastfed (62). Breastfeeding initiation and duration rates continue to be the highest among women who are white, college educated, older than 30 years, employed part-time, not enrolled in WIC and living in the Mountain or Pacific Regions (54, 62). The reasons are not fully understood and multiple research studies are currently investigating many of these questions.

Figure 2.2. Percent of Children Ever Breastfed in the United States from the National Immunization Survey, Centers for Disease Control and Prevention, Department of Health and Human Services

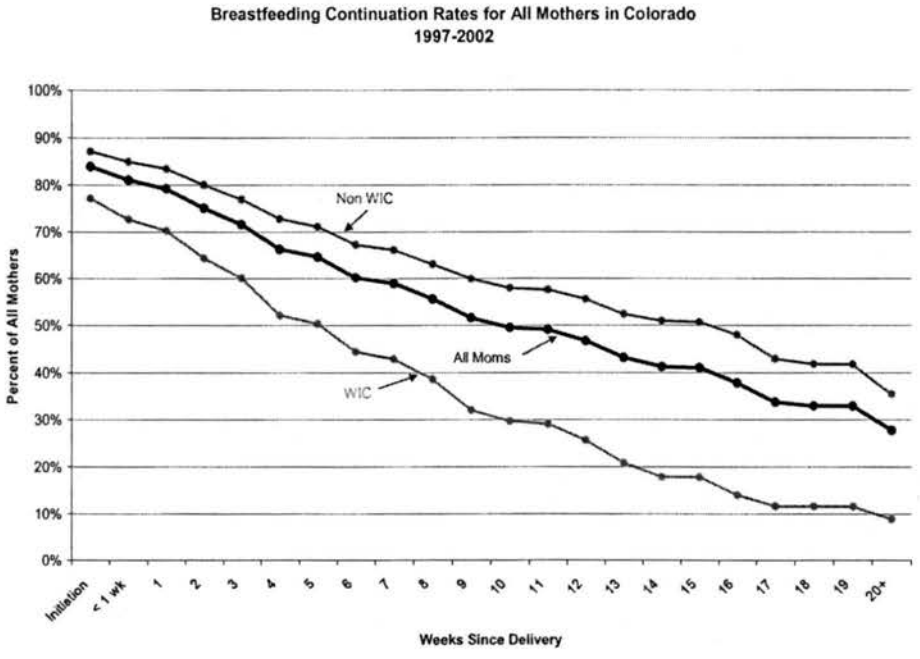


Breastfeeding Trends in Colorado. A recent analysis of Colorado PRAMS (Pregnancy Risk Assessment and Monitoring System) data from 1997-2002 (63) showed a dramatic decline in breastfeeding duration rates among all mothers in Colorado. Colorado exceeded the national recommendations of initiating breastfeeding at 83%, yet fell short at 6 months and one year, 46% and 21% respectively (62). According to the analysis, women who smoked initiated breastfeeding at far lower rates and discontinued more rapidly than women who were non-smokers. This assessment also noted that WIC clients initiated

breastfeeding at lower rates and discontinued more rapidly than non-WIC clients. Whether or not a mother smoked had a greater impact on breastfeeding continuation than whether or not she was a WIC client (63). The results also examined hospital practices and life stressors. Hospital practices (e.g. lack of help with initiation, pacifier use) negatively impacted breastfeeding. Initiation and duration rates were greater in 2002 than in 1997 regardless of the kind of stress a mother was under. Stressors included more arguments with family members or close friends than usual, more bills than usual, death of someone close, unwanted pregnancy, husband/partner lost job and/or family moved (63). These results are comparable to national data.

Figure 2.3 illustrates the breastfeeding continuation rates for all mothers in Colorado during 1997-2002 from PRAMS data. This figure shows the breastfeeding continuation rates out to 20 weeks. Each month, a stratified random sample (based on location and birth weight) containing approximately 5% of Colorado women who recently had a baby were selected from eligible birth certificates. At 2 to 6 months after delivery, each sampled woman was mailed a copy of the PRAMS questionnaire and called to ensure response rate. A total of 14,319 women were selected to participate in PRAMS and 10,399 (73%) of those women completed surveys (63). According to the data, breastfeeding rates quickly decline for all mothers from initiation. Mothers not enrolled in WIC have higher initiation and duration rates than women enrolled in WIC.

Figure 2.3. Breastfeeding Continuation Rates for All Mothers, Non WIC Mothers and WIC Mothers in Colorado from the 1997-2002 Colorado PRAMS Data



Barriers to Breastfeeding. Even though the benefits of breastfeeding are well-documented, there are still a multitude of barriers that affect both breastfeeding initiation and duration rates in the United States. Many new mothers and fathers look to their health care professionals as the "go to person" for advice about breastfeeding. While many health care professionals are supportive of breastfeeding, many lack the training to adequately answer questions or recognize any breastfeeding problems that require immediate attention.

A recent study by Krogstand et al. surveyed 262 physicians on their breastfeeding promotion practices, knowledge and areas in which they felt they needed more information on to support women to initiate or continue breastfeeding (64). Of the 262 physicians, over half (51%) reported no or limited

education in breastfeeding and 9% reported adequate education. Overall, physicians felt they needed more problem-solving education and information on breastfeeding to help their breastfeeding mother-infant pairs (64).

Another barrier is acculturation. Acculturation is the term to describe the complex process by which immigrants assume the cultural patterns (e.g. beliefs, religions and language) of a host country to which they have immigrated (65). Higher acculturation levels among immigrants to the United States have been shown to negatively affect breastfeeding initiation and duration rates among Hispanic mothers. In 2005, Gibson et al. (66) completed a secondary data analysis on NHANES (National Health and Nutrition Examination Survey) data. The degree of acculturation was assessed using the Short Acculturation Scale (SAS), a four-item Spanish language usage scale. The researchers concluded that Hispanic women with higher acculturation levels were less likely to have breastfed (33.1%) their children than both Hispanic women who were less acculturated (59.2%) and whites (45%). This association was seen even after controlling for education, age and income; all factors which appear to affect acculturation (66). It has also been shown that breastfeeding women were more likely to have been born in a country other than the United States or Puerto Rico, less likely to be a United States citizen, and/or likely to have spent less time in the United States (67). These findings have been confirmed in other studies (67-72). It appears that Hispanic mothers who are less acculturated and demonstrated closer ties with their cultural traditions, beliefs, and practices are most likely to initiate and sustain breastfeeding.

Changes in after-delivery care are another barrier to initiating breastfeeding. Shorter post-partum stays have limited the support from health care professionals and the "watchful eye" that many new mothers need to fully initiate breastfeeding while in the hospital. The Baby Friendly Hospital Initiative has potential to combat this barrier, but only 51 hospitals in the entire United States currently have this designation (73). The Baby Friendly Hospital Initiative is a global program developed by UNICEF and WHO. This program works with health care services (e.g. hospitals) to improve breastfeeding practices and policies so parents are prepared to make informed choices about how they feed and care for their babies (73). Currently two Colorado hospitals have filed for a certificate of intent to become "Baby Friendly" including Exempla Saint Joseph Hospital in Denver and Poudre Valley Hospital in Fort Collins. Exempla Good Samaritan Medical Center in Lafayette, Colorado succeeded in becoming "Baby Friendly" in the fall of 2006. See Appendix A for the "Ten Steps to Successful Breastfeeding" which was established in 1989 from WHO and UNICEF.

The largest barrier to breastfeeding is likely the numerous sociocultural factors in today's world. First, breastfeeding is not part of the United States' cultural norm. Embarrassment and reluctance of showing one's breast in public can also have negative effects on breastfeeding rates. Earle (74) completed qualitative work on new mothers' views on breastfeeding in public:

- ✓ "I wouldn't do it in public; I just couldn't get my body out anywhere, for anybody. It is more private, isn't it?" (74)
- ✓ "I wanted to breastfeed but wasn't sure if I felt comfortable about it. Purely because I think how I have been brought up very private and breastfeeding isn't that way at all…" (74)

Colorado passed a bill (Senate Bill 04-088) in 2004 stating that a mother may breastfeed in any place she has the right to be (75). Unfortunately, this bill does not protect those women who choose to pump their breastmilk for their infants when they return to work or school. In addition to the above barriers, there is a loss of traditional knowledge of breastfeeding since many of today's grandmothers did not breastfeed their own infants (66-72). Infant formula is marketed towards and readily available to pregnant women. Also, providing these products in discharge packets in hospitals has been found to discourage women from breastfeeding. Discharge packets are provided by infant formula companies and typically contain information to the new parents along with a can of formula; a smaller can if the woman has decided to breastfeed. When a new mother has her first common problem with breastfeeding, there is a can of formula available to "save her" (76). Last but not least, women are offered relatively shorter or no maternity leaves and/or return to work earlier. This may be due to the field of work or economic reasons. Also, many women struggle with inflexible work hours when returning to work and lack of breaks to express breastmilk while away from their infant. These challenges are especially cumbersome to women in non-professional jobs (57, 56, 76-79). The number of women in the work force continues to increase. As a result, the concern of a decrease in breastfeeding within this population needs to be examined.

Working Women and Child Care. There were 61 million working women in the United States in 2001 and nearly three quarters of all mothers in the United States are in the work force (80). In 2000, 65% of mothers with children under

the age of six were in the workforce, while this number was only 47% in 1980 (81). Every day, three out of five children are in child care (80). It is estimated that 12 million of the 19 million children in the United States under the age of five are in some form of child care (81). In 1977, there were less than 25,000 child care centers in the United States. This number grew to 40,000 by 1987 and had more than doubled by 2004 at 117,000 (81). It is hard to determine the exact number of child care centers due to the constant opening and closing of centers, the unknown number of unregulated centers and the fact that some child care centers choose not to share their information in research studies (81). In 2002, the fourth most common reason Colorado mothers cited for ceasing breastfeeding behind "not producing enough milk", "did not satisfy baby" and "baby had difficulty nursing" was because they returned to work or school (63). With the decline in breastfeeding coinciding with mothers return to work (3-6 months), this area deserves more study.

Visness et al. (77) found that the decision to initiate breastfeeding was not associated with maternal employment. Their analysis used nationally representative data from the 1988 National Maternal and Infant Health Survey to explore the factors, including employment, associated with breastfeeding initiation and duration among 9,087 women. The length of maternity leave was positively associated with the duration of breastfeeding ($p<.05$). Among breastfeeding women, returning to paid employment within a year of delivery was associated with a shorter duration of breastfeeding when other factors were controlled (77).

Noble et al. (56) found that planning to return to work prior to 6 weeks postpartum reduced the likelihood of initiating breastfeeding. Of the mothers who planned to work post-partum, 75% initiated breastfeeding as compared with 84% who did not plan to work post-partum (χ^2=108, p=.0001). Roe et al. (57) found that work intensity negatively influenced the level of breastfeeding. Data were taken from the Food and Drug Adminstrator's Infant Feeding Practices Study (IFPS) with a total of 1,550 mothers who completed eleven questionnaires at various times ranging from late pregnancy to 12 months postpartum. Expecting to work part-time neither decreased nor increased the probability of breastfeeding relative to expecting not to work. Expecting to work full-time significantly decreased breastfeeding duration up to 12 months (OR=.47, p<.01).

In 2005, Li et al. (62) conducted a study on approximately 3,500 children. Seventy-one percent of the 3,500 children had ever been breastfed. The percentage of children who continued to breastfeed to any extent at 6 and 12 months was 35% and 16%, respectively. Exclusive breastfeeding was low at 42% at 3 months and 13% at 6 months. Children who attended day care at 6 months were less likely to have ever been breastfed or remain exclusively breastfed at 7 days, 1 month, 3 months, 6 months and 12 months ($p \leq .05$). According to the researchers, "special attention needs to be paid to the sharp decline in exclusive breastfeeding between 3 and 5 months; for many mothers, this is the time at which they return to work or school and need additional support to continue exclusive breastfeeding" (62). This appears to be true for the many

breastfeeding mothers that send their children to day care centers; more support is needed (76-79).

Child care agencies often support breastfeeding as the food of choice for infants. In 1999, the USDA in a federal register regulation authorized the rule that meals for infants that contain only breastmilk could be reimbursed to support the research of the benefits of breastfeeding and the Healthy People 2010 objectives (82). It also mandated that breastmilk should be given to the child care provider from the parents and labeled with the infant's name. The infant is to only receive his/her mother's milk (82). The ADA recommended that breastmilk be offered as the food of choice for infants in child care centers. They also advocated proper storage and handling of both breastmilk and formula in child care centers. Parents should be involved in the nutrition planning at child care centers and appropriate infant feeding training should be presented to child care providers. The ADA also recommended that training for child care providers be ongoing and regular because of the high turnover rates of child care center employees. Half of child care staff and one-third of child care directors leave their child care center within four years of being hired by the center (81). The USDA developed a booklet, "A Guide for Use in Child Nutrition Programs". One of the chapters is entitled "Feeding the Breastfed Baby". This chapter outlines the important elements of feeding breastmilk to infants at child care centers and includes important topics such as ways to support the breastfeeding mother and guidelines on handling, storing, preparing and feeding breastmilk to infants (83).

Studies have been conducted to identify types of accommodation and support worksites/businesses can offer to provide a more supportive environment to breastfeeding working mothers (62, 84-93). Examples include: offering breaks to breastfeed/express breastmilk, child care available on site, lactation specialists available and policies/procedures protecting breastfeeding mothers from harassment. Yet, few studies have been published regarding the ways child care centers can provide a supportive environment for working women who are breastfeeding. In 1991, Dirige et al. surveyed 3,000 child care providers in San Diego County in California to determine the nutrition education needs of staff members in relationship to providing nutritious meals to the infants and children in their care (94). Of the 3,000 mailed surveys, 195 child care providers responded (6.5% response rate). Seventeen percent of the child care providers were interested in receiving training in breastfeeding topics. Ninety-four percent of respondents were interested in receiving nutrition related information, 46% were interested in attending a half-day nutrition workshop and 23% were interested in attending a full day nutrition workshop (94). This survey was administered to all child care providers, both family home day care and larger child care centers, and not infant room teachers and directors specifically; this study's primary target audience. Also, in 1992, the Colorado Department of Public Health and Environment (CDPHE) Child and Adult Care Food Program (CACFP) administered a questionnaire to child care centers in Colorado regarding breastfeeding, but due to time and budget constraints, no data were released or published from this survey (95).

Website Development

A review of literature highlights the need for an appropriate way to provide accurate educational materials and best practice information about infant feeding, specifically breastfeeding, to child care providers. A website may be an appropriate way to provide information to child care providers. Currently, there is a website from the University of Idaho that provides information on feeding young children in group settings. The website consistently receives an average of around 21,000 hits and a total of around 1,600 downloads of educational materials per month (96). This website is an excellent resource. However, the website's main target population is young children and not infants. As a result, topics relative to infant feeding, specifically breastfeeding, are not included.

The development of a website focusing on infant feeding would allow child care providers to receive simple, concrete messages regarding infant feeding practices. Shaikh et al. (97) conducted an assessment of the credibility of breastfeeding information on the Internet in 2005. They assessed 40 websites that dealt with breastfeeding. Most of the websites (40%) were developed and authored by physicians, registered nurses or certified lactation consultants. Only 65% had information available to the user about when the website was updated. Very few sites accurately discussed the important elements of breastfeeding which includes information on comfort, supply and the health and social aspects of the mother-infant breastfeeding pair. Many sites also lacked a specific disclaimer stating that the information available on this website was not to replace the information received by a health care provider (97). A website with

infant feeding practice information specific to the needs of child care providers is not available at this time.

The apparent interest in educational information distribution by the Internet is further supported by national trends. Approximately 60 million Americans per year use the Internet to receive health or medical information and this number continues to increase (98). It is also estimated that 93 million adults use the Internet to search for health-related information (99) and 74% of women with Internet access use it to obtain health-related information (97). There are a multitude of advantages of providing health information on websites including convenience, appeal, flexibility and openness of communication. Web-based technology can offer individuals access to information and support when they need it the most. Though the advantages are apparent, the Internet can be a source of inaccurate information as well (98). Kim et al. (100) reviewed published criteria regarding health related websites and found that a number of researchers agreed on six essential evaluation criteria: 1) content, 2) design and aesthetics of the site, 3) disclosure of authors, sponsors or developers, 4) current information, 5) authority of source, and 6) ease of use. An expert panel from HHS also described that health information on the internet should be accurate, current, valid, appropriate, intelligent and free of bias (101). In 2005, Sutherland et al. (99) evaluated the content, usability and readability of selected nutrition websites. They developed categories for each of the criteria of content quality and usability. Based on their work, they found that websites scored negatively if the sites did not include references for information sources and if the sites

displayed a lack of balanced information. Long scrolling screens, lack of available help, poor legibility and too high of a reading level scored negatively as well (99). They also noted that it was important to users to know who was "in charge" of the website and if this individual has appropriate credentials to make the claims on the website. Internet programs and websites have the potential to be a cost efficient way to deliver tailored communication that could have great effects on health promotion, disease prevention and management (100, 102).

Process evaluations can be done at any time to describe and analyze how a program is conceptualized, planned and implemented (103). Process evaluations of websites are an instrumental part of realizing the full potential of the information provided to users. According to Escoffery (104), "with interactive health communication applications, process evaluation helps track the operational characteristics of the intervention; assess security, accuracy, reliability, usability, and response time; and measure user satisfaction and usage patterns". Escoffery et al. (104) conducted a process evaluation of a web-based smoking cessation program for college students, which was based on the transtheoretical model of change theory, also known as the stages of change theory (tailor a therapy based on where a person is regarding changing a specific behavior). Before development of the program, the researchers conducted focus groups and interviews with the target population to determine what they felt were essential on a website for ceasing smoking. The development of the content and layout for the website was reviewed by health experts and based on the discussions with the target audience in the focus groups and interviews. Once

the website was designed, tobacco professionals and the target population reviewed the content and style of the website by testing the presentation of the website, ease of navigation, ease of learning, satisfaction, and other aspects of using the website. The process evaluation lasted for 2 months. As a result of the process evaluation, changes were made to the website. During the 2 month period, the researchers also used web analytic software to determine the actual number of website pages visited and downloaded. Many participants indicated that the website was easy to use and self-directed (104). Negative comments about the website ranged from repetition of content to technical issues. Escoffery recommended that more in-depth evaluations are necessary to learn if web-based programs will change health related behaviors (104). Other process evaluations have been conducted on web-based health programs including a website incorporating nutrition, health, and aging issues (105), nutrition education to promote fruit and vegetable intake in adults (106), nutrition and physical activity promotion to young girls (107), physical activity promotion in a worksite (108) and professional development for family life educators (109). The researchers from these studies stress the importance of making websites dynamic and up-to-date. It is also essential to determine the target population's computer knowledge and internet connection speed (e.g. making sure have appropriate graphics and text if target population primarily uses dial-up). Overall, there is a continued need to conduct outcome based research that measures usability trends as well as knowledge, behavior and attitude changes through using the website (104-109).

Questions surround the issue of the effectiveness of web-based vs. non-web-based interventions. Wantland et al. (110) recently conducted a meta-analysis of behavior change outcomes trying to answer these questions. The aggregated participant data totaled 11,754 participants. The results of this review showed that web-based tools produced similar results to their non-web-based counterparts (110). The authors did stress the importance of testing reliability and validity on web-based tools as well. Using the Internet not only for web-based interventions but also for collecting data through surveys is also highly prevalent. Surveys can be placed in a password protected area or may be open to the public (111). These types of surveys are convenient for researchers as the data can be directly entered into a database instead of entering it in manually. The validity and reliability of data received on-line are comparable to those obtained by traditional paper and pen methods. Selection bias can be a major limiting factor of using Internet surveys as they may limit the generalizablility of the results. According to Eysenbach, selection bias occurs due to the 1) non-representative nature of the Internet population and 2) the self-selection of participants (e.g. volunteer effect) (111).

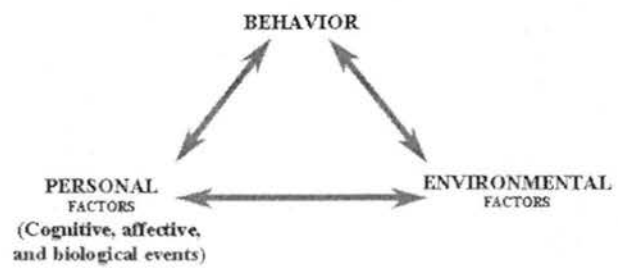
The majority of research studies on the effectiveness of web-based intervention programs last 2 to 3 months (104, 108) and computer literacy was not a barrier (102, 105). Unfortunately, in many research studies on health promotion and health behavior change, there was little evidence that websites can be an effective tool for behavior change due to lack of data (99, 102-106, 108). Furthermore, the researchers of this project have not found websites that

are specific to child care providers on infant feeding practices, specifically breastfeeding.

Behavior Change Theories

Even when developing a web-based intervention, it is important to base the development and evaluation of a program on a behavioral change theory (98). Perry, Baranowski and Parcel define the Social Learning Theory as a theory "addressing both the psychological dynamics underlying health behavior and the methods of promoting behavior change" (112, 113). Social Learning Theory is appropriate for the theoretical framework for the development of a website because of the essential constructs of interactions among the person, behavior and environment (reciprocal determinism), self-efficacy and modeling. Figure 2.4 illustrates the interaction between personal factors, behavior and environmental factors.

Figure 2.4. Social Learning Theory's Essential Constructs of Interaction with the Person, Behavior and Environment.



Other essential constructs of the Social Learning Theory include: Expectations (the outcome that one expects to happen), Expectancies (the benefits and barriers one places on the expectations), Behavioral Capabilities

(the knowledge and the skills to elicit the behavior change) and Vicarious Reinforcement (learning by watching peers or someone that is comparable) (112, 113).

Summary

Breastfeeding and the use of breastmilk have been shown to provide a multitude of benefits. Despite recognized benefits, most states fall below the Healthy People 2010 objectives for initiation and duration of breastfeeding including Colorado (115). Colorado exceeded the national recommendations of initiating breastfeeding at 83%, yet fell short at 6 months and one year, 46% and 21% respectively (62). Breastfeeding women face many barriers and reasons to quit each day including lack of support from loved ones and health care providers, sociocultural factors and returning to work or school. The fourth most common reason Colorado mothers cited for ceasing breastfeeding was because they returned to work or school (63). Because of the large number of working parents in our society today, many infants are being placed into child care.

In order to effectively support breastfeeding working mothers who enroll their infants in child care, it is important to determine the beliefs, knowledge and attitudes of child care providers in relationship to feeding infants, specifically breastfeeding and the use of breastmilk. Providing educational materials in a medium desired by child care providers is essential as well. Exploring various channels for the delivery of nutrition education is a challenge yet critical if effective communication and education is to be achieved. A plethora of health education websites are being developed and evaluated for usability and

effectiveness due to the increased use of technology (104-109). A website may be an effective means to provide infant feeding information to child care providers. Further study on this important issue is imperative to continue to support the working mother and breastfeeding infant.

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CHAPTER 3

NEEDS ASSESSMENT OF CHILD CARE PROVIDERS' KNOWLEDGE, ATTITUDES, BEHAVIORS AND TRAINING NEEDS RELATED TO INFANT FEEDING, SPECIFICALLY BREASTFEEDING

Introduction

It is well established that breastfeeding and the use of breastmilk have been shown to provide health, nutritional, immunological, developmental, psychological, social, economic and environmental benefits, which extend to the infant, mother and community (1). The United States Department of Health and Human Services (HHS) and the American Academy of Pediatrics (AAP) recommend that infants be breastfed exclusively for the first 6 months of life and the continuation of breastfeeding with appropriate solid foods for at least the first year (1-3).

Even though the benefits are well known, many mothers choose not to breastfeed or cease breastfeeding before the recommended time. Healthy People 2010 established goals that at least 75% of all United States mothers initiate breastfeeding, at least 50% continue breastfeeding for 6 months, and at least 25% of infants are breastfed until one year of age (4). Despite recognized benefits, many states fall below the Healthy People 2010 goals for breastfeeding

initiation and duration rates. Colorado exceeded the national recommendations of initiating breastfeeding at 83%, yet falls short for duration at both 6 months and one year, 46% and 21% respectively (5). In 2001, the Centers for Disease Control conducted the National Immunization Survey to assess how states were achieving the Healthy People 2010 goals for breastfeeding. Only 14 of the 50 states met the goal that 75% of all United States mothers initiated breastfeeding their infant (5). Out of the 50 states, Colorado ranks eighth for initiation of breastfeeding and thirteenth for breastfeeding duration at 6 months (5).

In 2002, the fourth most common reason Colorado mothers cited for ceasing breastfeeding behind "not producing enough milk", "did not satisfy baby" and "baby had difficulty nursing" was because they returned to work or school (6). The number of working women continue to rise. There were 61 million working women in the United States in 2001 and nearly three quarters of all mothers in the United States are in the work force (7). In 2000, 65% of mothers with children under the age of six were in the workforce, while this number was only 47% in 1980 (8). It is estimated that 12 million of the 19 million children in the United States under the age of five are in some form of child care (8). In 1977, there were less than 25,000 child care centers in the United States. This number grew to 40,000 by 1987 and had more than doubled by 2004 at 117,000 (8). It is hard to determine the exact number of child care centers due to the constant opening and closing of centers, the unknown number of unregulated centers and the fact that some child care centers choose not to share their information in research studies (8). Children who attend child care at 6 months

of age have been shown to be significantly less likely to have ever been breastfed or remain exclusively breastfed at 7 days, 1 month, 3 months, 6 months and 12 months (9).

Visness et al. (10) found that the decision to initiate breastfeeding was not associated with maternal employment. However, the length of maternity leave was positively associated with the duration of breastfeeding ($p<.05$). Among breastfeeding women, returning to paid employment within 12 months of delivery was associated with a shorter duration of breastfeeding when other factors were controlled (10). Noble et al. (11) found that planning to return to work prior to 6 weeks postpartum reduced the likelihood of initiating breastfeeding. Of the mothers who planned to work post-partum, 75% initiated breastfeeding as compared with 84% who did not plan to work post-partum ($\chi^2=108$, $p=.0001$). Roe et al. (12) found that the number of hours worked negatively influenced the level of breastfeeding. Expecting to work full-time significantly decreased the probability of breastfeeding duration (OR=.47, $p<.01$). Unfortunately, women are offered relatively shorter or no maternity leaves and/or return to work earlier. This may be due to the field of work or economic reasons. Also, many women do suffer from inflexible work hours when returning to work and lack of breaks to express breastmilk while away from their infant. These areas are especially cumbersome to women in non-professional jobs (11, 12, 13-16). With the decline in breastfeeding often coinciding with mothers return to work, it is important to examine where infants are being cared for when their parent(s) are working.

Child care agencies often support breastfeeding as the food of choice for infants. In 1999, the United States Department of Agriculture (USDA) in a federal register regulation authorized the rule that meals for infants that contain only breastmilk could be reimbursed to support the research of the benefits of breastfeeding. The American Dietetic Association (ADA) recommended that breastmilk be offered as the food of choice for infants in child care centers. They also advocated proper storage and handling of both breastmilk and formula. Parents should be involved in the nutrition planning at child care centers and appropriate infant feeding training should be conducted to child care providers. The ADA also recommended that training for child care providers be ongoing and regular because of the high turnover rates of child care center employees. Half of child care staff and one-third of child care directors leave their child care center within four years of being hired by their center (8). The USDA developed a booklet, "A Guide for Use in Child Nutrition Programs". One of the chapters is entitled "Feeding the Breastfed Baby". This chapter outlines the important elements of feeding breastmilk to infants at child care centers and includes important topics such as ways to support the breastfeeding mother and guidelines on handling, storing, preparing and feeding breastmilk to infants (18). Other agencies such as USDA – Cooperative State Research, Education and Extension Service (CSREES), the Supplemental Nutrition Program for Women, Infant and Children (WIC) and the AAP support breastfeeding as the preferred method of feeding infants (1, 19-20).

Studies have been conducted to identify types of accommodation and support worksites/businesses can offer to provide a more supportive environment to breastfeeding working mothers (21-30). Examples include: offering breaks to breastfeed/express breastmilk, child care available on site, lactation specialists available and policies/procedures protecting breastfeeding mothers from harassment. However, no peer reviewed studies known to the researchers have been published regarding the knowledge, attitude, behaviors and training needs of child care providers in relationship to infant feeding, especially breastfeeding. In 1991, Dirige et al. surveyed 3,000 child care providers in San Diego County in California to determine the nutrition education needs of staff members in relationship to providing nutritious meals to the infants and children in their care (31). Of the 3,000 mailed surveys, 195 child care providers responded. Seventeen percent of the respondents were interested in attending breastfeeding training. Ninety-four percent of respondents were interested in receiving nutrition related information, 46% were interested in attending a half-day nutrition workshop and 23% were interested in attending a full day nutrition workshop (31). This survey was administered to all child care providers, both home-based and center-based, and not infant room teachers and directors specifically; this study's primary target audience. This study was also conducted before the Internet was widely used. Also, in 1992, the Colorado Department of Public Health and Environment (CDPHE) Child and Adult Care Food Program (CACFP) administered a questionnaire to child care centers in Colorado regarding

breastfeeding, but due to time and funding constraints, no data was released or published from this survey (32).

The purpose of this study was to assess the knowledge, attitudes, behaviors and training needs of child care providers on infant feeding, specifically breastfeeding, in child care centers. Assessment tools also examined: 1) the extent to which child care providers felt they were an important element in offering support to breastfeeding working mothers; 2) what supportive elements were they currently providing (e.g. offering breastmilk to infants when parents requested, storing breastmilk appropriately, availability of educational materials); 3) appropriate ways to integrate best practice information; and 4) educational strategies to enable a more supportive infant feeding environment, specifically for breastfeeding.

Methods

Study approval was received from the Human Research Committee at Colorado State University. Two separate needs assessment surveys were developed: one for child care directors and one for infant room teachers. Questions were developed using a past survey that the Colorado Child and Adult Care Food Program (CACFP) developed in 1992; additional questions were added per advisement from an advisory committee of infant feeding experts. The director survey contained 24 questions primarily asking about the management of the child care center in relationship to infant feeding (e.g. feeding policies, educational materials available, enrollment in government food programs). The

infant room teacher survey contained 35 questions primarily asking about the process of feeding infants at the center. Once the survey was developed, content and face validity were tested with an advisory committee of breastfeeding, infant feeding, and child care experts (n=14) and members of the target population (n=7). Feedback was received and the survey was deemed valid. Reliability testing was completed with a separate sub-group of child care center directors and infant room teachers. Twenty-two infant room teachers and seven directors completed the survey 7 days apart. Reliability testing of the survey was conducted via a test-retest format in which all questions scored a correlation level at or above .7 indicating the tool was reliable. Breastfeeding and infant feeding method questions (e.g. formula feeding and introducing solid foods) were all used to decrease bias and assess overall needs. The guidelines used to assess the correct answers for storage of breastmilk in the refrigerator (48 hours) and refrigerator freezer (3 months) are from the Child and Adult Care Food Program's (CACFP) Breastfed Babies are Welcome Here: A Guide for Child Care Providers (33), because the Colorado CACFP Program uses these guidelines in their child care centers that are enrolled in their program. Power calculations were completed based on reliability testing of the needs assessment and a sample size of 202 surveys was needed to receive 90% power to be confident with the detection of significant differences among respondents.

A list of the 277 child care centers that were licensed to provide care to infants was provided by the Colorado Department of Human Services. An infant was defined for this study as $\leq$12 months. The number of surveys mailed to each

child care center was determined by a committee of experts and fell within available funding. Five surveys were mailed to each child care center. One director survey and four infant room teacher surveys were sent to each child care center with a self-addressed return envelope. A total of 1385 surveys to the 277 Colorado licensed child care centers were mailed. The 277 child care centers were all center-based; no home-based providers were surveyed for this research study. The exact proportion of unregulated child care centers and providers were unknown to the researchers. An overall cover letter to the director was sent explaining the research project. In addition, each survey had a cover letter describing the survey and informed consent to participate in the study. Incentives (drawing for a $50 gift certificate to a local store) were offered and postcards were sent to non-responding centers to increase the response rate. Statistical analysis software (SAS 9.1) was used to conduct frequency distributions and chi-square tests (34). Differences among weighted means of the preferred educational materials were analyzed using repeated measures analysis of variance with the Bonferroni post hoc test. Open-ended questions were evaluated to determine themes among participant answers using triangulation data analysis procedure (35). This procedure consists of two people analyzing the qualitative data and comparing the themes that emerged to determine if there was theme consensus among the two people.

Results

Response Rate and Center Demographics. Ten centers (50 surveys) from the initial 277 centers were eliminated because the child care centers were closed or were not caring for infants at the time of the study. Surveys were received from 73 child care centers (27% response rate). A total of 201 teacher (19% response rate from 1068 of the surveys mailed to teachers) and 66 child care director (25% response rate from 267 of the surveys mailed to directors) surveys were received with an overall response rate of 20%. The respondents' centers were distributed among rural (28%), other metro (41%) and Denver metro (31%). Centers, on average, were licensed to provide care for 15 infants, but only provided care for a mean of 11 infants at the time of the study. Eighteen percent of the centers were accredited by the National Association for the Education of Young Children (NAEYC). The State of Colorado does not accredit or have levels of accreditation for child care centers. Forty-seven percent (47%) of the centers were enrolled in CACFP. Ninety-eight percent of the centers allowed staff members to breastfeed during their shift, but during breaks only. One hundred percent of the centers accepted infants who received breastmilk and the average age of the infants when starting child care was 3-½ months.

Director Survey Results. The characteristics of the child care directors surveyed are described in Table 3.1. According to the needs assessment, directors were female (100%) and most had worked in child care for greater than 10 years (62%). Forty-three percent of the 52 directors who had children fed them breastmilk.

Table 3.1 – Characteristics of Child Care Directors and Infant Room Teachers		
	Child Care Directors (N=66)	**Infant Room Teachers (N=201)**
Gender		
Female	100% (66)	100% (201)
Male	0% (0)	0% (0)
Worked in Child Care		
<1 year	0% (0)	7% (14)
1-4 years	5% (3)	23% (46)
5-10 years	34% (21)	34% (69)
>10 years	62% (41)	36% (72)
Worked at Current Center		
<1 year	12% (8)	26% (52)
1-4 years	24% (16)	44% (89)
5-10 years	35% (23)	25% (50)
>10 years	29% (19)	5% (10)
Have Children		
Yes	79% (52)	71% (143)
No	21% (14)	29% (58)
Fed Children	*N=52*	*N=143*
Breastmilk	43% (22)	23% (33)
Formula	41% (21)	29% (41)
Combination	16% (8)	48% (69)

Seventy-three percent of the directors stated their center had a written policy on infant feeding. Of this percent, 69% had a written formula feeding policy and 57% had a written breastfeeding policy. There was no evidence that the probability if the child care center had a written breastfeeding policy (χ^2 =8.41; p=.2097) or formula feeding policy (χ^2 =4.30; .6361) depended on what the directors had fed their own children. Roughly 88% of the directors shared infant feeding policies with parents. Ninety-two percent of child care directors provided a packet of information to prospective parents, yet approximately half (43%) of the packets did not have information on the infant feeding practices at their center. Infant feeding educational materials available at the centers to child

care providers, staff and parents included information on breastfeeding (70%), formula feeding (70%), introducing solid foods (66%), and 27% of the centers had none of the above information available. There was evidence that the probability if the child care center provided a packet of information about the center with breastfeeding information ($\chi^2 = 9.03$; $p<.003$) or formula feeding information ($\chi^2 = 9.22$; $p<.002$) to prospective parents depended on if the directors had breastfeeding educational materials available at their center. Even though a large percentage of the centers did have information available to parents and staff, participants stated in the open-ended questions that the information was "*out of date*", they "*questioned the credibility*" of the information and they "*wanted Spanish*" information as well.

Infant Room Teacher Survey Results. The characteristics of the infant room teachers surveyed are described in Table 3.1. According to the needs assessment, teachers were female (100%) and most had worked in child care for greater than 5 years (70%). Forty-eight percent of the 143 infant room teachers who had children fed them breastmilk. Fifty percent of the teachers answered "like it a lot" when asked about how they felt about mothers breastfeeding at their center, while only 2% "did not like it". There was evidence that the probability of how infant room teachers felt about mothers breastfeeding at their center depended on what they had fed their own children ($\chi^2 = 22.72$; $p=.007$). Twenty-one percent of infant room teachers answered correctly on how long it is safe to store prepared formula in the refrigerator and 28% answered correctly for breastmilk. Forty-five percent answered correctly on how long it is safe to store

breastmilk in the refrigerator freezer. There was no evidence that the probability of how long child care providers felt it was safe to store prepared formula in the refrigerator (χ^2 = 3.04; p=.69), store breastmilk in the refrigerator (χ^2 =7.67; p=.18) or store breastmilk in a refrigerator freezer (χ^2 = 3.94; p=.56) depended on if they had been to a training on how to appropriately store, handle and feed an infant. Yet, there was evidence that the probability if they felt frozen breastmilk should be thawed in the microwave (χ^2 = 22.77; p=.01) and if breastmilk (χ^2 =24.34; p=.006) or formula (χ^2 = 203.74; p<.0001) should be warmed in the microwave depended on if they had been to a training on how to appropriately store, handle and feed an infant. Contrary to the high numbers of incorrect answers on adequate storage, 90% of the respondents answered they have received training on how to appropriately store, handle and feed both formula and breastmilk to infants in their care.

Child care providers' perceived attitudes on the advantages and disadvantages of one feeding method versus another feeding method are described in Table 3.2-3.5. The top believed advantage of breastmilk over formula was better bonding with mom (86%), while the top believed disadvantage of breastmilk over formula was harder for infants to leave their mothers (55%). The top believed advantage of formula over breastmilk was easier and more convenient (45%), while the top believed disadvantage of formula over breastmilk was not as healthy (47%). In addition, the perceived appropriate mean age to stop offering formula and breastmilk to an infant was 12 months with a range of 6 to 21 months for formula fed infants and 2 to 36 months for breastfed infants.

Table 3.2 – Child Care Providers' Perceived Advantages of Breastmilk over Formula	
Advantages	**% (N)**
Better bonding with mother	86% (171)
Saves family money	85% (170)
Better nutritionally	83% (166)
Less illness	77% (153)
Less risk of diseases in adult life	59% (118)
Less trash	53% (105)
More convenient	41% (81)
It is easier	40% (79)
Less risk of obesity	36% (72)
Helps make infants smarter	34% (68)
Diapers not as smelly	29% (58)
Infant is easier to care for	22% (43)
Not embarrassing	11% (22)
No advantage	2% (4)
Other	2% (4)

Table 3.3 – Child Care Providers' Perceived Advantages of Formula over Breastmilk	
Advantages	**% (N)**
It is easier	45% (89)
More convenient	45% (89)
Infant is easier to care for	31% (61)
No advantage	28% (56)
Not embarrassing	28% (55)
Diapers not as smelly	15% (30)
Other	7% (14)
Better nutritionally	5% (10)
Less trash	4% (8)
Less illness	3% (5)
Better bonding with mother	3% (5)
Helps makes infants smarter	2% (4)
Saves family money	2% (3)
Less risk of obesity	1% (2)
Less risk of diseases in adult life	1% (1)

Table 3.4 – Child Care Providers' Perceived Disadvantages of Breastmilk over Formula	
Disadvantages	**% (N)**
Harder for them to leave their mothers	55% (110)
Eat more frequently	42% (83)
Do not have as regular of schedule	29% (57)
No disadvantage	25% (50)
More diaper changes	18% (35)
Uncomfortable for staff	13% (26)
Embarrassing	9% (17)
Other	3% (6)
Not as healthy	1% (1)

Table 3.5 – Child Care Providers' Perceived Disadvantages of Formula over Breastmilk	
Disadvantages	**% (N)**
Not as healthy	47% (94)
No disadvantage	38% (76)
Other	8% (3)
More diaper changes	6% (4)
Do not have as regular of a schedule	3% (6)
Eat more frequently	3% (6)
Harder for them to leave their mothers	1% (2)
Embarrassing	1% (2)
Uncomfortable for staff	1% (1)

Eighty-four percent of the infant room teachers felt they have an important role in supporting parents with their infant feeding choice. There was no evidence that the probability of whether or not they felt they had an important role depended on what they had fed their own children (χ^2 = .44; p=.9789).

Information regarding the types of supportive measures the child care centers provided working breastfeeding mothers was assessed. Supportive measures in a child care center would include offering a private space or water to

drink for mothers who are breastfeeding at the center and offering breast pumps to mothers to use at the center. Ninety-seven percent of teachers stated that mothers were allowed to breastfeed at their center and 44% stated that their center had a special place (usually a rocking chair in the infant room) for mothers to breastfeed, while 31% stated their center had "no place special". Breast pumps were available at 7% of the centers surveyed. No information was provided on the type of breast pump available (e.g. hospital grade, single use). There was evidence that the probability that there was a private room/space at the center for mothers to breastfeed their infants depended on if the centers had breast pumps available to mothers (χ^2 = 18.92; p=.0003).

The type of feeding method at child care centers per age group is described in Table 3.6.

Table 3.6 – Type of Feeding at Child Care Center per Age Group

Age Group	Received Breastmilk % (N)	Received Formula % (N)	Total Number
0-2 months	65% (22)	35% (12)	**34**
2-4 months	45% (44)	55% (53)	**97**
4-6 months	31% (39)	69% (88)	**126**
6-8 months	28% (43)	72% (109)	**152**
8-12 months	16% (42)	74% (201)	**272**
TOTAL	**28% (190)**	**68% (463)**	**684**

Of a total of 684 infants, 28% were fed breastmilk and 68% were fed formula at the child care centers at 12 months of age or younger. As the age of the infants increased, the number of infants receiving breastmilk decreased from 65% at 0-2 months to 16% at 8-12 months. Child care providers did not report if

the infants were receiving a combination of formula and breastmilk at feedings. In the 8 to 12 month range, it was noted on surveys that some infants were offered milk products (e.g. 2% milk, whole milk) other than formula or breastmilk (9%).

Determined Education Needs of Child Care Providers. Each child care director and infant room teacher was asked the following open-ended question, "What kind of information and training would be helpful to you in assisting parents, staff or yourself with feeding formula or breastmilk to infants?" The majority of child care directors (91%) and infant room teachers (89%) answered the above question. All of the specific topics desired by the child care directors and infants fit into the content areas of breastfeeding/breastmilk, bottle feeding or introducing solid foods. Child care providers desired information on the benefits of breastfeeding; truth behind breastfeeding myths; storage, preparation and feeding of breastmilk; and nutrition needs for mothers when breastfeeding. They also desired information to share with parents on how to prepare breastfed infants to start child care. Appropriate bottle feeding methods and information on introducing solid foods was also deemed important to child care providers. Breastfeeding information versus formula feeding or starting solid food information was desired more often throughout the open-ended questions. Desired content areas and specific topics for further information are described in Table 3.7.

Table 3.7 – Child Care Providers' Desired Content Areas and Specific Topics for Further Information	
Content Areas	**Specific Topics**
Breastfeeding/Breastmilk	1. Benefits of Breastfeeding 2. Truth Behind Breastfeeding Myths 3. Breastfeeding Friendly Environment in Child Care Centers 4. Parents Guide to Breastfeeding and Child Care Centers 5. Storage and Preparation of Breastmilk for Child Care Providers 6. Breastmilk: How Much is Enough? 7. Mother's Nutrition Needs When Breastfeeding
Bottle Feeding	1. Bottle Do's and Don'ts in Child Care Centers 2. Different Formulas for Different Needs 3. Storage and Preparation of Formula for Child Care Providers 4. Formula: How Much is Enough?
Introducing Solid Foods and Other Nutrition Information	1. When, What and How Much: Introducing Solid Foods and Fluids at Child Care Centers 2. Healthy Finger Foods and Snacks at Child Care Centers 3. I'm Hungry – Watching for Hunger Cues

Eighty-six percent of directors and 67% of teachers stated that they have Internet access at work. Eighty-nine percent of the rural centers had Internet access. Eighty-eight percent of directors and 79% of teachers would be interested in a website with infant feeding information that was specific to child care providers. The educational medium choice of a website was statistically

higher than the other available choices ($p<.001$). Other types of trainings/education material distribution preferred besides Internet/web-based was attend a one day conference (54% directors vs. 55% teachers) and self-paced paper lessons (37% directors vs. 36% teachers).

Discussion

This was an exploratory research study as no known needs assessment has been done to assess knowledge, attitudes, behaviors and training needs on infant feeding, specially breastfeeding, within a child care setting. Directors (43%) and infant room teachers (48%) breastfed their children less than the general population (71%) (5). The breastfeeding rates of the providers are more comparable to the rates of those women who are enrolled in WIC (64%) (5). Child care providers' knowledge of appropriate ways to prepare and store both breastmilk and formula was low. Thirty-eight percent of child care providers felt formula had no disadvantage over breastmilk. With the amount of information available about the benefits of breastfeeding, this is an interesting finding. Overall, the findings of this study support a need for educating child care center directors and infant room teachers.

Directors and teachers desired updated infant feeding information available in both English and Spanish regarding breastfeeding, formula feeding and introducing solid foods. Demographic information, current needs assessments and a review of literature and existing programs highlight the need for an appropriate way to provide accurate educational materials and best

practice information to child care providers on infant feeding, specifically breastfeeding. Currently, there is one website that provides information on feeding young children in group settings. The website consistently receives an average of approximately 21,000 hits and 1,600 downloads of educational materials per month (36). This website is an excellent resource. However, the website's main target population is young children and not infants.

According to the results of this needs assessment survey, the majority of child care providers would like to have information available to them on a website that is specific to their needs on infant feeding practices. They also desired not only information regarding breastfeeding, but information regarding formula feeding and introducing solid foods to infants. The intent of this research study was to determine the needs of child care providers related to breastfeeding, but there appears to be an apparent need for information on all forms of infant feeding. Simple to read, free educational materials were desired by both directors and teachers on the pros and cons of all feeding methods. They also desired information on common infant feeding myths (e.g. need to put cereal in bottles to elicit sleep or fullness). Information on best practices is needed due to the low number of correct answers on both preparation and storage of formula and breastmilk. Also, information on appropriate fluids to offer infants throughout the first year of life is also warranted due to the number of infants that were receiving 2% or whole milk before the age of one. Child care providers also desired information they could use but could also share with parents, especially information on the appropriate way to introduce a bottle to breastfed infants so

when they start child care, this is not an obstacle the providers (and infants) need to face.

One challenge in disseminating the survey was to determine the appropriate number of surveys to send to each child care center. A current count of the number of child care providers was relatively unknown due to center closures and job transitions. It was determined with a group of experts to mail out four teacher surveys and one director survey to each center. This number was derived by assuming there were two infant rooms in each child care center staffed by two infant room teachers. Even though there was only a 20% return rate for the survey, the true denominator was unknown and the number of surveys returned (N=267) exceeded the number to attain the power (N=202) necessary to detect significant differences among respondents. Even though it is difficult to say that the results of this study can be generalizable to all child care centers, the investigators have confidence in the results of the study based on the achievement of 90% power to detect significant differences among respondents.

Conclusions

The research findings of this study indicate an apparent need for best practice information to be more readily available to child care providers on infant feeding, specifically breastfeeding. An infant feeding website for child care providers was not available at the time of this study. The results of this needs assessment have been used to develop a website based on the needs of child

care providers on infant feeding, specifically breastfeeding. This website will make it possible for child care providers to receive simple, concrete messages regarding infant feeding practices including appropriate ways to store, handle, prepare and feed breastmilk and formula to the infants in their care. This website may provide an innovative way to meet the infant feeding information needs of child care providers, promote breastfeeding and the use of breast milk in child care centers as well as stay in tune with the increasing span of technology available.

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CHAPTER 4

GROUP DISCUSSIONS, WEBSITE DEVELOPMENT AND PROCESS EVALUATION OF *INFANET NUTRITION FOR CHILD CARE PROVIDERS* WEBSITE

Introduction

In 2002, approximately 93 million adults used the Internet to search for health-related information (1). Seventy-four percent of women report using the Internet to obtain health-related information and 59% of women reported searching the Internet to find nutrition information (2). Providing health education information on the Internet can offer individuals access to a vast of information twenty-four hours a day.

A recently completed needs assessment (3) and a review of the literature highlight the need for an appropriate means of providing accurate infant feeding (specifically on breastfeeding and the use of breastmilk in child care centers) educational materials and best practice information to child care providers. In the needs assessment, 86% of 66 child care directors and 67% of 201 infant room teachers stated that they have internet access at their child care center (3). In addition, 88% of 66 child care directors and 79% of 201 infant room teachers

reported being interested in a website which contained infant feeding information (3).

Process evaluations of websites are an instrumental part of realizing the full potential of the information provided to users and can be done throughout to describe and analyze how a program is conceptualized, planned and implemented (4). Recently, researchers (5) conducted a process evaluation on a web-based smoking cessation program for college students. Before the development of the program, the researchers conducted focus groups and interviews with the target population to determine what they felt would be essential on a website which educated college students on ways to stop smoking. The content of the website was based on a literature review, needs identified by the target audience and expert panel recommendations. The process evaluation was conducted over a 2 month period. Adaptations were made to the website incorporating the results of the process evaluation. The researchers recommended that more in-depth evaluations should be conducted to learn if web-based programs will change health related behaviors (5). Other process evaluations have been conducted on web-based health programs including a website incorporating nutrition, health, and aging issues (6); nutrition education to promote fruit and vegetable intake in adults (7, 8); nutrition and physical activity promotion to young girls (9); physical activity promotion in a worksite (10); and professional development for family life educators (11). The researchers from these studies stressed the importance of developing dynamic and up-to-date websites and determining the target populations' computer

knowledge and internet connection speed (e.g. to employ appropriate graphics and text if primarily use a dial-up connection). Overall, there is a continued need to conduct outcome based research that evaluates website usability trends as well as knowledge, behavior and attitude changes resulting from the use of a website.

The issue of the effectiveness of web-based vs. non-web-based educational interventions is unclear. Wantland et al. (12) recently conducted a meta-analysis of health related behavior change outcomes trying to answer these questions. The results of this review showed that the web-based health interventions produced similar results as their non-web-based counterparts.

Using the Internet for data collection is also highly prevalent. Surveys can be placed in a password protected area or may be open to the public and the data can be directly entered into a database instead of entering the data in manually. Web-based surveys are also cost-effective because there is no reason to use funding to mail the surveys (13). Researchers have stressed the need to test the reliability and validity of web-based surveys (12, 13). When tested for reliability and validity, web-based surveys are often comparable to those obtained by traditional paper and pen methods (13).

The development of a website regarding infant feeding practices would allow child care providers easy access to research-based information, current public health recommendations as well as handouts they could print and give to parents and use for themselves. Currently, there is a website which provides information on feeding young children in group child care settings, which

received an average of 21,000 hits and 1,600 educational materials were downloaded per month (14). This website is an excellent resource, but the main target population is young children and not infants. A website with infant feeding educational materials and best practice information specific to the needs of child care providers, especially infant room teachers, is not known to be available at this time.

The primary aim of this research study was to first conduct group discussions with child care providers to seek their input on the layout of the infant feeding website. Second, a process evaluation was conducted for 1 month after the website was launched to determine the effectiveness of the website implementation. This manuscript describes the methods and results of the group discussions, website development and the methods and results of the process evaluation.

Group Discussions

Methods. Study approval was received from the Human Research Committee at Colorado State University to conduct the group discussions with child care directors and infant room teachers (see Appendix G for HRC Approval Letter). Open-ended questions (see Appendix H for Group Discussion Questions) were developed and tested for content validity (correct information) and face validity (appropriate appearance) with a breastfeeding and infant feeding advisory committee (n=14) and members of the target population (n=4). Recruitment was completed by announcing the group discussions on a local

early childhood council list serve (see Appendix I for Recruitment Letter to Child Care Providers). Informed consent to participate in the group discussions was received (see Appendix J for Consent Form). Compensation was given to those who participated. The group discussions were held at a local child care center and at Colorado State University. The discussions were facilitated by the researcher with predetermined open-ended questions. Conversations from group discussions were taped and transcribed. The data were analyzed using the triangulation data analysis procedure for qualitative data (15). This procedure consists of two people analyzing the qualitative data and comparing the themes that emerged to determine if there was theme consensus between the two people.

Results. Two group discussions were completed with a total of five child care professionals. Three were child care providers (one director and two infant room teachers) and two were child care health consultants. All participants were from different centers. Participants reported using the Internet on a daily to biweekly basis with the majority of their centers using dial-up services to access the Internet. Browsing health-related websites was the primary way they spent their time on the computer at work in addition to accessing email. Participants preferred straightforward sites without moving icons. They also desired subtle "baby colors" (no red). They felt the website should not contain unnecessary or large graphics as these would deter the website from uploading quickly. The website should have clear links to find the available infant feeding information. A logo with soothing colors should be apparent on all pages. On the home page,

all the information should be seen at once to eliminate the need for scrolling down the web page. On the subsequent web pages, a link to get back to the top of the web page was desired by the participants. The primary purpose of the website should be in plain site on the home page. A web page of helpful websites including local infant feeding resources, where to find a lactation consultant and more information on breastfeeding was also desired. Credentials and contact information of the web designer should be provided on the website as this would provide viewers with confidence in the credibility of the information provided.

As a result of the recently completed needs assessment (3), website content ideas (e.g. desired information, specific topics) were shared with group discussion participants. The website content ideas (see Appendix E for Desired Content Information Areas and Specific Topics from Needs Assessment Survey) identified through the needs assessment included information on breastfeeding/breastmilk, bottle feeding and introducing solid foods to infants. The participants felt these website content ideas addressed the majority of the information that met their needs. In addition, they wanted the website to include information on menu planning and finger foods for infants from 6 to 12 months.

Handout layout and design were discussed as well in the group discussions. Participants preferred handouts they would be able to print and use for themselves or give to parents, co-workers and/or employees. All of the providers desired formatted handouts to ensure that information was not "cut off" when the handouts were printed. The most important characteristic of the

handouts identified by group discussion participants was the need for handouts to be accurate and up-to-date. The participants also stressed that the information on the website should not replace the advice of a health care professional and that this disclaimer should be stated throughout the website. One participant stated, "I would love to have a website like this! It is really needed! It is great the information will be in Spanish and...user-friendly".

Conclusions. Overall, child care providers who participated in the group discussions desired a website with accurate information based on the content ideas that were determined through the needs assessment. Child care providers who participated in the group discussions agreed upon the following recommendations for the website: a) friendly, non-threatening messages and the graphics should be light blue or pink; b) highly visible and straight forward links to other parts of the website; c) graphics should be kept to a minimum due to slower Internet connection; and d) contact and credentials should be provided for the web designer to suggest that the website is credible. All five participants agreed a website specific to the needs of child care providers with infant feeding information, including breastfeeding/breastmilk information, would be a valuable tool for them to use in their child care setting.

Theoretical Framework for Developing the Website – Social Learning Theory

When developing a nutrition web-based program, it is important to build the development and evaluation of a program on a behavioral change theory (1).

Social Learning Theory has been defined as a theory "addressing both the psychological dynamics underlying health behavior and the methods of promoting behavior change" (16, 17). The Social Learning Theory was chosen as the theoretical framework for the development of the website because the basic tenets of this theory include the essential constructs of interaction with the person, behavior and environment (reciprocal determination), self-efficacy (confidence in oneself to perform a behavior) and modeling (imitation by a peer). Other essential components of the Social Learning Theory include: expectations (the outcome that one expects to happen); expectancies (the benefits and barriers one places on the expectations); behavioral capabilities (the knowledge and the skills to illicit the behavior change); and vicarious reinforcement (learning by watching peers or someone that is comparable) (16, 17). The resulting website allows child care providers to have access to educational materials that may enable them to improve the nutritional well-being of the infants in their care by replacing their barriers to infant feeding with motivators (personal factors). The information available on the website may empower them to improve their infant feeding skills and practices (behavior) which may alter the child care center to be a more supportive environment for working mothers (environmental factors), especially those who choose to continue to breastfeed their infants (16, 17). The website also includes links to information regarding breastfeeding, bottle feeding, introducing solid foods as well as other credible websites for further information. The inherent design of this website allows for interaction between the person and the information available on the Internet. The other

components of the Social Learning Theory were addressed by including educational materials that can be printed and used by the child care providers directly or shared with parents (16, 17). The Social Learning Theory Construct Matrix for Educational Handouts and Other Information on the *InfaNET Nutrition Child Care Providers* Website is provided in Appendix K.

Website Development

Website development occurred in two phases: handout development and website graphic and layout design. Fourteen handouts were developed based on the desired content and topics from the needs assessment and confirmed by participants in the group discussions. All of the handouts were developed utilizing the same format for ease, uniformity and simplicity. Handouts were assessed and feedback was received from an advisory committee of infant feeding experts (n=14) and members from the target audience (n=4). Several changes to the handouts occurred due to feedback from these groups. Readability testing was completed on all handouts using the Flesch-Kincaid Grade Level Testing from Microsoft Office Word® 2003. Thirteen of the 14 handouts scored at the 7th grade reading level or lower. This was deemed appropriate for this audience given that 80% of the child care providers from the needs assessment have post-high school education and/or training (Clark et al., 2006). The "Benefits of Breastfeeding" Handout contained numerous medical terms that resulted in this handout being at the 9th grade reading level. Handouts were transferred to portable document files (PDFs) to secure content and to

ensure they could be opened with a variety of programs. A bilingual student from Colorado State University translated 1 of the 14 handouts into Spanish. Only one handout was translated initially assuming the handouts would need to be changed based on the process evaluation, eliminating unnecessary translation time and expense. Appendix L contains all 14 of the handouts in both English and Spanish.

The web developer completed two courses on website design at Colorado State University before developing the website. Two computer programs, Macromedia Dreamweaver MX® 2004 and Macromedia Fireworks MX® 2004, were purchased to develop the website. Web architecture and design were developed based on the desired layout and design needs from the group discussion participants. A logo and website name, "*InfaNET Nutrition for Child Care Providers*" was developed (see Appendix M for Website Logo) by the author. Eight web pages were developed for the *"InfaNET Nutrition for Child Care Providers"* website, including: a) homepage; b) "infant feeding information" web page with links to the handouts on the "breastfeeding/breastmilk" web page, "bottle feeding" web page and "introducing solid foods" web page; c) "contact us" web page with contact information for the web developer; d) "more information" web page with additional websites on breastfeeding/breastmilk, bottle feeding and introducing solid foods to infants; and e) "survey page" web page. Graphics on the website were kept to a minimum, colors were pink and blue and appropriate font style (Tahoma) and size (14) were used so all users were able to read the text. The website was tested on Internet Explorer 6.0x® as this is the

most commonly used web server in the United States (18). Multiple drafts of the website and logo were evaluated by the advisory committee (n=14) and target population (n=4) before the final website was completed. Established website effectiveness and usability criteria were used to evaluate the website including the following six essential evaluation criteria: 1) content, 2) design and aesthetics of the site, 3) disclosure of authors, sponsors or developers, 4) current information, 5) authority of source, and 6) ease of use (18-21).

Usability testing (a measurement of a user's interaction with a program) and content layout appropriateness was evaluated by an infant feeding advisory committee and a child care provider liaison. A total of 15 people tested the site for usability. Feedback regarding the presentation of the website (e.g. colors, graphics, text), ease of navigation (e.g. ability to find information on the website), ease of comprehending the handouts (e.g. readability and appropriateness of the handouts) and overall satisfaction of the website was received from the 15 participants of the usability testing. The participants of the usability testing deemed the *InfaNET Nutrition for Child Care Providers* website was ready to proceed to the process evaluation.

Process Evaluation

Methods. Study approval was received from the Human Research Committee at Colorado State University to conduct the one-month process evaluation (see Appendix G for HRC Approval Letter). A process evaluation survey was developed and tested for content and face validity with a

breastfeeding and infant feeding advisory committee (n=14) members of the target population (n=4). The survey was transferred to a web-based medium with the assistance of an instructional technology manager (see Appendix N for the Website Process Evaluation Survey). Recruitment was completed by announcing the process evaluation on a local early childhood council list serve and at a state-wide breastfeeding task force meeting (see Appendix O for the Recruitment and Steps to Participate Letter). Consent to participate in the process evaluation was received (see Appendix P for the Consent Form). Compensation was given to those who participated. Members of the above groups were allowed access to the website for 1 month.

The experts reviewed the website and provided feedback via email to the researchers while the child care providers completed closed and open-ended process evaluation questions about their participation, usage and feedback about the website. Child care providers were asked about the number of handouts they printed and read from the website and the perceived value of each of the components of the website. Statistical analysis software (SAS 9.1, Cary, N.C., 2003) was used to conduct frequency distributions. Open-ended questions were qualitatively analyzed by determining themes among respondents' answers. The number of downloads, hits and the average amount of time per visit was also assessed using WebTrends® 2006 analytical software.

Results. A total of 13 experts and 7 child care providers participated in the process evaluation. Experts included people with knowledge in breastfeeding, infant feeding, child care and web design. Expert feedback was positive with

minor changes to the website and handouts suggested. The most requested suggestion from the experts was to add additional website addresses to the "more information" web page. Seven child care providers reviewed the website and handouts and completed the survey. Each of the child care providers was female and white. Two providers were child care directors, two were infant room teachers and three were child care health consultants (e.g. nurses with child care experience). Two of the participants were between the ages of 20-29 years, two were between the ages of 40-49 years and three were 50 years or older. All of the participants had children. Seventy-one percent (n=5) fed their infants a combination of breastmilk and formula, while 29% (n=2) fed their infants breastmilk only. The majority (85%, n=6) of the child care providers responding used the website one to three times during the 1 month process evaluation period. When asked to choose their preference among potential website marketing ideas (e.g. magnet, pad of paper, pen), three preferred a magnet with the *InfaNET Nutrition for Child Care Providers* website address and three preferred a pad of paper with the website address. One hundred percent (100%) would change nothing about the website (e.g. text style, text size, color of background, color of graphics, buttons, graphics, usability and navigation through website).

The participants were asked about the number of handouts printed and read during the course of the 1 month period. The results are described in Table 4.1. Three of the participants used the handouts for their own use, one gave the

handouts to parents, one gave the handouts to their employees/co-workers and two answered "none of the above".

Table 4.1 – Handouts Viewed and Printed by Child Care Providers as well as Handouts Needing to Be Changed per Child Care Providers (n=7)

Handout Title	Handouts Viewed	Handouts Printed	Handouts Needing Changes
Benefits of Breastfeeding	5 (71%)	3 (43%)	1 (14%)
Truth Behind Breastfeeding Myths	2 (29%)	2 (29%)	1 (14%)
Creating a Breastfeeding Environment	4 (57%)	2 (29%)	1 (14%)
Parents Guide to Breastfeeding and Child Care	6 (86%)	5 (71%)	1 (14%)
Storage and Preparation of Breastmilk	7 (100%)	4 (57%)	0 (0%)
Breastmilk: How Much is Enough?	4 (57%)	3 (43%)	0 (0%)
Nutrition Needs of Moms When Breastfeeding	4 (57%)	4 (57%)	0 (0%)
Bottle Do's and Don'ts	4 (57%)	4 (57%)	0 (0%)
Different Formulas for Different Needs	3 (43%)	3 (43%)	0 (0%)
Storage and Preparation of Formula	5 (71%)	3 (43%)	1 (14%)
Formula: How Much is Enough?	3 (43%)	3 (43%)	1 (14%)
When, What, Why and How: Intro Solid Foods	4 (57%)	4 (57%)	1 (14%)
Healthy Finger Foods for Infants	5 (71%)	5 (71%)	0 (0%)
I'm Hungry – Watching Infants Feeding Cues	3 (43%)	3 (43%)	0 (0%)
None of the Above	0 (0%)	2 (29%)	4 (57%)

WebTrends® 2006 web analytics software determined that during the 1 month process evaluation there were a total of 1,340 hits with 1,223 hits during the weekdays and 117 hits during the weekends with an average of two visits per day. Overall, there were 80 different visitors to the website with 9 of the 80 visiting the website more than once. The average visit duration was roughly 10 minutes. The top five web pages out of eight that were looked at were the "*InfaNET Nutrition for Child Care Providers"* home web page, the "breastfeeding/breastmilk" web page, the "survey" web page, the "more

information" web page and the "infant feeding information" web page. The most active day and time for the website was on the last day of the process evaluation during the lunch hour. The top web browser used by the participants was Internet Explorer 6.0x®.

Conclusions. Upon receiving feedback from the process evaluation participants, revisions were made to both the *InfaNET Nutrition for Child Care Providers* website and handouts. The remaining 13 handouts were translated and back-translated by two separate bilingual students at Colorado State University. Overall, the participants in the process evaluation determined the *InfaNET Nutrition for Child Care Providers* website was an appropriate tool for child care providers.

Overall Conclusions

A website with infant feeding practice information specific to the needs of child care providers is not known to be available at the time of this study. Limitations of this research project included self-selected participants which may decrease the generalizability to all child care providers. Another limitation could be that the information regarding child care providers' use of the website was self-reported. However, the web analytics software verified that the website was utilized during the 1 month period.

The development of the *InfaNET Nutrition for Child Care Providers* website may serve as a medium for information dissemination to child care providers who care for infants. This website may also provide an innovative way

to meet the infant feeding information needs of child care providers, promote breastfeeding and the use of breastmilk within child care centers as well as stay in tune with the increasing span of technology available. The next phase of this project will consist of a quasi-experimental design study to determine if the *InfaNET Nutrition for Child Care Providers* website is an effective means of providing infant feeding information, specifically breastfeeding information, to child care providers.

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CHAPTER 5

EVALUATION OF AN INFANT FEEDING WEBSITE FOR CHILD CARE PROVIDERS

Introduction

The benefits of breastfeeding and the use of breastmilk are well-documented in the literature (1-3). A recent analysis of Colorado PRAMS (Pregnancy Risk Assessment and Monitoring System) data from 1997-2002 (4) showed a dramatic decline in breastfeeding duration rates among all mothers in Colorado. Colorado exceeded the national recommendations of initiating breastfeeding at 83%, yet fell short at both 6 months and one year, 46% and 21% respectively (5). In 2002, the fourth most common reason Colorado mothers cited for ceasing breastfeeding behind "not producing enough milk", "did not satisfy baby" and "baby had difficulty nursing" was because they returned to work or school (4). With the decline in breastfeeding coinciding with mothers return to work (3-6 months), this area deserves more study.

In 2000, 65% of mothers with children under the age of six were in the workforce, while this number was only 47% in 1980 (6). It is estimated that 12 million of the 19 million children in the United States under the age of five are in

some form of child care (6). In 1977, there were less than 25,000 child care centers in the United States. This number grew to 40,000 by 1987 and had more than doubled to 117,000 by 2004 (6). Determining the exact number of child care centers is difficult due to the constant opening and closing of centers, the unknown number of unregulated centers and the fact that some child care centers choose not to share their information in research studies (6). Researchers have shown that children who attend child care at 6 months were significantly less likely to have ever been breastfed or remain exclusively breastfed at 7 days, 1 month, 3 months, 6 months and 12 months (5). This trend appears to be true for the many breastfeeding mothers that send their children to child care centers (7-10).

However, child care agencies often support breastfeeding as the food of choice for infants. In 1999, the United States Department of Agriculture (USDA) in a federal register authorized the rule that meals for infants that contain only breastmilk could be reimbursed to support the benefits of breastfeeding (11). Other agencies such as USDA Cooperative State Research, Education and Extension Service, the Special Supplemental Nutrition Program for Women, Infant and Children, the American Dietetic Association, and the American Academy of Pediatrics support breastfeeding as the preferred method of feeding infants (1, 6, 12-13).

Studies have been conducted to identify types of accommodation and assistance worksites/businesses can offer to provide a more supportive environment to breastfeeding working mothers (5, 14-22). Examples include:

offering breaks to breastfeed/express breastmilk, child care on-site, lactation specialists available and policies/procedures protecting breastfeeding mothers from harassment. However, no peer reviewed studies known to the researchers have been published regarding educational mediums that improve the knowledge, attitudes and behaviors of child care providers in relationship to infant feeding, especially breastfeeding.

A review of literature and a recently completed needs assessment (23) highlight the need for an appropriate way to provide accurate educational materials and best practice information about infant feeding, specifically breastfeeding and offering breastmilk, to child care providers. According to the needs assessment, 88% of directors and 79% of teachers would be interested in a website with infant feeding information specific to child care providers (23). Currently, there is a website which provides information on feeding young children in group settings. The website consistently receives an average of approximately 21,000 hits and 1,600 downloads of educational materials per month (24). This website is an excellent resource, but its main target population is young children and not infants. As a result, topics relative to infant feeding, specifically breastfeeding/breastmilk, are not included. A website with infant feeding practice information specific to the needs of child care providers is not available at this time.

The development of a website focusing on infant feeding would allow child care providers to receive simple, concrete messages regarding infant feeding practices. The apparent interest in educational information distribution by the

Internet is further supported by national trends. In 2003, approximately 60 million Americans per year used the Internet to receive health or medical information and this number continues to increase (25). There are a multitude of advantages of providing health information on websites including convenience, appeal, flexibility and openness of communication (25).

The development and evaluation of a website should be based on a behavioral change theory (25). Perry and colleagues defined the Social Learning Theory as a theory "addressing both the psychological dynamics underlying health behavior and the methods of promoting behavior change" (26). Social Learning Theory was used as the theoretical framework for the development of the website because of the essential constructs of interaction with the person, behavior and environment (reciprocal determinism), self-efficacy and modeling (26-27). Using this theory in the development of the website provided a basis for the child care providers to have access to educational materials that could enable them to improve the nutritional well-being of the infants in their care by replacing the barriers to feeding the infants' breastmilk with motivators (personal factors). This may improve their infant feeding skills and practices (behavior) which will alter the child care center to be a more supportive environment for working breastfeeding mothers (environmental factors) (26-27).

This research study was designed with a pre-, post- and six month follow-up assessment to determine the effectiveness of the **InfaNET Nutrition for Child Care Providers** website. Evaluation also included assessing the bilingual educational materials and information on infant feeding practices, specifically the

use of breastmilk and determining changes in the child care providers' knowledge, attitudes and behaviors on infant feeding best practices.

Methods

Study approval was received from the Human Research Committee at Colorado State University (see Appendix Q for HRC Approval Letter). A survey was developed and tested for content and face validity with an advisory committee of breastfeeding and infant feeding experts (n=14) and members of the target population (n=7). The survey contained 42 questions asking participants about their infant feeding knowledge, attitudes and behaviors in relationship to breastfeeding/breastmilk, bottle feeding and introducing solid foods (see Appendix R for the Website Intervention Survey). Table 5.1 depicts how the questions were divided into the categories of knowledge, attitudes and behaviors.

Table 5.1 –Knowledge, Attitude and Behavior Survey Questions

	Question
Knowledge – 9 Questions	
Q16	How long is it safe to store prepared formula in the refrigerator?
Q17	How long is it safe to store breastmilk in the refrigerator?
Q18	How long is it safe to store breastmilk in a freezer compartment attached to the refrigerator?
Q19	Where should frozen breastmilk be thawed?
Q20	Where should breastmilk be warmed before feeding it to an infant?
Q21	Where should formula be warmed before feeding it to an infant?
Q22	Which of the below statements is true (e.g. infant feeding practices)?
Q23	Which of the below statements is true (e.g. infant feeding practices)?
Q24	Which of the following is a sign that an infant is ready to start eating solid foods?

Table 5.1 –Knowledge, Attitude and Behavior Survey Questions (continued)	
	Question
Attitude – 13 Questions	
Q30	How strongly do you agree/disagree with the statement, "I have an important role in supporting parents' infant feeding choices"?
Q31	How strongly do you agree/disagree with the statement, "I have an important role in meeting the nutrition needs of the infants in my care"?
Q32	How confident are you in answering questions parents have on breastfeeding their infants?
Q33	How confident are you in answering questions parents have on formula feeding their infants?
Q34	How confident are you in answering questions parents have on introducing solid foods to their infants?
Q35	What things would make it easier for you to feed infants in your care?
Q36	Which of the following do you believe are advantages of formula over breastmilk?
Q37	Which of the following do you believe are advantages of breastmilk over formula?
Q38	Which of the following do you believe are disadvantages of breastmilk over formula?
Q39	Which of the following do you believe are disadvantages of formula over breastmilk?
Q40	Which of the following forms of feeding do you feel provides the most benefits to infants?
Q41	Which of the following forms of feeding do you feel provides the most benefits to parents?
Q42	Which of the following forms of feeding do you feel provides the most benefits to child care providers?
Behavior – 9 Questions	
Q8	Where are breastmilk/prepared formula stored at your center?
Q11	Which of the following does your center make available to mothers who come to your center to breastfeed?
Q12	Does the staff at your center encourage mothers to breastfeed?
Q14	How often do you feed infants less than 6 months at your center?
Q15	How does your center support parents with their infant feeding choice?
Q26	Do you offer pacifiers to the infants in your care?
Q27	When do you feed breastfed infants?
Q28	When do you feed formula fed infants?
Q29	When parents pick up their infant, do you share information with the infant's parents on how their infant ate for the day?

A website was developed to be the platform for the survey (see Appendix S for the Survey Website Pages). The survey was then transferred to the website with the assistance of an instructional technology manager. Test-retest reliability was completed with local child care providers (n=20) using the online survey (see Appendix T for Reliability Testing Cover Letter). A correlation level at or above .7 needed to be achieved for a question to remain on the survey. Intervention recruitment was conducted by calling and mailing postcards to child care centers that were licensed to provide care to infants in Colorado (see Appendix U and V for the Recruitment Calling Scripts and Postcards). The list of child care centers was provided by the Colorado Department of Human Services. Power calculations were calculated and a sample size of 14 child care providers in each group was needed to receive 80% power in order to be confident with the detection of significant differences among respondents (28).

Consent to participate in the three phases (pre-test, post-test and 6 month follow-up) of the study was received (see Appendix W for Consent Form). Upon receiving the consent forms, a letter to the child care providers was mailed explaining the steps to participate in the study (see Appendix X for the Steps to Participate Letter). Each child care center was randomly assigned to be in the intervention group or control group. Child care providers were instructed to visit the website for 3 months as they desired. The control group was instructed to view an already established health-related website specific to child care providers (Back-to-Sleep Campaign – www.whatitis.com) and the intervention group viewed the **InfaNET Nutrition for Child Care Providers** website

(www.infanet.cahs.colostate.edu). All participants were instructed to complete the pre-test, view their assigned website for 3 months as they deemed appropriate and then complete the post-test assessment. Participants completed closed and open-ended questions regarding their demographics as well as knowledge, attitudes and behaviors in relation to infant feeding, specifically breastfeeding. Letters to the child care providers were sent to remind them to take the post-test (see Appendix X for Steps to Participate Letter). At the post-test, the intervention group was also asked to fill out a survey to evaluate the components of the **InfaNET Nutrition for Child Care Providers** website (see Appendix Y for the Website Evaluation Survey).

At the 6 month follow-up, letters to the child care providers were sent to remind them to take the 6 month follow-up survey (see Appendix Z for Steps to Participate Letter). Each child care provider was mailed a letter that included instructions on how to access the website survey page and complete the same survey.

Incentives were offered to increase the response rate. If the child care providers completed both the pre-and post-test assessments, their names were entered into a drawing for the chance to win one of ten $50 cash drawings. All other providers who did not win the drawing received $10. For the 6 month follow-up, each provider who completed the survey received $10. Phone calls, emails and additional letters were sent to non-responders to increase the response rate. Statistical analysis software (SAS 9.1) was used to conduct several assessments to determine differences between the intervention and

control groups. These included: frequency distributions; independent samples t-tests; chi square tests; and repeated measures. Sphericity tests were also conducted to assume that the variance of the differences between the levels of the three repeated measurements (pre-test, post-test and follow-up) were constant. Open-ended questions were qualitatively analyzed by determining themes among respondents' answers. The number of downloads, hits and average time per visit via website software was also assessed using WebTrends®2006.

Results

Pre-test Results. Consent to participate in the study was received from 48 child care providers. Thirty-eight child care providers filled out the online pre-test survey, which was determined to be valid and reliable. Reliability testing of the survey was conducted via a test-retest format in which all questions scored a correlation level at or above .7 indicating the tool was reliable. At the pre-test assessment, 80% power was achieved. Eighteen child care centers participated in the survey; nine centers from each group. Demographic characteristics of the intervention and control group at baseline are described in Table 5.2. The statistics (means, standard deviations and p-values) were determined using chi square tests. The intervention and control groups' demographic characteristics did not differ at the pre-test time period. The availability of a lactation consultant to answer breastfeeding questions was statistically significant when compared between the intervention and control group (p=.05). Child care providers were

female (100%) and white (79%). The Internet (70%) and other co-workers (74%) was the primary way both groups received infant feeding information.

Table 5.2 – Demographic Characteristics of the Intervention and Control Groups at Pre-Test and Post-Test

	Pre-Test			*Post-Test*		
Demographic	***Intervention Group (n=23)[a]***	***Control Group (n=15)[a]***	***p-value***	***Intervention Group (n=23)[a]***	***Control Group (n=15)[a]***	***p-value***
Gender	**2.00±.00[b]**	**2.00±.00[b]**		**2.00±.00[b]**	**2.00±.00[b]**	
Female	23 (100%)	15 (100%)	**1.00**	16 (100%)	14 (100%)	**1.00**
Male	0 (0%)	0 (0%)		0 (0%)	0 (0%)	
Age (years)	**3.46±.30[b]**	**2.94±.28[b]**		**3.17±.30[b]**	**3.00±.28[b]**	
≤20	0 (0%)	0 (0%)		0 (0%)	0 (0%)	
21-29	8 (35%)	3 (20%)		7 (44%)	3 (21%)	
30-39	6 (26%)	4 (27%)	**.46**	4 (25%)	3 (21%)	**.41**
40-49	6 (26%)	3 (20%)		3 (19%)	3 (21%)	
≥50	3 (13%)	5 (33%)		2 (13%)	5 (36%)	
Ethnicity	**5.76±.20[b]**	**5.56±.31[b]**		**5.25±.21[b]**	**5.32±.37[b]**	
Am. Indian	0 (0%)	0 (0%)		0 (0%)	0 (0%)	
Asian	1 (4%)	0 (0%)		1 (4%)	0 (0%)	
Black	1 (4%)	2 (13%)	**.60**	1 (4%)	2 (14%)	**.48**
Hispanic	2 (9%)	2 (13%)		1 (4%)	2 (14%)	
Hawaiian	0 (0%)	0 (0%)		0 (0%)	0 (0%)	
White	19 (83%)	11 (73%)		14 (88%)	10 (71%)	
Have Children	**.85±.12[b]**	**.63±.11[b]**	**.06**	**.79±.12[b]**	**.62±.11[b]**	
Yes	13 (57%)	13 (87%)		10 (63%)	11 (79%)	**.33**
No	10 (43%)	2 (13%)		6 (38%)	3 (21%)	
Fed Children	**2.00±.34[b]**	**1.40±.32[b]**		**1.78±.34[b]**	**1.31±.32[b]**	
Formula	2 (15%)	2 (15%)		1 (10%)	2 (18%)	
Combination	7 (54%)	8 (62%)	**.90**	5 (50%)	6 (55%)	**.77**
Breastmilk	4 (31%)	3 (23%)		4 (40%)	3 (27%)	
Position	**1.71±.15[b]**	**1.63±.14[b]**		**1.71±.15[b]**	**1.56±.14[b]**	
Director	8 (35%)	4 (27%)	**.60**	8 (50%)	4 (29%)	**.25**
Provider	14 (61%)	11 (73%)		7 (44%)	10 (71%)	
None of Above	1 (4%)	0 (0%)		1 (6%)	0 (0%)	
Location	**1.86±.23[b]**	**1.63±.21[b]**		**1.64±.23[b]**	**2.13±.21[b]**	
Rural	11 (48%)	6 (40%)	**.20**	5 (31%)	7 (50%)	**.25**
Other Metro	10 (43%)	5 (33%)		6 (38%)	5 (36%)	
Denver Metro	2 (9%)	3 (20%)		3 (19%)	2 (14%)	
Unsure	0 (0%)	1 (7%)		0 (0%)	1 (7%)	
Trainings Attended	**.29±.14[b]**	**.38±.13[b]**		**.29±.14[b]**	**.31±.13[b]**	
Yes	7 (30%)	4 (27%)	**.80**	5 (31%)	2 (14%)	**.32**
No	16 (70%)	11 (73%)		11 (69%)	11 (79%)	

[a] = n (%)
[b] = mean±SD
* = Difference from the control group conducted with χ^2, $p<.05$

Knowledge, attitude and behavior scores were assessed at baseline between the intervention and control groups using independent samples t-tests.

The test scores of the three areas were grouped together and factor analysis was completed to confirm if the patterns of interrelationships and levels among the variables was appropriate. Factor analysis tests showed that it was appropriate to group the total behavior and knowledge questions into a scale of 0-1 (right or wrong answer/behavior); total attitude scores were kept at the original scale of 1-5 (1=strongly agreed and 5=strongly disagreed). No significant differences were found at baseline between the two groups as shown in Table 5.3.

5.3 – Overall Pre-Test Scores of the Intervention and Control Groups

Survey Areas	Scale	Intervention Group (n=23)	Control Group (n=15)	p-value
Total Knowledge (9 Questions)	0-1[b]	.37 ± .05[a]	.39 ± .07[a]	.56
Total Attitude (13 Questions)	1-5	3.7 ± .11[a]	3.7 ± .20[a]	.83
Total Behavior (9 Questions)	0-1[b]	.53 ± .05[a]	.56 ± .17[a]	.78

[a] = mean±SD
[b] = Factor analysis was completed
* = Difference from the control group conducted with independent samples t-tests, p<.05

Post-Test Results. Thirty child care providers filled out the online post-test survey. Eighty percent power was achieved. Eight child care providers dropped out at the time of the post-test. Demographic characteristics between those who dropped out (n=8) and those who remained in the study (n=30) were not significantly different. The child care providers who dropped out of the study were female (100%), 21-29 years of age (33%), white (80%), had children (73%) and fed their infants formula (60%). All child care providers in the post-test were female. Demographic characteristics between the post-test intervention and control groups are described in Table 5.1. There was a significant difference

between the intervention and control groups participants' centers' availability of a lactation consultant or physician to answer infant feeding questions ($p<.001$).

The behaviors of the child care providers in relationship to offering a supportive environment for breastfeeding were examined. The percentage of child care providers whose centers participated in breastfeeding friendly child care center criteria are described in Table 5.4. Of the four statistically significant breastfeeding friendly criteria areas, two variables were supportive of the intervention group. There were no center effects among the different criteria. The guidelines used to determine the criteria for breastfeeding friendly are from the Child and Adult Care Food Program's (CACFP) Breastfed Babies are Welcome Here: A Guide for Child Care Providers (29), because the Colorado CACFP Program uses these guidelines in the child care centers that are enrolled in their program. Overall, child care providers encouraged mothers to breastfeed their infants, 93% (n=13) in the control group and 87% (n=14) in the intervention group. For both the intervention and control group, the majority of child care providers answered correctly where frozen breastmilk should be thawed (64%); and where breastmilk (93% for control group, 88% for intervention group) and formula (93% for control group, 94% for intervention group) should be warmed before feeding. The primary way that the child care providers from both the control and intervention groups responded on how their centers supported parents with their infant feeding choice was through answering their questions on infant feeding.

Table 5.4 – Percentage of Child Care Providers at Post-Test whose Centers Participated in the Breastfeeding Friendly Child Care Center Criteria		
Criteria	**Intervention Group (n=16)[a]**	**Control Group (n=14)[a]**
Encourage working mothers to continue to breastfeed	9 (56%) All of the Time* 5 (31%) Some of the Time* 2 (13%) No*	12 (86%) All of the Time 1 (7%) Some of the Time 0 (0%) No
Offer a comfortable and private place, sink to wash hands and glass of water	15 (94%) Comfortable Chair* 14 (88%) Sink 11 (69%) Water to Drink 10 (63%) Private Space*	13 (93%) Comfortable Chair 14 (100%) Sink 7 (50%) Water to Drink 9 (69%) Private Space
Communicate with the parent about how infant did for the day	16 (100%) Written Report 14 (88%) Talk with Parents*	14 (100%) Written Report 9 (64%) Talk with Parents
Train all center staff to be supportive of breastfeeding	4 (25%) Attended Training	2 (21%) Attended Training
Promote breastmilk as the only food offered until the infant is 6 months of age	9 (56%) Yes*	10 (57%) Yes
Avoid the use of pacifiers	14 (88%) No 2 (13%) Yes	14 (100%) No 0 (0%) Yes
Work with community resources to conduct activities and trainings related to breastfeeding	14 (88%) Nurse 1 (6%) Lactation Consultant 1 (6%) Dietitian	12 (86%) Nurse 4 (29%) Lactation Consultant 3 (21%) Dietitian
Safely store breastmilk at center	14 (88%) Refrigerator 13 (81%) Unsure 11 (69%) Freezer	14 (100%) Refrigerator 14 (100%) Unsure 13 (93%) Freezer

[a] = n (%)

* = Difference from the control group conducted with independent samples t-tests, $p<.05$

Child care providers answered conservatively when asked how long breastmilk or prepared formula was safe to store in the refrigerator. Seventy-nine percent in the control group and 63% in the intervention group answered 1 day for storage of both breastmilk and prepared formula in the refrigerator when the correct amount of time is 2 days. The guidelines used to assess the correct answers for storage of breastmilk in the refrigerator (48 hours) and refrigerator freezer (3 months) are from the CACFP Breastfed Babies are Welcome Here: A Guide for Child Care Providers (29), because the Colorado CACFP Program uses these guidelines in the child care centers that are enrolled in their program.

Child care providers were asked to determine their perceived disadvantages and advantages of both breastmilk and formula. Table 5.5 describes the three most frequently identified advantages and disadvantages of breastmilk and formula. The main difference between the two groups was their perceived attitudes of the advantages of breastmilk. Providers in both groups answered the same on their perceived advantages and disadvantages of formula.

Table 5.5 – Three Most Frequently Identified Advantages and Disadvantages of Breastmilk and Formula

Intervention Group (N=16)		Control Group (N=14)	
Advantages	**Disadvantages**	**Advantages**	**Disadvantages**
Breastmilk:	**Breastmilk:**	**Breastmilk:**	**Breastmilk:**
Better nutrition	No disadvantage	Better nutrition	No disadvantage
Saves money	Harder to leave mom	Increases bonding	Eat more frequently
Less illness	Eat more frequently	Easier for mom	Harder to leave mom
Formula:	**Formula:**	**Formula:**	**Formula:**
No advantage	Not as healthy	No advantage	Not as healthy
Easier for provider	No disadvantage	Convenient for provider	No disadvantage
Easier for mom	More diaper changes	Easier for provider	More diaper changes

Child care providers in both the intervention and control group strongly agreed they have an important role in supporting parents' infant feeding choices and meeting the nutrition needs of the infants in their care, 69% and 64%, respectively. The perceived confidence of child care providers in relation to their ability to answer parents' questions on breastfeeding, formula feeding and introducing solid foods is reported in Table 5.6. Overall, child care providers felt very confident in answering questions parents have on breastfeeding, formula feeding or introducing solid foods to their infants. There were no significant differences between the two groups when analyzed using independent samples t-tests. Even though this is true, child care providers partook in behaviors they

knew were not appropriate (e.g. feeding two infants at a time, feeding an infant cow's milk), because parents, co-workers and physicians were telling them these behaviors were acceptable.

Table 5.6 – Perceived Confidence of Child Care Providers on the Ability to Answer Parents' Questions on Infant Feeding

	Intervention Group (n=16)[a]	Control Group (n=14)[a]	p-value
Answering questions parents have on breastfeeding	**2.07±.23[b]** 3 (19%) Extremely confident 8 (50%) Very confident 3 (19%) Moderately confident 2 (13%) Not very confident	**2.25±.20[b]** 3 (21%) Extremely confident 7 (50%) Very confident 4 (29%) Moderately confident 0 (0%) Not very confident	**.57**
Answering questions parents have on formula feeding	**2.08 ±.23[b]** 3 (19%) Extremely confident 7 (44%) Very confident 4 (25%) Moderately confident 4 (25%) Not very confident	**2.38±.32[b]** 2 (14%) Extremely confident 9 (64%) Very confident 3 (21%) Moderately confident 0 (0%) Not very confident	**.46**
Answering questions parents have on introducing solid foods	**1.85±.21[b]** 3 (19%) Extremely confident 6 (38%) Very confident 6 (38%) Moderately confident 1 (6%) Not very confident	**2.31±.20[b]** 4 (29%) Extremely confident 8 (57%) Very confident 2 (14%) Moderately confident 0 (0%) Not very confident	**.13**

[a] = n (%)
[b] = mean±SD
* = Difference from the control group conducted with independent samples t-tests, p<.05

Child care providers in both the intervention and control group had difficulty answering the correct answer for when infants were developmentally ready to start eating solid foods. In the intervention group, child care providers choose incorrectly 35% of the time whereas the control group choose incorrectly 44% of the time. One child care provider in the control group stated in the open-ended questions regarding feeding infants, "I think that it is not best practice to feed more then one infant at a time but if two babies are needing to be fed it is easier to let one sit next to you on the floor and drink its bottle as you feed a smaller one".

In regards to infant feeding cues, 100% of the child care providers answered that they feed formula fed and breastfed infants based on infant hunger cues (e.g. sucking on fingers, fussy), yet all child care providers felt that crying was a good sign that an infant is hungry and ready to eat. They also felt that the form of feeding that provided the most benefits to infants and parents was breastmilk. For the control group, child care providers who fed their own children formula were more likely to believe that a combination of breastmilk and formula provide the most benefits to child care providers ($\chi^2 = 6.98$; p=.03). For the intervention group, child care providers who fed their own children formula felt that a combination of breastmilk and formula provided the most benefits to both parents ($\chi^2 = 9.00$; p=.01) and child care providers ($\chi^2 = 11.00$; p=.03). There was a significant difference between the intervention group and control group at the post-test when asked about the form of feeding that provided the most benefits to infants (p>.05). The intervention group felt that breastmilk provided the most benefits to infants.

Repeated measures between the questions on the pre-test and post-test were conducted. Five significant interactions were found; four in favor of the intervention group and one in favor of the control group. The intervention group had a significant increase from pre- to post-test for offering water to breastfeeding mothers as part of the breastfeeding friendly criteria (p=.05), significant decrease on the behavior to feed infants every 2 hours (p=.01) and significant increase in the belief that breastfed infants' diapers are "not as smelly" as formula fed infants (p<.05). Child care providers in the intervention group also

had a significant change in their attitude that breastfeeding provided the most benefit to infants ($p<.05$) over formula or a combination of breastmilk and formula. The control group had a significant change in their attitude that breastfeeding increased the incidence of infants bonding with their mothers ($p=.05$).

Website Evaluation Survey Results. Eleven child care providers from the intervention group completed the website evaluation survey at post-test. The majority of the child care providers used the website during the 3 month period three times. Overall, they used the website primarily at their center (n=7). The child care providers felt they would have accessed the website more if they had additional time during their workday. A magnet with the website address would be the best reminder for them to view the website. Six out of the seven child care providers viewed the handouts on the website, two printed off the handouts and two read the handouts.

Five of the seven providers felt their center was meeting the recommendations made on the website most of the time. Nine of the 11 providers felt the website would be an excellent way to receive infant feeding information and five of the providers felt they would continue to use this website in the future. Overall, they would not change anything to the layout of the website. Child care providers also shared other thoughts on the website including, "I hope to have more time to study this website and print off the material that will benefit our parents…my time was limited during the past three months so I didn't get to study the site as much as I wanted to"; "honestly and in

hind sight I didn't share anything from the website because I thought it was still in test mode and I shouldn't do so. Sorry I didn't take advantage of your great resources and now I WILL!"".

Website Usage Software Results for the Months between the Pre- and Post-Test. WebTrends® 2006 software determined that there were a total of 1,515 hits on the website; 1,431 hits during the weekdays and 84 hits during the weekends. Overall, there were 48 different visitors to the website with 8 of the 48 visiting the website more than once. The average visit duration was roughly 11-½ minutes. The top five pages that were viewed were the **InfaNET Nutrition for Child Care Providers** home webpage, the "infant feeding information" webpage, the "breastfeeding/breastmilk" webpage, the "survey" webpage and the "more information" webpage. The most active time during the day for website use was during the lunch hour. The top web browser used by the participants was Internet Explorer 6.0x®. One-hundred and seventy-eight pages were viewed from the website. On average, two web pages were viewed per day and three web pages were viewed during each visit during the 3 month period.

Follow-up Results. Fifteen child care providers filled out the online follow-up survey. Fifteen child care providers dropped out at the time of the follow-up; six from the intervention group and nine from the control group. Reasons for dropping out from the study were received from 10 of the child care providers. The reasons included left the child care center (n=6) and no longer working with infants (n=4). Power was not achieved at follow-up. Demographic characteristics between those who dropped out (n=15) and those who remained

in the study (n=15) were not significantly different. There was a significant difference between the participants' centers availability of a lactation consultant or physician to answer infant feeding questions ($p<.001$). All child care providers at follow-up were female. Repeated measures were conducted between the questions on the pre-test, post-test and follow-up. There were no significant differences between the intervention and control groups' answers on the attitude, behavior and knowledge questions. Also, total knowledge, attitude and behavior scores were analyzed. No significant differences were found between the three time periods as show in Figures 5.1-5.3. There appeared to be a trend of increased knowledge between the three time periods with the intervention group, but this was not statistically significant.

Figure 5.1 – Total Attitude Scores of Child Care Providers
(Scale of 1-5 with 1=strongly agree and 5=strongly disagree)

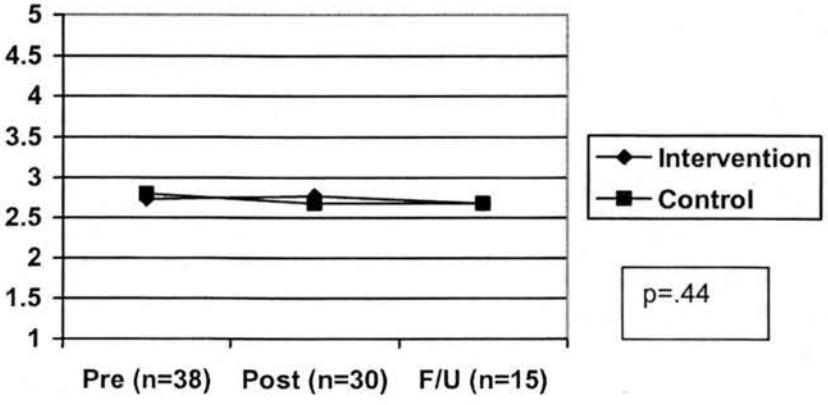


Figure 5.2 – Total Behavior Scores of Child Care Providers
(Scale of 0-1 with 0=not desirable behavior and 1=desirable behavior)

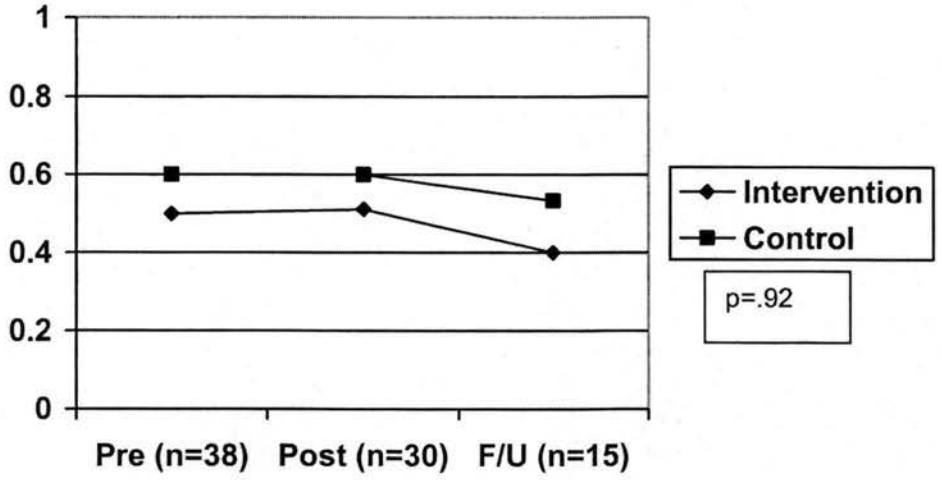
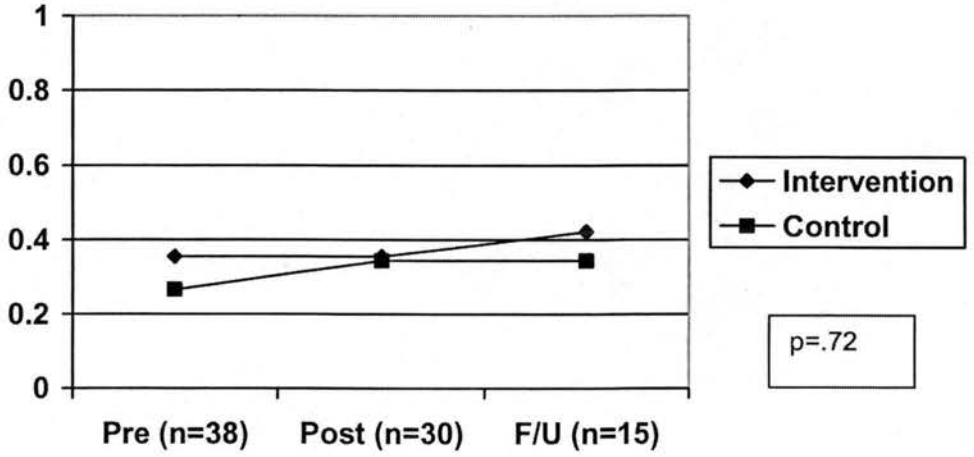


Figure 5.3 – Total Knowledge Scores of Child Care Providers
(Scale of 0-1 with 0=incorrect answer and 1=correct answer)



Website Usage Software Results for the Months between the Post-Test and Follow-up. WebTrends® 2006 data was only available for 5 months due to a licensing error by the college. WebTrends® 2006 software determined that there

were a total of 1,117 hits on the website; 1,058 hits during the weekdays and 59 hits during the weekends. Overall, there were 51 different visitors to the website with 9 of the 51 visiting the website more than once. The average visit duration was roughly 6 minutes. The top three pages that were looked at were the **InfaNET Nutrition for Child Care Providers** home webpage, the "infant feeding information" webpage and the "survey" webpage. The most active time during the day for website use was during the lunch hour. The top web browser used by the participants was Internet Explorer 6.0x®. Four hundred and eleven pages were viewed from the website. On average, two web pages were viewed per day and six web pages were viewed during each visit during the 5 month period.

Conclusions

Within the limitations of the study, the study results provide some evidence that an infant feeding website for child care providers is a viable resource for this population. Between the pre-test and post-test, the intervention group did have more positive changes (statistically significant) in desired behaviors and attitudes in relationship to infant feeding and providing a supportive environment for breastfeeding. Knowledge scores did not improve drastically and this could be because this sub-group of child care providers in this study already possessed a desirable level of knowledge on the appropriate ways to store, prepare and feed breastmilk and formula to the infants in their care. An area of need appears to be in reading infant hunger cues. All of the child care providers in both the intervention and control group answered incorrectly when

asked if crying was a good sign of hunger in infants. Even though crying is considered a late hunger cue in infants, the recommendations are not to let an infant get to the point of hunger where crying occurs. Determining the reasons why child care providers feel that crying is a "good" infant hunger cue is warranted. Even though it was not significant, the majority of child care providers who dropped out of the study fed their infants formula; this variable would be interesting to examine in future research.

Limitations of this study include a self-selected portion of the target population and a low response rate for the follow-up data which did not meet 80% power to have confidence in the results of the follow-up data. More funding sources to provide larger incentives and in-person visits to the child care centers may have helped to increase the response rate. Many child care providers in this study left their job or moved to the toddler room of their center which made their eligibility to partake in the study non-existent. Researchers have found that half of child care staff and 1/3 of child care directors leave their child care center within four years of being hired by that center (6). Because the study participants were instructed to use the website as desired and were not given any specific instructions, child care providers used the website only minimally. Also, during the course of the intervention time frame, a large media campaign occurred on the benefits of breastfeeding. This wave of media press may have affected the child care providers' answers to the survey. Difficulty in accessing the website was mentioned by only two of the participants during the time of the study, so availability of the Internet was not a limitation for this research study.

This research study evaluated an infant feeding website for child care providers; other studies of this nature are not known to the researchers, so the information from this study will provide a framework for future research. Information on reading infant hunger cues should also be more prominent on the website since a low number of participants answered correctly on this topic. More research is warranted on the use of a website as the appropriate medium to use for disseminating infant feeding information, specifically breastfeeding and use of breastmilk, to child care providers as well as how infant feeding cues are read and determined in child care centers.

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CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE RESEARCH

Conclusions

The overall aim of this research project was two-fold: 1) develop a website using the Social Learning Theory as the theoretical framework to address infant feeding, specifically on breastfeeding and the use of breastmilk at child care centers and 2) evaluate the website's effectiveness in yielding improvements in knowledge, attitudes and behaviors among child care providers on infant feeding, specifically breastfeeding and the use of breastmilk at child care centers. The anticipated outcomes for this research project included an increase in the child care providers' knowledge, attitudes and behaviors on infant feeding best practices. The results of this research project reflect that the **InfaNET Nutrition for Child Care Providers** website was deemed by the child care providers as a well-liked and appropriate tool to receive infant feeding information. At least 3,972 hits were made on the website during the study period. Results also showed that between the pre- and post-test intervention, the intervention group did have more changes in attitudes and behaviors than the

control group but no changes in knowledge likely due to the fact that the child care providers surveyed already possessed a desirable level of knowledge in regards to storing, preparing and feeding infants' breastmilk and formula. These behavior and attitude changes were not sustained at the follow-up, but results showed that there was a positive trend in changes in knowledge for the intervention group.

Finding innovative ways to provide infant feeding information, especially given that breastfeeding is the infant feeding gold standard (attitudinal) and ways to support the breastfeeding mother-infant pair (behaviors) is apparent due to the decreased level of breastfeeding in Colorado and around the nation (1). Child care providers' desire for a website was apparent throughout all stages of this project (needs assessment, group discussions, process evaluation and intervention) through their answers to open-ended questions. Child care providers in both the intervention and control groups listed the Internet as their top choice for receiving infant feeding information, 75% and 71%, respectively. Their choice of Internet was over government food programs, child care referral agencies, books, media and their child care center director. One child care provider when asked what other information would be desired on a website stated, "simplified information is needed for providers…many do not have children and are wanting to learn the time frame of when to feed, what to feed and have other questions answered. Many are turning to the Internet for accurate and quick information to better perform their job". Additional time and staff appeared to be two areas that child care providers desired to help them

seek out infant feeding information and feed the infants in their care. Child care providers appeared to know what the correct infant feeding behaviors were, but often did not act out desired behaviors because of lack of self-efficacy or time to commit to the correct behavior. This was apparent by statements in the open-ended questions. One child care provider stated, "'I have only had one baby whose doctor wanted me to give cow's milk to, so I did". Another child care provider stated, "I think that it is not best practice to feed more then one infant at a time but if two babies need to be fed it is easier to let one sit next to you on the floor and drink its bottle as you feed a smaller one. Having options is best. If a child can only have breast milk it will have to stay hungry". Both of these statements show the need to commit to correct infant feeding behaviors. Self-efficacy to believe in oneself to share the knowledge child care providers have on the appropriate ways to feed infants is apparent throughout the results of this study.

Recommendations for Future Research

More research is warranted on the use of a website as the appropriate medium to use for disseminating infant feeding information, specifically breastfeeding and use of breastmilk, to child care providers as well as how infant feeding cues are read and determined in child care centers. Even though power was attained at both the pre- and post-test results, additional funding would have allowed for personal visits to each child care center and possibly a larger sample size resulting in greater confidence in the findings. Through phone conversations

and emails with the child care providers, personal contact was desired by those who participated and those who decided not to participate in the study. Child care providers felt that if the researchers would have been able to visit their centers and give them a personalized tour of the website, this would have enabled them to understand and use the website more effectively during the study period. Additional funding for this type of research study is currently being explored. Working as a child care provider can be transient position because of low wages offered and a stepping stone to a different career (2). Because of these reasons, this population is often considered a difficult research target population (2-3). In addition, the decision was made to not give the child care providers instructions on how to use the website as the researchers desired the providers to view and read the website information as they deemed necessary. More concrete directions may also have helped the child care providers view the website more effectively.

Child care providers also answered that they often partake in behaviors they knew were not appropriate (e.g. feeding two infants at a time, feeding an infant cow's milk) because parents, co-workers and physicians were telling them those behaviors were acceptable. Self-efficacy is an important construct in the Social Learning Theory and a definite area that needs to be addressed with this population. More research needs to be conducted to determine how child care providers self-efficacy can improve which would empower them to act out the behaviors they know are correct. Child care directors' role in their staff's self-efficacy would also be important to investigate.

An interesting finding from this study was in regards to the child care providers' views on infant hunger cues. In both the control and intervention groups at both pre-test, post-test and 6 month follow-up time periods, all of the child care providers felt that crying was a good sign that an infant is hungry and ready to eat. Even though this can be true, crying is considered a late indicator of hunger and feeding during this time should be avoided due to the risk of choking and frustration on the infant's part. When crying occurs as an indicator of hunger, this often signals that other feeding cues have been missed (4). Researchers have also found that overfeeding an infant can occur if care givers consistently respond to crying by feeding the infant and do not learn to monitor infant's hunger and satiety cues (4-5). Overfeeding of an infant has also been linked to an increase in childhood overweight (6-9). In addition, several studies have shown that breastfeeding may have a protective effect against the risk of future overweight (6-9). The ability of infants to naturally regulate their intake as opposed to feeding by the clock or being "forced" to finish a bottle is an important mechanism to learn; this mechanism might be one of the reasons why breastfeeding is linked to a decrease in the risk of overweight (6-9). The fact that child care providers do not know what infant hunger cues are, or the more likely reason, that they are too busy caring for multiple infants is a concern. More research needs to be done to assess the need for policy and/or environmental changes in child care centers to allow for child care providers to adequately watch for infant hunger cues. The **InfaNET Nutrition for Child Care Providers** website does contain information on infant hunger cues, but this information is

not at the forefront of the website. A link to infant hunger cue information will be made available directly on the website home page. The **InfaNET Nutrition for Child Care Providers** website will be maintained by Colorado State University, so this information will continue to be available for child care providers and more research can be conducted. A benefit of using a nutrition education website is that it can be easily updated, no paper waste occurs and purchasing supplies such as binders is nonexistent. Dissemination of the website address will occur to child care centers in Colorado. Funding availability for magnets with the website address is also being researched.

This research study evaluated an infant feeding website for child care providers; other studies of this nature are not known to the researchers, so the information from this study will provide a framework for the future research mentioned above. Information on reading infant hunger cues will be placed in a more prominent position on the website since a low number of participants answered correctly on this topic. More research is warranted on the use of a website as the appropriate medium to use for disseminating infant feeding information, specifically breastfeeding and use of breastmilk, to child care providers as well as how infant feeding cues are read and determined in child care centers.

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APPENDICES

Appendix A

Ten Steps to Successful Breastfeeding

Ten Steps to Successful Breastfeeding

World Health Organization & UNICEF, 1989

Every facility providing maternity services and care for newborn infants should:

1. Have a written breastfeeding policy that is routinely communicated to all health care staff.

2. Train all health care staff in skills necessary to implement this policy.

3. Inform all pregnant women about the benefits and management of breastfeeding.

4. Help mothers initiation breastfeeding within one hour of birth.

5. Show mothers how to breastfeed and how to maintain lactation even if they should be separated from their infants.

6. Give newborn infants no food or drink others than breastmilk, unless *medically* indicated.

7. Practice rooming-in – allow mothers and infants to remain together – 24 hours a day.

8. Encourage breastfeeding on demand.

9. Give no artificial teats or pacifiers to breastfeeding infants.

10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic.

Appendix B

HRC Study Approval Letter for Needs Assessment

Colorado State University

Office of Regulatory Compliance
Office of Vice President for Research
and Information Technology
Fort Collins, CO 80523-2011
(970) 491-1553
FAX: (970) 491-2293

MEMORANDUM

TO: Jennifer Anderson, FSHN, 1571
FROM: Janell A. Meldrem, Administrator
Human Research Committee
SUBJECT: **PROJECT APPROVAL**
Title: Assessing the Knowledge, Attitudes, Behaviors and Training Needs Related to Breastfeeding of Colorado Child Care Providers: Creating a Supportive Breastfeeding Environment Intervention
Protocol No.: 04-328H
Funding Agency: TBD

DATE: February 10, 2005

The above-referenced project was approved by the Human Research Committee on February 4, 2005 for the period February 4, 2005 to November 19, 2005. Because of the nature of this research, it will not be necessary to obtain a signed consent form. However, all subjects must receive a copy of the approved cover letter printed on department letterhead. The requirement of documentation of a consent form is waived under § __.117(c)(2). **Approval is for PHASE I: to survey 278 child care centers: surveying 1 director and 4 teachers per center: totaling a maximum of 1390 participants.**

A status report of this project will be required within a 12-month period from the date of approval. Renewal is the Principal Investigator's responsibility, but as a courtesy, you will be sent a reminder approximately two months before the protocol expires. The Principal Investigator will report on the numbers of subjects who have participated this year and project-to-date, about problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary form (H-101) is available from the Regulatory Compliance web page (see below). Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

It is the responsibility of the investigator to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research. It is also the investigator's responsibility to notify the Committee of any changes in experimental design, participant population, or consent procedures or documents. This can be done with a memo which completely describes the changes and their consequences (new consent form or cover letter, or altered survey instrument, for example). Students serving as Co-Principal Investigators may not alter projects without first obtaining PI approval. The PI is ultimately responsible for the conduct of the project.

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647. If approval did not accompany a proposal when it was submitted to a sponsor, it is the researcher's responsibility to provide the sponsor with the approval notice.

Please direct any questions about the Committee's action on this project to me for routing to the Committee. Additional information is available from the Regulatory Compliance web site at http://www.research.colostate.edu/rcoweb/.

Attachment
cc: Alena Clark w/attachment

Appendix C

Cover Letter to Child Care Centers for Reliability Testing

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

February 3, 2005

Dear Child Care Director,

We appreciate your center's involvement in our research on infant feeding practices. As part of this research, you are being asked to complete the same survey on two different dates (~7-10 days apart) to test the reliability of the survey (whether the survey will give the same results when taken at two different points in time). This second survey needs to be completed by **Thursday, February 10.**

Because of the importance of matching both surveys to the same person, please write down your initials and birth date on the blank on the top of the first page of the survey. Also, please fill out the survey on your own and write comments by a question if you feel if it is not clear. As a token of appreciation, please fill out the below contact information to be placed in a drawing for a chance to win one of two $10 gift certificates to Wal-Mart, Target, Safeway, Albertsons or King Soopers – your choice (to be eligible for the drawing both surveys must be completed and returned)!

This survey is part of a research project to fulfill my graduate degree requirements, so your help is greatly appreciated. Please note that none of your responses will be used in the actual research process. If you have any questions or concerns while taking this survey, please contact Alena Clark at the number below. Thank you for taking the time to complete this survey.

Sincerely,

Alena Clark, MPH, RD, CLC
Doctoral Student
Department of Food Science and Human Nutrition
Colorado State University
alenac@lamar.colostate.edu
970-491-5676

Thank you for participating in this study. As a token of appreciation for your thoughts and time, please write your contact information below for your chance to win one of two $10 gift certificates to a store in your area. *Thank you again!*

Name: _____
Address: _____
Phone: _____

Appendix D

Child Care Center Needs Assessment Packet:
Introductory Cover Letter to Child Care Centers
Cover Letter to Child Care Center Director
Child Care Center Director Needs Assessment Survey
Cover Letter to Infant Room Teacher
Infant Room Teacher Needs Assessment Survey

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

March 9, 2005

Dear Child Care Director,

Greetings! Did you know that there is evidence that food habits and patterns of nutrient intake acquired in early infancy/childhood "track" into later childhood and adulthood? The Department of Food Science and Human Nutrition at Colorado State University has developed the following surveys to assess the thoughts, needs and suggestions of child care directors and teachers on infant feeding practices.

This packet includes two surveys: one director survey and four teacher surveys. The teacher surveys are for those who currently work in the infant rooms (infants below the age of 12 months) at your center. Please fill out your survey and request your infant room teachers to fill out the teacher surveys. If you have an infant room director that you feel would be better suited to respond to this survey, please pass this information along to him/her. To maintain confidentially, it is recommended to place the provided pre-addressed manila envelope in a common place area, so when the teachers are completed with the survey they can place it in the manila envelope without having anyone else know they have participated. Please mail back the manila envelope with the completed surveys to Colorado State University by **Monday, April 4**.

This research project would not be possible without you and your staff. The feedback you provide will be used to develop new materials and programs on infant feeding practices in Colorado. In addition to Colorado State University, this survey is supported by the Colorado Department of Public Health and Environment.

As a token of appreciation, there is a chance for those that participate to win one of three $50 gift certificates. If you and your staff have any questions regarding the surveys at anytime, please contact Alena Clark at the number and/or email address below. Thank you for you and your staff's time, effort and opinions, as they will help to further strengthen the support of infants and child care providers in Colorado.

Sincerely,

Alena Clark, MPH, RD, CLC
Doctoral Student
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
alenac@lamar.colostate.edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor
Dept. Food Science & Human Nutrition
Colorado State University
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Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

March 9, 2005

Dear Child Care Director,

Greetings! The Department of Food Science and Human Nutrition at Colorado State University developed the following survey as part of a research project to assess your thoughts, needs and suggestions regarding infant feeding practices and child care centers.

This survey will take 10-15 minutes to complete. Your participation in filling out this survey is voluntary. If you choose to participate, your agreement of consent is simply filling out and returning the survey. Your answers, thoughts, opinions, and comments will be kept confidential as your privacy is very important. Names and/or identifying information will not be collected. The risk of a breach of confidentiality will be minimized by presenting research in a way that makes identification of individuals impossible, and individual responses will not be available to anyone outside the research team. It is not possible to identify all potential risks in research procedures, but the researchers have taken the precautions to minimize any potential risks. There are also no known benefits in participating with this survey, but we hope to develop new materials and programs on infant feeding practices for Colorado child care centers. You may withdraw your consent at any time. If you have any questions regarding your rights as a research participant, please contact Janel Meldrem at 970-491-1655.

Once you have completed your survey, place it into the provided white envelope. Please return all of the surveys, including your survey and your staff's surveys, in the provided pre-addressed manila envelope by **Monday, April 4**.

This research project would not be possible without you. As a token of our appreciation for your time, please fill out the below information for a chance to win one of three $50 gift certificates to a store in your area. This information will be removed immediately from the survey once received. If you have any questions regarding the survey, please contact Alena Clark at the number and/or email address below. Thank you for your time, effort and opinions, as they will help to further strengthen the support of infants and child care providers in Colorado.

Sincerely,

Alena Clark, MPH, RD, CLC
Doctoral Student
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
alenac@lamar.colostate.edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
970-491-7334

As a token of appreciation for your thoughts and time, please write your contact information below for your chance to win one of three $50 gift certificates to a store in your area. This information will be removed immediately upon receiving your survey.

Name: _____
Address: _____
_____
Phone: _____

Infant Feeding Practices in Colorado Child Care Centers

DIRECTOR SURVEY

1. Are you? *(circle <u>one</u> letter)*
   a. male
   b. female

2. How long have you worked in child care? *(circle <u>one</u> letter)*
   a. less than 1 year
   b. 1-4 years
   c. 5-10 years
   d. greater than10 years

3. How long have you worked at <u>this</u> child care center? *(circle <u>one</u> letter)*
   a. less than 1 year
   b. 1-4 years
   c. 5-10 years
   d. greater than10 years

4. Do you have children of your own? *(check <u>one</u> box)*
   □ Yes □ No

   4a. **If yes,** what did you feed your children when they were infants? *(circle <u>one</u> letter)*
   a. formula
   b. breast milk
   c. both formula and breast milk

5. Which best describes where your center is located? *(circle <u>one</u> letter):*
   a. rural (city population of less than or equal to 50,000 people)
   b. other metro (city population of greater than or equal to 50,000 people)
   c. Denver metro (metropolitan area of greater than or equal to 1 million)

6. How many infants is your center licensed to care for? *(<u>write</u> one number)*
   _____

7. Please <u>list the number</u> of infants, in <u>each</u> age category below, that your center currently has in its care?
   0 to 4 months ___ 5 to 7 months ___ 8 to 12 months ___

8. What is the average age of the infants who enter your center? *(<u>write</u> one number)*
   _____ months

9. Is your center NAEYC (National Association for the Education of Young Children) accredited? *(check <u>one</u> box)*
   □ Yes □ No □ Unsure

10. Is your center enrolled in the Child and Adult Care Food Program? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

11. Does your center accept infants who receive breast milk? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

12. Does your center have a <u>written</u> infant feeding policy? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

13. Does your center have a <u>written</u> formula feeding policy? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

    13a. **If yes**, are parents informed about the policy when they inquire about care for their child? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

14. Does your center have a <u>written</u> breastfeeding policy? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

    14a. **If yes**, are parents informed about the policy when they inquire about care for their child? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

15. Are staff members at your center allowed to breastfeed at work? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

    15a. **If yes**, approximately how many of your staff members have breastfed at work? *(<u>write</u> one number)*

    _____

    15b. Of the above number, how many work in your infant room? *(<u>write</u> one number)*

    _____

16. Does your center provide a packet of information about your center to prospective parents? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

    16a. **If yes**, does this packet contain information on *(circle the letter for **<u>each</u>** that apply)*:
    a. breastfeeding
    b. formula feeding
    c. introducing solid foods
    d. none of the above

17. Which of the following types of infant feeding education materials does your center have available for parents? *(circle the letter for **<u>each</u>** that apply)*
    a. breastfeeding
    b. formula feeding
    c. introducing solid foods
    d. none of the above

18. What kind of information and training would be helpful to you and your staff in assisting parents with formula feeding questions? *(list ideas)*

_____

_____

_____

19. What kind of information and training would be helpful to you and your staff in assisting parents with breastfeeding questions? *(list ideas)*

_____

_____

_____

20. Which of the following types of trainings on infant feeding would you attend? *(circle the letter for **each** that apply)*
    a. one day conference
    b. on your own internet based lessons
    c. on your own paper copy lessons with case studies and videos
    d. 2 to 3 two-hour night classes
    e. other (please explain): _____
    f. I would not be interested in obtaining such training

21. Do you have internet access at work? *(check one box)*
    □ Yes □ No □ Unsure

22. Would you be interested in a website with infant feeding information that is specific to child care providers? *(check one box)*
    □ Yes □ No □ Unsure

23. What types of things, besides training, might help your center support parents' decisions on formula feeding or breastfeeding? *(please list)*

_____

_____

_____

_____

_____

24. Please list any other ideas or comments regarding feeding infants.

_____

_____

_____

_____

_____

_____

Thank you for participating in this survey!

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

March 9, 2005

Dear Child Care Teacher,

Greetings! The Department of Food Science and Human Nutrition at Colorado State University developed the following survey as part of a research project to assess your thoughts, needs and suggestions regarding infant feeding practices and child care centers.

This survey will take 15-20 minutes to complete. Your participation in filling out this survey is voluntary. If you choose to participate, your agreement of consent is simply filling out and returning the survey. Your answers, thoughts, opinions, and comments will be kept confidential as your privacy is very important. Names and/or identifying information will not be collected. The risk of a breach of confidentiality will be minimized by presenting research in a way that makes identification of individuals impossible, and individual responses will not be available to anyone outside the research team. It is not possible to identify all potential risks in research procedures, but the researchers have taken the precautions to minimize any potential risks. There are also no known benefits in participating with this survey, but we hope to develop new materials and programs on infant feeding practices for Colorado child care centers. You may withdraw your consent at any time. If you have any questions regarding your rights as a research participant, please contact Janel Meldrem at 970-491-1655.

Once you have completed your survey, place it into the provided white envelope. Please place the envelope into the provided pre-addressed manila envelope by **Friday, April 1**. Your director can let you know where this manila envelope is located.

This research project would not be possible without you. As a token of our appreciation for your time, please fill out the below information for a chance to win one of three $50 gift certificates to a store in your area in a drawing. This information will be removed immediately from the survey once received. If you have any questions regarding the survey, please contact Alena Clark at the number and/or email address below. Thank you for your time, effort and opinions, as they will help to further strengthen the support of infants and child care providers in Colorado.

Sincerely,

Alena Clark, MPH, RD, CLC
Doctoral Student
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
alenac@lamar.colostate.edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
970-491-7334

As a token of appreciation for your thoughts and time, please write your contact information below for your chance to win one of three $50 gift certificates to a store in your area. This information will be removed immediately upon receiving your survey.

Name: _____

Address: _____

_____

Phone: _____

Infant Feeding Practices in Colorado Child Care Centers

INFANT ROOM TEACHER SURVEY

1. Are you *(circle <u>one</u> letter)*:
   a. male
   b. female

2. How long have you worked in child care? *(circle <u>one</u> letter)*
   a. less than 1 year
   b. 1-4 years
   c. 5-10 years
   d. greater than 10 years

3. How long have you worked at <u>this</u> child care center? *(circle <u>one</u> letter)*
   a. less than 1 year
   b. 1-4 years
   c. 5-10 years
   d. greater than 10 years

4. How many hours do you work per week? *(circle <u>one</u> letter)*
   a. <10 hours
   b. 10-20 hours
   c. 20-30 hours
   d. 30+ hours

5. Do you have any post high school training? *(check <u>one</u> box)*
   □ Yes □ No □ Unsure

   5a. **If yes**, what type of training? *(circle <u>one</u> letter)*
   a. certificate
   b. 2 year degree
   c. 4 year early childhood related degree
   d. 4 year degree, other
   e. other (please explain): _____

6. Do you have children of your own? *(check <u>one</u> box)*
   □ Yes □ No

   6a. **If yes,** what did you feed your children when they were infants? *(circle <u>one</u> letter)*
   a. formula
   b. breast milk
   c. both formula and breast milk

7. For each age group in your infant room, please list the total number of infants and of that total number, list the number of infants who are currently breastfed or formula fed.

Age Group	Total Number	# of Breastfed	# of Formula fed
0 to 2 months			
2 to 4 months			
4 to 6 months			
6 to 8 months			
8 to 12 months			

8. Which of the following do you believe are advantages of formula over breastmilk? *(circle the letter for **each** that apply)*
   a. less illness
   b. it is easier
   c. more convenient
   d. better bonding with mom
   e. less risk of diseases in adult life
   f. better nutritionally
   g. helps make infants smarter
   h. infant is easier to care for
   i. less risk of obesity
   j. diapers not as smelly
   k. saves family money
   l. less trash
   m. not embarassing
   n. no advantage
   o. other (please explain): _____

9. Which of the following do you believe are advantages of breastmilk over formula? *(circle the letter for **each** that apply)*
   a. less illness
   b. it is easier
   c. more convenient
   d. better bonding with mom
   e. less risk of diseases in adult life
   f. better nutritionally
   g. helps make infants smarter
   h. infant is easier to care for
   i. less risk of obesity
   j. diapers not as smelly
   k. saves family money
   l. less trash
   m. not embarassing
   n. no advantage
   o. other (please explain): _____

10. Which of the following do you believe are disadvantages of breastmilk over formula? *(circle the letter for **each** that apply)*
    a. more diaper changes
    b. it is harder for them to leave their moms
    c. do not have as regular of a schedule
    d. eat more frequently
    e. uncomfortable for staff
    f. not as healthy
    g. embarrassing
    h. no disadvantage
    i. other (please explain): _____

11. Which of the following do you believe are disadvantages of formula over breastmilk? *(circle the letter for **each** that apply)*
    a. more diaper changes
    b. it is harder for them to leave their moms
    c. do not have as regular schedule
    d. eat more frequently
    e. uncomfortable for staff
    f. not as healthy
    g. embarrassing
    h. no disadvantage
    i. other (please explain): _____

12. Are mothers allowed to breastfeed at your center? *(check one box)*
    □ Yes □ No □ Unsure

    12a. **If yes,** please indicate how you feel about this practice *(circle one letter).*
    a. dislike it a lot
    b. do not especially like it
    c. no opinion
    d. it is okay
    e. like it a lot

13. Do you have a special place at your center for mothers to breastfeed their infants? *(circle the letter for **each** that apply)*
    a. private room/space
    b. special chair or couch
    c. nowhere special
    d. other (please explain): _____
    e. unsure

14. What would you say to other child care staff about having mothers breastfeed at their day care centers? *(circle one letter)*
    a. do not try it
    b. it is not such a great idea
    c. no opinion
    d. it is okay
    e. encourage it

15. Are breast pumps available to mothers to express their milk at your center? *(check one box)*
    □ Yes □ No □ Unsure

16. Do you feel your center has an adequate place to store breastmilk and/or prepared formula? *(check one box)*
    □ Yes □ No □ Unsure

    16a. **If yes,** where are breastmilk and/or prepared formula stored: *(circle the letter for **each** that apply)*
    a. refrigerator
    b. freezer
    c. mother brings in cooler
    d. other (please explain): _____
    e. unsure

17. How long is it safe to store prepared formula in the refrigerator? *(circle one letter)*
    a. 1 day
    b. 2-3 days
    c. 4-5 days
    d. 1 week
    e. unsure

18. How long is it safe to store breastmilk in the refrigerator? *(circle one letter)*
    a. 1 day
    b. 2-3 days
    c. 4-5 days
    d. 1 week
    e. unsure

19. How long is it safe to store breastmilk in the refrigerator freezer? *(circle one letter)*
    a. 1-2 months
    b. 3-6 months
    c. 7-10 months
    d. 11-12 months
    e. unsure

20. Should frozen breast milk be thawed in the microwave? *(check one box)*
    □ Yes □ No □ Unsure

21. Should breast milk be warmed in the microwave? *(check one box)*
    □ Yes □ No □ Unsure

22. Should prepared formula be warmed in the microwave? *(check one box)*
    □ Yes □ No □ Unsure

23. Which of the following feeding methods have you been trained on how to appropriately store, handle and feed to an infant? *(circle <u>one</u> letter)*
    a. breast milk
    b. formula
    c. both breast milk and formula
    d. none of the above

24. In <u>your opinion</u>, when is the appropriate age to stop offering formula? *(<u>write</u> one number)*
    _____ months

25. In <u>your opinion</u>, when is the appropriate age to stop offering breastmilk? *(<u>write</u> one number)*
    _____ months

26. Do you believe a mother can successfully breastfeed if she is feeding her infant a combination of breastmilk and formula? *(circle <u>one</u> letter)*
    a. should never be done
    b. not a good idea
    c. no opinion
    d. it is an okay idea
    e. may be a good option

27. Do you believe that child care centers have an important role in supporting parents with their infant feeding choice? *(check <u>one</u> box)*
    □ Yes □ No □ Unsure

    27a. **If yes,** how can child care centers support parents who decide to formula feed? *(<u>list</u> ideas)*

_____

_____

    27b. **If yes,** how can child care centers support parents who decide to breastfeed? *(<u>list</u> ideas)*

_____

_____

28. Which of the following types of infant feeding education materials does your center have available for parents? *(circle the letter for **<u>each</u>** that apply)*
    a. breastfeeding
    b. formula feeding
    c. introducing solid foods
    d. none of the above

29. What kind of information and training would be helpful to you in assisting parents with formula feeding questions? *(<u>list</u> ideas)*

_____

_____

_____

30. What kind of information and training would be helpful to you in assisting parents with breastfeeding questions? *(list ideas)*

_____

_____

_____

31. Which of the following types of trainings on infant feeding would you attend? *(circle the letter for **each** that apply)*
    a. one day conference
    b. on your own internet based lessons
    c. on your own paper copy lessons with case studies and videos
    d. 2 to 3 two-hour night classes
    e. other (please explain): _____
    f. I would not be interested in obtaining such training

32. Do you have internet access at work? *(check one box)*
    □ Yes □ No □ Unsure

33. Would you be interested in a website with infant feeding information that is specific to child care providers? *(check one box)*
    □ Yes □ No □ Unsure

34. What types of things, besides training, might help your center support parents' decisions on formula feeding or breastfeeding? *(please list)*

_____

_____

_____

_____

_____

35. Please share any other ideas or comments regarding feeding infants. *(please list)*

_____

_____

_____

_____

_____

Thank you for participating in this survey!

Appendix E

Desired Website Content Information Areas and Specific Topics
from Needs Assessment Survey

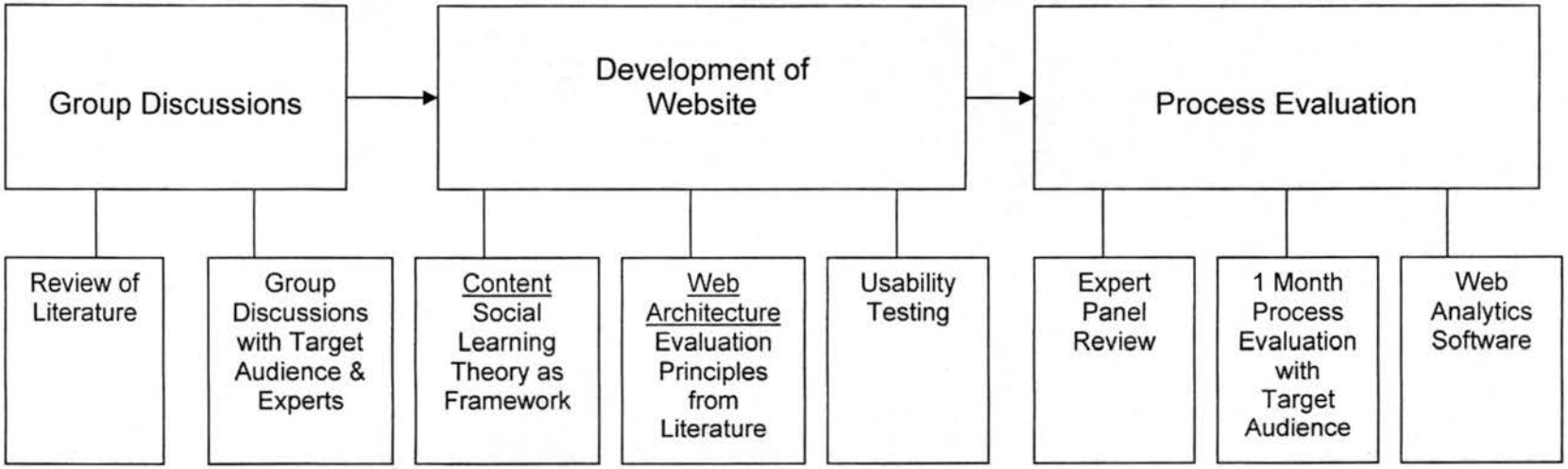
Desired Website Content Information from Needs Assessment Survey

Content Areas	Specific Topics
Breastfeeding/Breastmilk	1. Benefits of Breastfeeding 2. Truth Behind Breastfeeding Myths 3. Breastfeeding Friendly Environment in Child Care Centers 4. Parent's Guide to Breastfeeding and Child Care Centers 5. Storage and Preparation of Breastmilk for Child Care Providers 6. Breastmilk: How Much is Enough? 7. Mother's Nutrition Needs When Breastfeeding
Bottle Feeding	1. Bottle Do's and Don'ts in Child Care Centers 2. Different Formulas for Different Needs 3. Storage and Preparation of Formula for Child Care Providers 4. Formula: How Much is Enough?
Introducing Solid Foods and Other Nutrition Information	1. When, What and How Much: Introducing Solid Foods and Fluids at Child Care Centers 2. Healthy Finger Foods and Snacks at Child Care Centers 3. I'm Hungry – Watching for Hunger Cues

Appendix F

Flow Chart for Group Discussions, Website Development and Process Evaluation

Flow Chart for Group Discussions, Website Development and Process Evaluation



Appendix G

HRC Study Approval Letter for Group Discussions and Process Evaluation

Colorado State University

Office of Regulatory Compliance
Office of Vice President for Research
and Information Technology
Fort Collins, CO 80523-2011
(970) 491-1553
FAX: (970) 491-2293

MEMORANDUM

TO: Jennifer Anderson, FSHN, 1571

FROM: Janell A. Meldrem, Administrator
Human Research Committee

SUBJECT: **PROJECT APPROVAL**
Title: Developing and Implementing Educational Strategies to Establish Best Practices for Supporting Breastfeeding in Child Care Centers
Protocol No.: 05-197H
Funding Agency: TBD

DATE: July 12, 2005

The above-referenced project was approved by the Human Research Committee on July 11, 2005 for the period July 11, 2005 to July 5, 2006 with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. It is the investigator's responsibility to obtain this consent form from all subjects. *NO changes may be made to this document without first obtaining the approval of the Committee.*

Approval is for a maximum of 20 participants.

A status report of this project will be required within a 12-month period from the date of approval. Renewal is the Principal Investigator's responsibility, but as a courtesy, you will be sent a reminder approximately two months before the protocol expires. The Principal Investigator will report on the numbers of subjects who have participated this year and project-to-date, about problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary form (H-101) is available from the Regulatory Compliance web page (see below). Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.

It is the responsibility of the investigator to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research. It is also the investigator's responsibility to notify the Committee of any changes in experimental design, participant population, or consent procedures or documents. This can be done with a memo which completely describes the changes and their consequences (new consent form or cover letter, or altered survey instrument, for example). Students serving as Co-Principal Investigators may not alter projects without first obtaining PI approval. The PI is ultimately responsible for the conduct of the project. Upon completion of the project, an H-101 should be submitted as a close-out report.

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647. If approval did not accompany a proposal when it was submitted to a sponsor, it is the researcher's responsibility to provide the sponsor with the approval notice.

Please direct any questions about the Committee's action on this project to me for routing to the Committee.

Attachment

cc: Alena Clark w/attachment

Appendix H

Group Discussions Questions

Group Discussion Questions

1. How often do you use the internet at work for work-related topics?

2. Do you use high speed internet or a dial-up service at work? Other?

3. What types of websites do you use at work?

4. What would allow you to use the internet at work more?

5. What features do you think make a "good" website? A "poor" website?

6. There are specific criteria that are often used to evaluate a website. I would like to hear how you think each of these criteria can be met with a website on infant feeding practices for child care providers.
   - Appropriate content
   - Well designed
   - Disclosure or listing of authors
   - Current information
   - Authority of source
   - Ease of use

7. We are planning on developing a website on infant feeding practices specific to child care providers. We recently completed a needs assessment and on the sheet in front of you, there is a list of the content areas that were desired by the surveyed Colorado child care providers.
   - What type of layout for a handout would be the most user-friendly to use as a reference?
   - Any other thoughts on the content ideas that are on the sheet of paper?

8. Besides handouts, what other types of things would be beneficial to you on a website for infant feeding?

9. What kind of colors do you think would be good for this website?

10. Any other thoughts on what should be on the website?

Appendix I

Recruitment Letter to Child Care Providers for Group Discussions

Recruitment Letter to Child Care Providers via Listserve Email

Dear Child Care Providers,

You are invited to participate in a group discussion about infant feeding practices on Wednesday, July 27 from 12:00 – 1:30 pm at Colorado State University. This discussion is being led by a graduate student for a research project and we are looking for ~10 people to participate. We are interested in hearing about your ideas and thoughts regarding the development of a website specific to child care providers on infant feeding practices. **The only criteria to be a part of this group discussion is that you have and use the internet at your child care center for work purposes.** If you are able to attend, you will receive $10 for your participation. Lunch will also be provided.

Your input is very important to us. If you are able to join us on July 27 for this group discussion, please email back your response to Alena Clark at alenac@lamar.colostate.edu by Friday, July 22 for further information. We look forward to hearing from you!

Jennifer Anderson, PhD, RD
Professor

Alena Clark, MPH, RD
Graduate Student

Appendix J

Consent Form to Participate in Group Discussions

Colorado State University
Consent to Participate in a Research Study

TITLE OF STUDY: Developing and Implementing Educational Strategies to Establish Best Practices for Supporting Breastfeeding in Child Care Centers

PRINCIPAL INVESTIGATOR: Dr. Jennifer Anderson, RD
970-491-7334

CO-PRINCIPAL INVESTIGATOR: Alena Clark, MPH, RD
970-491-5676

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH STUDY?
You are being invited to participate in this study because you are a child care provider.

WHO IS DOING THE STUDY?
Researchers in the Food Science and Human Nutrition Department at Colorado State University are conducting this research study.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this group discussion is to determine the desired layout for a website and educational materials related to infant feeding practices in child care centers.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The study will take place at Colorado State University in the Gifford Building, 2nd Floor, Room 204. The group discussion will take approximately 2 hours.

WHAT WILL I BE ASKED TO DO?
You will be asked to talk about your thoughts on how a website and educational handouts for the website should be developed. The website and handouts will be used by child care providers, like yourselves, and we want to develop them so you will use them when you are at work. You will only be asked to attend the one group discussion.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY?
There are no known reasons why you should not take part in this study.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
The only known risk would be the potential harm resulting from a breach of confidentiality, but every effort has been made so that this will not happen including using only initials instead of full names in our notetaking. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

WILL I BENEFIT FROM TAKING PART IN THIS STUDY? There is no known direct benefit in participating in this study, but Colorado child care providers may receive additional support and educational information from the website that will be developed using your feedback.

DO I HAVE TO TAKE PART IN THE STUDY?
Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

 Participant's initials _____ Date _____

WHAT WILL IT COST ME TO PARTICIPATE?
There are no costs to you to participate in this study.

WHO WILL SEE THE INFORMATION THAT I GIVE?
We will keep private all research records that identify you, to the extent allowed by law. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep you name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records and these two things will be stored in different places under lock and key.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?
You will receive $10 for your participation during the group discussion. Food will also be provided to you during the discussion. You will still receive the $10 if you need to leave early.

WHAT HAPPENS IF I AM INJURED BECAUSE OF THE RESEARCH?
The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, **Alena Clark** at **491-5676**. If you have any questions about your rights as a volunteer in this research, contact Celia Walker, Director of Regulatory Compliance, at 970-491-1553. We will give you a copy of this consent form to take with you.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____ _____
Signature of person agreeing to take part in the study Date

_____
Printed name of person agreeing to take part in the study

_____ _____
Name of person providing information to participant Date

_____
Signature of Research Staff

 Participant's initials _____ Date _____

Appendix K

Social Learning Theory Construct Matrix for Educational Handouts and Other Information on **InfaNET Nutrition for Child Care Providers** Website

Social Learning Theory Construct Matrix for Educational Handouts and Information on the InfaNET Nutrition for Child Care Providers Website

Content Area	Constructs	Content Elements	Outcome/Objectives
Breastfeeding/Breastmilk			
Benefits of Breastfeeding	Expectations Expectancies Self-efficacy Behavioral Capabilities Self-efficacy Behavioral Capabilities	Increase awareness of the benefits of breastfeeding to mother, infant, community and child care providers: ✓ Nutritional ✓ Immunological ✓ Developmental ✓ Psychological ✓ Social ✓ Economic ✓ Environmental List benefits of supporting new behavior of encouraging a supportive breastfeeding environment. Used to help child care providers see the significance of supporting the behavior change from a larger perspective.	Child care providers will gain the knowledge of why breastfeeding is the "gold standard" in infant feeding. Child care providers will share learned knowledge with parents of the infants in their care.
Truth Behind Breastfeeding Myths	Expectations Expectancies Modeling Self-efficacy Behavioral Capabilities	Dispel common myths of breastfeeding such as: ✓ "My breasts will sag" ✓ "I can't breastfeed" ✓ "I work, I can't"	Child care providers will gain the knowledge of the "truths" behind breastfeeding Child care providers will share learned knowledge with parents of the infants in their care.

Content Area	Constructs	Content Elements	Outcome/Objectives
Breastfeeding/Breastmilk			
10 Ways to Create and Promote a Breastfeeding Friendly Environment in Your Center	Modeling Self-efficacy Behavioral Capabilities Reinforcement	List ways that child care providers can offer a supportive breastfeeding environment for the working breastfeeding mother: ✓ Encourage breastfeeding mothers ✓ Respect parent's wishes ✓ Match mother's schedule ✓ Offer a place to nurse ✓ Open communication with parents ✓ Train staff ✓ Avoid pacifiers ✓ Safe storage practices	Child care providers will use the new knowledge of ways to create a supportive breastfeeding environment for working breastfeeding mothers. Child care providers will model new learned behaviors to other providers and parents. Environmental changes will occur to enable a supportive breastfeeding environment.
Parent's Guide to Breastfeeding and Child Care Centers	Behavioral Capabilities Modeling Self-efficacy Reciprocal Determination	Increase awareness to both child care providers and parents on the role of parents and breastfeeding in child care centers such as: ✓ Options for feeding infant include pumping or coming into child care center to feed ✓ Introducing bottle techniques ✓ Pumping and collecting breastmilk tips	New knowledge of parent's role will lead to the empowerment of the child care providers to share these ideas with parents so the best nutrition can occur for infants. Child care providers will model new learned behavior to other providers and parents.

Content Area	Constructs	Content Elements	Outcome/Objectives
Breastfeeding/Breastmilk			
Storage and Preparation of Breastmilk – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Modeling Self-efficacy Reinforcement Reciprocal Determination	List appropriate ways to store and prepare breastmilk to feed to infants at child care centers such as: ✓ Length to store in refrigerator and freezer ✓ Mechanisms to warm breastmilk Increase awareness of the problems that can occur if incorrect procedures are followed.	Child care providers' knowledge will increase on the appropriate ways to store and prepare breastmilk. Child care providers will be able to demonstrate the appropriate way to store and prepare breastmilk to other child care providers and parents. New knowledge of ways for storage will lead to behavior and environmental changes such as banning warming breastmilk in microwave and increasing behaviors of adequate storage in refrigerator for breastmilk.
Breastmilk: How Much is Enough? – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Self-efficacy Modeling Reinforcement Reciprocal Determination	List the ways that child care providers can tell if the infant they are caring for is receiving enough breastmilk such as: ✓ Recommended amounts ✓ Stooling patterns ✓ Urine patterns Increase awareness of need to discuss concern of not receiving adequate breastmilk with parents and health care professional.	Child care providers will be able to assess correctly if a child is receiving enough breastmilk and know the appropriate steps to take if not receiving enough or too much.

Content Area	Constructs	Content Elements	Outcome/Objectives
Breastfeeding/Breastmilk			
Nutrition Needs for Moms when Breastfeeding – Guidelines for Child Care Providers	Expectations Expectancies Reinforcement Reciprocal Determination Behavioral Capabilities Self-efficacy	List the ways mother diet may affect breastmilk. Increase awareness of the importance of adequate nutrition during lactation. Discuss the pros and cons of mother's diet on breastmilk.	Child care providers will gain the knowledge to understand the importance of mother's nutrition on breastmilk and offer appropriate encouragement.
Bottle Feeding			
Different Formulas for Different Needs – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Reinforcement Reciprocal Determination	Describe the reasoning behind using different types of formula such as: ✓ Soy ✓ Iron vs. No Iron ✓ Lactose Free ✓ Name Brand vs. Generic Increase awareness of providing each of the different types of formulas and the expected outcomes that can occur with each.	Child care providers will gain the knowledge of the differences between formula types. Child care providers will share learned correct knowledge with parents of the infants in their care.

Content Area	Constructs	Content Elements	Outcome/Objectives
Bottle Feeding			
Storage and Preparation of Formula – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Self-efficacy Reciprocal Determination Reinforcement	List appropriate ways to store and prepare formula to feed to infants at child care centers such as: ✓ Length to store in refrigerator and freezer ✓ Mechanism to warm breastmilk Increase awareness of the problems that can occur if incorrect procedures are followed.	Child care providers' knowledge will increase on the appropriate ways to store and prepare formula. Child care providers will be able to demonstrate the appropriate way to store and prepare formula to other child care providers and parents. New knowledge of ways for storage will lead to behavior and environmental changes such as banning warming formula in microwave.
Formula: How Much is Enough? – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Self-efficacy Reciprocal Determination Reinforcement	List the ways that child care providers can tell if the infant they are caring for is receiving enough formula such as: ✓ Ounces ✓ Stooling patterns ✓ Urine patterns Increase awareness of need to discuss concern of not receiving adequate formula with parents and health care professional.	Child care providers will be able to assess correctly if a child is receiving enough formula and know the appropriate steps to take if not receiving enough or too much.

Content Area	Constructs	Content Elements	Outcome/Objectives
Bottle Feeding			
Bottles: Do's and Don'ts in Child Care Centers	Expectations Expectancies Behavioral Capabilities Modeling Self-efficacy Reinforcement	Increase awareness of the do's and don'ts of bottle feeding for both breastmilk and formula such as: ✓ Warming techniques ✓ Bottle propping ✓ Solids in bottles	Child care providers' knowledge will increase on the appropriate use of bottles in child care centers. Child care providers will be able to demonstrate and explain the reasoning behind why certain techniques should and should not be used when feeding infants with a bottle to other providers and parents.
Content Area	**Constructs**	**Content Elements**	**Outcome/Objectives**
Introducing Solid Foods & Other Nutrition Information			
When, What and How Much: Introducing Solid Foods – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Self-efficacy Reciprocal Determination Reinforcement	List the appropriate amounts and types of food to start for each age group. Discuss the pros and cons of starting early with food and fluid choices such as: ✓ 2% vs. whole milk ✓ Fruits or Vegetables First Inform need to discuss concern of not receiving adequate breastmilk with parents and health care professional.	Child care providers' knowledge will increase on the appropriate ways to introduce solid foods and fluids other than breastmilk or formula. Child care providers will be able to demonstrate and explain the appropriate way to introduce solid foods to other providers and parents. New knowledge of ways for storage will lead to behavior and environmental changes such as appropriate standards for starting solid foods.

Content Area	Constructs	Content Elements	Outcome/Objectives
Introducing Solid Foods & Other Nutrition Information			
Healthy Finger Foods for Infants – Guidelines for Child Care Providers	Expectations Expectancies Behavioral Capabilities Self-efficacy Reciprocal Determination Reinforcement	List appropriate healthy finger foods and snacks based on food program recommendations. Increase awareness that healthy food choices at young ages set the stage for healthy outcomes in adulthood.	Child care providers' knowledge will increase on healthy and appropriate finger foods for infants. Child care providers will be able to demonstrate and explain the reasoning behind why healthy finger foods are to be used to other providers and parents. New knowledge will lead to behavior and environmental changes such as implementing healthier finger food choices into meal plan.
I'm Hungry – Watching for Hunger Cues	Expectations Expectancies Behavioral Capabilities Modeling Self-efficacy Reinforcement	List the most common hunger cues such as: ✓ Sucking on hand ✓ Alertness ✓ Rooting ✓ Fussiness Increase awareness that crying is not an appropriate hunger cue and to feed when hunger cues are present even if not the exact feeding time.	Child care providers' knowledge will increase on what hunger cues are in infants. Child care providers will be able to sense and explain what hunger cues are in infants to other providers and parents.

Appendix L

Sample Infant Feeding Handouts Available on **InfaNET Nutrition for Child Care Providers** Website – English and Spanish

10 Ways to Create and Promote a Breastfeeding Friendly Environment in Your Center

1. Encourage breastfeeding mothers to continue to breastfeed when they return to work or school:
   - ✓ Tell them about the benefits of breastfeeding and that you and your center support breastfeeding;
   - ✓ Respect parents' wishes to feed their infant breastmilk and do not feed the infant formula;
   - ✓ Promote your child care center as breastfeeding friendly!

2. If a mother chooses to breastfeed her infant while she is at your center, offer her a:
   - ✓ Quiet, comfortable and private place to breastfeed;
   - ✓ Place to wash her hands before and after feeding;
   - ✓ Glass or bottle of water to provide her with the fluids she needs while breastfeeding.

3. Encourage parents to try putting breastmilk into a bottle and bottle feeding their infant before coming to your center. It is recommended to practice giving one bottle a day at least 2 weeks before an infant starts coming to child care. Practice time with a bottle can start after the mother's milk supply and the infant's feeding schedule is well established. This is usually around 4 to 6 weeks.

4. Check with the infant's parents to see if they would like you to try and time feedings so he/she is hungry when the parent picks the infant up from child care.

5. Communicate with the parent about how and what his/her infant did for the day. For example, write down how much and when he/she ate and how many wet and dirty diapers he/she had during the day.

6. Train all center staff to be supportive of breastfeeding. Provide breastfeeding information through newsletters and bulletin boards.

7. Promote breastmilk as the only food offered until the infant is 6 months of age unless otherwise directed by a health professional.

8. Avoid the use of pacifiers among infants who are breastfeeding and only use if asked for by their parents.

9. Work with health centers, community agencies and/or lactation consultants on activities and trainings related to breastfeeding/infant nutrition.

10. Safely store breastmilk at your center whether it is in the refrigerator or freezer.

10 Modos de Crear y Promover un Ambiente Amistoso para el Amamantamiento en su Guardería

1. Anime a las madres que amamantan para que lo continúen haciendo cuando regresen para al trabajo o a la escuela:
   - ✓ Aviséles sobre las ventajas del amamantamiento y que usted y su guardería apoyan el amamantamiento;
   - ✓ Respete los deseos de los padres de alimentar a su niño su leche de pecho y de no alimentar a su niño la leche de fórmula;
   - ✓ ¡Promueva su guardería como amistoso hacia el amamantamiento!

2. Si una madre decide amamantar a su niño mientras que ella está en su guardería ofrézcale:
   - ✓ Un lugar tranquilo, cómodo y privado para que amamante;
   - ✓ Un lugar para lavarse las manos antes y después de alimentar a su bebe;
   - ✓ Un vaso o botella de agua para proveerle los líquidos que necesita mientras amamante.

3. Anime a los padres que traten de verter la leche de pecho en un biberón y darle el biberón a su niño antes de venir a la guardería. Se recomienda que practiquen de dar un biberón cada día por lo menos 2 semanas antes de que un niño comience a venir a la guardería. El tiempo de práctica con un biberón puede comenzar después de que el suministro de leche de la madre y los horarios de alimentación del niño estén bien establecidos. Esto por lo general ocurre alrededor de las 4 a 6 semanas.

4. Pregúntele a los padres para ver si les gustaría que usted organicé los tiempos de alimentaciones para que él/ella tenga hambre cuando los padres lo/la recogen de la guardería.

5. Comuniqué a los padres del niño sobre como lo aguantó y que hizo su niño durante el día. Por ejemplo, anote cuanto y cuando comió y también cuantos pañales mojados y sucios que tuvo durante el día.

6. Entrene a todo el personal de la guardería para que apoyen al amamantamiento. Proporcione la información del amamantamiento por folletos de novedades y en tablones de anuncios.

7. Promueva la leche de pecho como el único alimento ofrecido hasta que el niño tenga 6 meses de edad a menos que sea aconsejado por parte de un profesional de salud.

8. Evite el uso de los chupones entre los niños que amamantan y sólo utilícelos si se lo piden los padres.

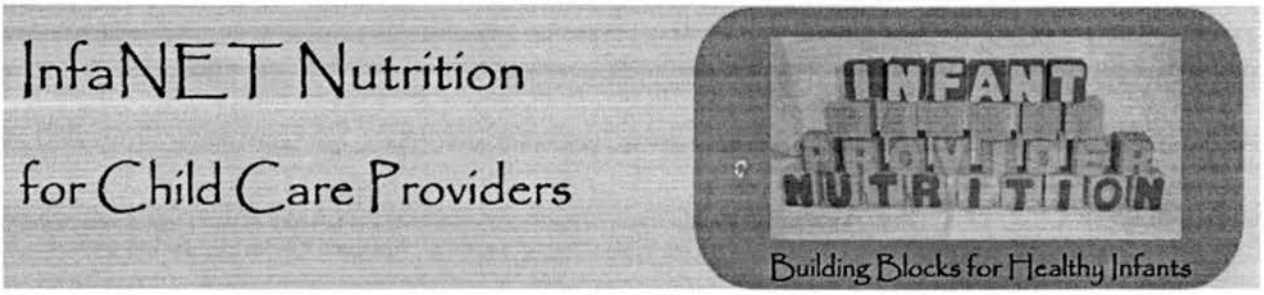
9. Colabore con centros de salud, agencias de la comunidad y/o con asesores de lactancia en actividades y entrenamientos relacionados con nutrición de amamantamiento y de niños infantiles.

10. Guarde con cuidado la leche de pecho en su guardería ya sea en el refrigerador o en el congelador.

Appendix M

Logo and Sample Website Page from **InfaNET Nutrition for Child Care Providers** Website

Logo for InfaNET Nutrition for Child Care Providers Website



InfaNET Nutrition
for Child Care Providers

INFANT PROVIDER NUTRITION
Building Blocks for Healthy Infants

Infant Feeding Information | More Information | Contact Us | Surveys | Home

Welcome
Child Care Providers!

This site gives you helpful information on **breastfeeding, bottle feeding** and **introducing solid foods** to the infants in your care.

The tips will help you to offer infant feeding support to all of your parents especially breastfeeding mothers.

Colorado State University
Knowledge to Go Places

Appendix N

Website Process Evaluation Survey

Website Process Evaluation Survey
(Survey was available to providers in a web-based format)

The purpose of this survey is to receive your opinion on how to improve our website on infant feeding. Please refer back to the website to answer the questions if needed.

1. How many times did you visit the website during the past month? *(click on **one** letter)*
    a. 1 – 3 times
    b. 4 – 6 times
    c. 7 – 9 times
    d. 10 – 12 times
    e. Greater than 12 times

2. What type of a reminder would help you to use the website more? *(click on **one** letter)*
    a. Magnet with website address
    b. Pen with website address
    c. Pad of paper with website address
    d. None of the above

3. Which of the following would you change about the design of the website? *(click on the letter for **each** that apply)*
    a. Text style
    b. Text size
    c. Color of background
    d. Color of graphics
    e. Buttons that link to the other pages on the website
    f. Graphics
    g. Usability of website
    h. Navigation through website
    i. None of the above

4. Which of the following handouts from the website did you look at during the past month? *(click on the letter for **each** that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. Creating a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. None of the above

Website Process Evaluation Survey
(Survey was available to providers in a web-based format)

5. Which of the following handouts from the website did you print off during the past month? *(click on the letter for **each** that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. Creating a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. None of the above

6. Who did you use the handouts for? *(click on **one** letter)*
    a. My own use
    b. Gave to parents
    c. Gave to employees
    d. None of the above

7. Which of the following handouts do you think need to be changed? *(click on the letter for **each** that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. Creating a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. None of the above

8. Please list other infant feeding websites that you would want on this website.

Website Process Evaluation Survey
(Survey was available to providers in a web-based format)

9. Please list any other ideas or comments regarding this website.

_____

_____

_____

Please answer the follow questions about you.

1. Are you? *(click on **one** letter)*
   a. Male
   b. Female

2. What is your age group? *(click on **one** letter)*
   a. Less than 20 years
   b. 20-29 years
   c. 31-39 years
   d. 40-49 years
   e. Greater than 50 years

3. What ethnicity are you? *(click on **one** letter)*
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Hispanic or Latino
   e. Native Hawaiian or Other Pacific Islander
   f. White

4. Do you have children of your own? *(click on **one** letter)*
   a. Yes (skip to question 5)
   b. No (skip to question 6)

5. What did you feed your children when they were infants? *(click on **one** letter)*
   a. Breastmilk
   b. Formula
   c. Both Breastmilk and Formula

6. What is your position at your child care center? *(click on **one** letter)*
   a. Director
   b. Child Care Provider
   c. None of the above

The information you provided will improve our website. If we can contact you to clarify any of the things you wrote on your survey, please type your phone number in the space below.

Thank you for taking the time to fill out this survey.

Appendix O

Recruitment and Steps to Participate in Process Evaluation Letter to Child Care Providers

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

November 28, 2005

Dear:

Greetings! Thank you so much for your past help with my research project. After reviewing the results of the needs assessment that you helped with last spring, it was decided to develop a website that provides infant feeding information to child care providers.

You and your staff are invited to participate in evaluating this website. **The only criterion to be a part of this project is that you have a computer with internet access at your work and you are able to complete 1 survey.**

Steps for Participating in this Project:

1. Contact Alena Clark at 491-5676 or email her at Alena.Clark@Colostate.Edu to let her know that you are willing to help her with this phase of her project.
2. Complete the attached consent form. Send one copy back to Colorado State University in the provided envelope and keep one for your files. Each child care provider who participates needs to fill one out before completing this survey. The consent form can be copied.
    - Consent forms are also available under the "Survey" tab on the website, so if other child care providers are interested in participating, please have them print, sign and send back the consent form.
3. For the next few weeks, log on and use the website: www.infanet.cahs.colostate.edu. Once you have used the website, complete the short survey that is found under the tab "Survey" on the website by **December 20, 2005**.

This research project would not be possible without you and your staff. As a token of appreciation, there is a chance for those that participate to be entered into a drawing to win $50. If you have any questions regarding the website or survey at anytime, please contact Alena Clark at the number and/or email address below. Thank you for you and your staff's time, effort and opinions, as they will help to further strengthen the support of infants and child care providers in Colorado.

Sincerely,

Alena Clark, MPH, RD
Ph.D. Candidate
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
Alena.Clark@Colostate.Edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor
Dept. Food Science & Human Nutrition
Colorado State University
Fort Collins, Colorado
970-491-7334

Appendix P

Consent Form for Process Evaluations

Colorado State University
Consent to Participate in a Research Study

TITLE OF STUDY: Creating a Supportive Breastfeeding Environment: Evaluating a Website on Infant Feeding for Child Care Providers

PRINCIPAL INVESTIGATOR: Dr. Jennifer Anderson, RD
970-491-7334

CO-PRINCIPAL INVESTIGATOR: Alena Clark, MPH, RD
970-491-5676

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH STUDY?
You are being invited to participate in this study because you are a child care provider and have access to a computer with internet at your work.

WHO IS DOING THE STUDY?
Researchers in the Food Science and Human Nutrition Department at Colorado State University are conducting this research study.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this study is to evaluate and determine the strengths and weaknesses of a website as an appropriate training tool and education source for child care providers on infant feeding.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The study will take place at your child care center. You will have access to the website for up to 1 month.

WHAT WILL I BE ASKED TO DO?
You will be asked to use the website for up to 1 month to find information on infant feeding including breastfeeding, bottle feeding and introducing solid foods. You will also be asked to review the website and use the information available to answer or clarify questions or concerns that you have about infant feeding. At the end of the one month period, you will be asked to complete a short survey about your thoughts on the website.

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY?
There are no known reasons why you should not take part in this study.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
The only known risk would be the potential harm resulting from a breach of confidentiality, but every effort has been made so that this will not happen. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

WILL I BENEFIT FROM TAKING PART IN THIS STUDY? There is no known direct benefit in participating in this study, but you may receive additional support and educational information from the website that you have been using.

DO I HAVE TO TAKE PART IN THE STUDY?
Your participation in this research is voluntary. If you decide to participate in the study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

 Participant's initials _____ Date _____

WHAT WILL IT COST ME TO PARTICIPATE?
There are no costs to you to participate in this study.

WHO WILL SEE THE INFORMATION THAT I GIVE?
We will keep private all research records that identify you, to the extent allowed by law. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep you name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records and these two things will be stored in different places under lock and key.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?
You will not receive compensation for your participation in this study, but you will be entered into a drawing for the chance to win $50.

WHAT HAPPENS IF I AM INJURED BECAUSE OF THE RESEARCH?
The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the co-investigator, **Alena Clark** at **491-5676**. If you have any questions about your rights as a volunteer in this research, contact Janell Meldrum, Human Research Administrator at 970-491-1655. We will give you a copy of this consent form to take with you.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____ _____
Signature of person agreeing to take part in the study Date

_____
Printed name of person agreeing to take part in the study

_____ _____
Name of person providing information to participant Date

_____
Signature of Research Staff

 Participant's initials _____ Date _____

Appendix Q

HRC Study Approval Letter for Intervention and 6 Month Follow-up

COPY

Colorado State University

Office of Regulatory Compliance
Office of Vice President for Research
and Information Technology
Fort Collins, CO 80523-2011
(970) 491-1553
FAX: (970) 491-2293

Notice of Approval for Human Research

Principal Investigator: Jennifer Anderson, FSHN, 1571
Co-Principal Investigator: Alena Clark, FSHN, 1571
Title: Creating a Supportive Breatfeeding Environment: Evaluating a Website on Infant Feeding for Child Care Providers

Protocol #: 05-278H **Funding Source:** TBD

Number of Participants/Records: 350 child care providers
Committee Action: **Approved on:** November 10, 2005 **Expires:** October 11, 2006

HRC Administrator: Janell Meldrem Janell Meldrem

Consent Process:
The above-referenced project was approved by the Human Research Committee with the condition that the attached consent form is signed by the subjects and each subject is given a copy of the form. *NO changes may be made to this document without first obtaining the approval of the Committee.*

Investigator Responsibilities:

- It is the PI's responsibility to obtain this consent form from all subjects.
- It is the responsibility of the PI to immediately inform the Committee of any serious complications, unexpected risks, or injuries resulting from this research.
- It is also the PI's responsibility to notify the Committee of any changes in experimental design, participant population, consent procedures or documents. This can be done with a memo describing the changes and submitting any altered documents.
- Students serving as Co-Principal Investigators must obtain PI approval for any changes prior to submitting the proposed changes to the HRC for review and approval.
- The PI is ultimately responsible for the conduct of the project.
- A status report of this project will be required within a 12-month period from the date of review. Renewal is the PI's responsibility, but as a courtesy, a reminder will be sent approximately two months before the protocol expires. The PI will be asked to report on the numbers of subjects who have participated this year and project-to-date, problems encountered, and provide a verifying copy of the consent form or cover letter used. The necessary continuation form (H-101) is available from the RCO web page www.research.colostate.edu/rcoweb/.
- Upon completion of the project, an H-101 should be submitted as a close-out report.
- If approval did not accompany a proposal when it was submitted to a sponsor, it is the PI's responsibility to provide the sponsor with the approval notice.
- **Should the protocol not be renewed before expiration, all activities must cease until the protocol has been re-reviewed.**

This approval is issued under Colorado State University's OHRP Federal Wide Assurance 00000647.

Please direct any questions about the Committee's action on this project to me for routing to the Committee.

Attachment Date of Correspondence: 11/13/05

Appendix R

Website Intervention Survey

Website Intervention Survey
(Survey was available to providers in a web-based format)

Please answer the following questions about you before taking the survey. This information will be used to contact you during this project and it will not be linked to any of your answers that you will be giving in the survey. Your contact information will also allow us to place your name in a drawing for the chance to win $50.

First Name: Last Name:

Child Care Center:

Number of Infants Cared for at Center:

Email Address (please provide only if checked regularly):

Center Phone Number:

Your opinions are very important to us and your answers will help us to improve a website for child care providers on feeding infants. Your individual answers will be kept confidential. Thank you for taking the time to answer the following questions.

Please answer the following questions about you.

1. Are you *(click on one)*:
   a. Male
   b. Female

2. What is your age group? *(click on one)*
   a. Less than or equal to 20 years
   b. 21-29 years
   c. 30-39 years
   d. 40-49 years
   e. Greater than or equal to 50 years

3. What ethnicity are you? *(click on one)*
   a. American Indian or Alaska Native
   b. Asian
   c. Black or African American
   d. Hispanic or Latino
   e. Native Hawaiian or Other Pacific Islander
   f. White

4. Do you have children of your own? *(click on one)*
   a. Yes (go to question 5)
   b. No (go to question 6)

5. What did you feed your children when they were infants? *(click on one)*
   a. Breastmilk
   b. Formula
   c. Combination of breastmilk and formula

6. What is your position at your child care center? *(click on one)*
    a. Director
    b. Child care provider
    c. None of the above

Please answer the following questions about your child care center.

7. Which best describes where your center is located? *(click on one):*
    a. Rural (city population of less than or equal to 50,000 people)
    b. Other metro (city population of greater than or equal to 50,000 people)
    c. Denver metro (metropolitan area of greater than or equal to 1 million)
    d. Unsure

8. Where are breastmilk and/or prepared formula stored at your center? (*click on each that apply*):
    a. Refrigerator
    b. Freezer
    c. Mother brings in cooler
    d. Other (please specify): _____
    e. Unsure

9. Have you attended trainings on feeding infants in the last year? *(click on one)*
    a. Yes (go to question 10)
    b. No (go to question 11)
    c. Unsure (go to question 11)

10. Which of the following topics have been covered in the trainings that you have attended in the last year? *(click on each that apply)*
    a. Feeding formula to infants
    b. Feeding breastmilk to infants
    c. Offering solid foods to infants
    d. Other (please specify): _____
    e. None of the above
    f. Have not attended any trainings

11. Which of the following does your center make available to mothers who come to your center to breastfeed? (*click on each that apply*):
    a. Private room/space
    b. Comfortable chair
    c. Sink to wash her hands before and after feeding her infant
    d. Water to drink while feeding her infant
    e. Other (please specify): _____
    f. None of the above
    g. Unsure

12. Does the staff at your center encourage mothers to breastfeed? *(click on one)*
    a. Yes, all of the time
    b. Yes, some of the time
    c. No
    d. Unsure

13. Which of the following health care professionals are available for you to call with questions about feeding the infants in your care? *(click on each that apply)*
    a. Nurse
    b. Registered Dietitian
    c. Lactation Consultant
    d. Physician
    e. Other (please specify): _____
    f. None of the above
    g. Unsure

14. How often do you feed infants less than 6 months at your center? *(click on each that apply)*
    a. Every 2 hours
    b. Every 3 hours
    c. Every 4 hours
    d. Based on hunger cues (e.g. sucking on fingers, fussy)
    e. Based on parents' requests

15. How does your center support parents with their infant feeding choice? *(click on each that apply)*
    a. Encourage them to continue to formula feed
    b. Encourage them to continue to breastfeed
    c. Answer questions they have on infant feeding
    d. Give them handouts on infant feeding
    e. Refer them to a health care professional (e.g. nurse, dietitian, physician, lactation consultant)
    f. Other (please specify): _____
    g. None of the above
    h. Unsure

Please answer the following questions based on your knowledge of infant feeding.

16. How long is it safe to store prepared formula in the refrigerator? *(click on one)*
    a. 1 day (24 hours)
    b. 2 days (48 hours)
    c. 4 days
    d. 1 week
    e. Unsure

17. How long is it safe to store breastmilk in the refrigerator? *(click on one)*
    a. 1 day (24 hours)
    b. 2 days (48 hours)
    c. 4 days
    d. 1 week
    e. Unsure

18. How long is it safe to store breastmilk in a freezer compartment attached to the refrigerator? *(click on one)*
    a. 1 month
    b. 3 months
    c. 6 months
    d. 12 months
    e. Unsure

19. Where should frozen breastmilk be thawed? *(click on each that apply)*
    a. In the microwave
    b. In the refrigerator
    c. On the counter
    d. Under running cold water
    e. None of the above
    f. Unsure

20. Where should breastmilk be warmed before feeding it to an infant? *(click on each that apply)*
    a. Container of warm water (e.g. crock-pot)
    b. In the microwave
    c. Under running warm tap water
    d. In the stove
    e. Breastmilk does not need to be warmed before feeding
    f. None of the above
    g. Unsure

21. Where should formula be warmed before feeding it to an infant? *(click on each that apply)*
    a. Container of warm water (e.g. crock-pot)
    b. In the microwave
    c. Under running warm water
    d. In the stove
    e. Formula does not need to be warmed before feeding
    f. None of the above
    g. Unsure

22. Which of the below statements is true? *(click on each that apply)*
    a. Crying is a good sign that an infant is hungry and ready to eat.
    b. Cow's milk is OK to give to an infant who is less than 12 months of age.
    c. It is important to microwave breastmilk or formula before giving it to an infant.
    d. It is not recommended to shake formula or breastmilk in a bottle.
    e. It is fine to switch an infant's formula to another type if he/she runs out of it while at the center.
    f. None of the above

23. Which of the below statements is true? *(click on each that apply)*
    a. Infants who are not able to sit should always be held when bottle feeding.
    b. It is a best practice to feed more than one infant at a time.
    c. Formula or breastmilk left in a bottle for greater than 1 hour is OK for an infant to drink.
    d. Cereal mixed with breastmilk or formula can be put into a bottle and fed to an infant if needed.
    e. None of the above

24. Which of the following is a sign that an infant is ready to start eating solid foods? *(click on each that apply)*
    a. Able to crawl
    b. Leaning forward to food
    c. Wanting what others are eating
    d. Bringing things to his/her mouth
    e. None of the above

Please answer the following questions about your work at your child care center.

25. Which of the following people or programs do you receive infant feeding information from? *(click on each that apply)*
    a. Child care center director
    b. Internet
    c. Child care referral agencies
    d. Government food programs (e.g. CACFP, WIC)
    e. Books
    f. Brochures/pamphlets
    g. Media (e.g. TV, magazines, radio)
    h. Other co-workers
    i. None of the above

26. Do you offer pacifiers to the infants in your care? *(click on one)*
    a. Yes, all the time
    b. Yes, with parents' permission
    c. No
    d. Unsure

27. When do you feed breastfed infants? *(click on each that apply)*
    a. Same as formula fed infants
    b. Based on infants' hunger cues
    c. Based on policies of child care center
    d. According to parents' directions
    e. None of the above
    f. Unsure

28. When do you feed formula fed infants? *(click on each that apply)*
    a. Same as breastfed infants
    b. Based on infants' hunger cues
    c. Based on policies of child care center
    d. According to parents' directions
    e. None of the above
    f. Unsure

29. When parents pick up their infant, do you share information with the infants' parents on how their infants ate for the day? *(click on one)*
    a. Yes, we talk to parents about their infants' day including how much they ate
    b. Yes, we provide a written report to parents about their infants' day including how much they ate
    c. Yes, only when parents ask
    d. No
    e. Unsure

30. How strongly do you agree/disagree with the statement, "I have an important role in supporting parents' infant feeding choices". *(click on one)*
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

31. How strongly do you agree/disagree with the statement, "I have an important role in meeting the nutritional needs of the infants in my care".
    a. Strongly agree
    b. Agree
    c. Neutral
    d. Disagree
    e. Strongly disagree

32. How confident are you in answering questions parents have on breastfeeding their infants? *(click on one)*
    a. Extremely confident
    b. Very confident
    c. Moderately confident
    d. Not very confident
    e. Not at all confident

33. How confident are you in answering questions parents have on formula feeding their infants? *(click on one)*
    a. Extremely confident
    b. Very confident
    c. Moderately confident
    d. Not very confident
    e. Not at all confident

34. How confident are you in answering questions parents have on introducing solid foods to their infants? *(click on one)*
    a. Extremely confident
    b. Very confident
    c. Moderately confident
    d. Not very confident
    e. Not at all confident

Website Intervention Survey
(Survey was available to providers in a web-based format)

35. What things would make it easier for you to feed infants in your care? *(click on each that apply)*
    a. Better/more equipment (e.g. bottles, spoons, plates)
    b. More money
    c. More staff
    d. More time
    e. More support from parents
    f. More support from supervisor/director
    g. More support from co-workers
    h. Less infants to care for
    i. Latest guidelines/recommendations on what/how to feed infants
    j. None of the above

36. Which of the following do you believe are advantages of formula over breastmilk? *(click on each that apply)*
    a. Less illness for the infant
    b. It is easier for the mother/parent
    c. It is easier for the child care provider
    d. More convenient for the mother/parent
    e. More convenient for the child care provider
    f. Increases bonding with mom
    g. Less risk of diseases
    h. Better nutritionally
    i. Helps make infants smarter
    j. Infant is easier to care for
    k. Less risk of child being overweight
    l. Diapers not as smelly
    m. Saves family money
    n. Less trash
    o. Not embarrassing for parent
    p. Not embarrassing for child care provider
    q. No advantage

37. Which of the following do you believe are advantages of breastmilk over formula? *(click on each that apply)*
    a. Less illness for the infant
    b. It is easier for the mother/parent
    c. It is easier for the child care provider
    d. More convenient for the mother/parent
    e. More convenient for the child care provider
    f. Increases bonding with mom
    g. Less risk of diseases
    h. Better nutritionally
    i. Helps make infants smarter
    j. Infant is easier to care for
    k. Less risk of child being overweight
    l. Diapers not as smelly
    m. Saves family money
    n. Less trash
    o. Not embarrassing for parent
    p. Not embarrassing for child care provider

q. No advantage

38. Which of the following do you believe are disadvantages of breastmilk over formula? *(click on each that apply)*
    a. More diaper changes
    b. It is harder for them to leave their mother/parent
    c. Do not have as regular of a feeding schedule
    d. Eat more frequently
    e. Uncomfortable/embarrassing for staff
    f. Uncomfortable/embarrassing for mother/parent
    g. Not as healthy
    h. No disadvantage

39. Which of the following do you believe are disadvantages of formula over breastmilk? *(click on each that apply)*
    a. More diaper changes
    b. It is harder for them to leave their mother/parent
    c. Do not have as regular of a feeding schedule
    d. Eat more frequently
    e. Uncomfortable/embarrassing for staff
    f. Uncomfortable/embarrassing for mother/parent
    g. Not as healthy
    h. No disadvantage

40. Which of the following forms of feeding do you feel provides the most benefits to infants? *(click on one)*
    a. Formula
    b. Breastmilk
    c. Combination of breastmilk and formula

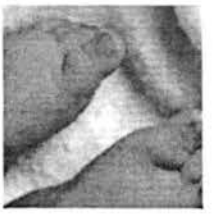
41. Which of the following forms of feeding do you feel provides the most benefits to parents? *(click on one)*
    a. Formula
    b. Breastmilk
    c. Combination of breastmilk and formula

42. Which of the following forms of feeding do you feel provides the most benefits to child care providers? *(click on one)*
    a. Formula
    b. Breastmilk
    c. Combination of breastmilk and formula

43. Please share any ideas or comments that you have regarding a website on feeding infants for child care providers. *(please list)*

Appendix S

Survey Website Page



Welcome Child Care Provider!

Thank you for taking the time out of your busy schedule to fill out this survey.
It should take you 10-15 minutes to complete.

There are 2 sections to fill out for this survey. The first section is your contact
information and the second section is the survey. Please fill out both sections.

Click on the link below to start the survey.

Infant Feeding Survey

If you have any questions,
please contact Alena Clark at 970-491-5676
or at Alena.Clark@Colostate.Edu.

Appendix T

Cover Letter to Child Care Providers for Reliability Testing

Colorado State University

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

January 3, 2006

Dear Child Care Provider,

Hello! Thank you for your help with this survey on infant feeding in child care centers. As a part of this project, you are being asked to complete the same survey on **two** different dates (~7 days apart) to test the reliability of the survey (whether the survey will give the same results when taken at two different points in time). This **first** survey needs to be completed by **Tuesday, January 24.**

Because of the importance of matching both surveys to the same person, please write down your initials and birth date in the space provided on the top of the first page of the survey. Also, please fill out the survey on your own and write comments by a question if you feel it is not clear. As a token of appreciation, please fill out the below contact information, so you can be entered into a drawing for the chance to win $10 (to be eligible for the drawing both surveys must be completed and returned)!

This survey is part of a research project to fulfill graduate degree requirements, so your help is greatly appreciated. Please note that none of your responses will be used in the actual research process. If you have any questions or concerns while taking this survey, please contact Alena Clark at the number or email address below. Thank you for taking the time to complete this survey!

Sincerely,

Alena Clark, MPH, RD
PhD Candidate
Dept. of Food Science and Human Nutrition
Colorado State University
Fort Collins, Colorado
Alena.Clark@Colostate.Edu
970-491-5676

Thank you for participating in this study. As a token of appreciation for your thoughts and time, please write your contact information below for your chance to win $10. Two cash prizes will be given. *Thank you again!*

Name: _____

Address: _____

Phone: _____

Appendix U

Recruitment Postcard to Child Care Providers

Dear Child Care Director,

Greetings! **Your opinion could win you $50!** You and your infant room teachers are invited to review a website on feeding infants that was developed for child care providers. Want to participate? Please call Alena Clark at 970-491-5676 or email her at Alena.Clark@Colostate.Edu by Friday, January 20, 2006. This website was developed as part of a student research project.

To participate, you and your staff need to have internet access at your child care center as well as complete 2 surveys which will be three months apart. Everyone who completes the surveys will be entered into a drawing for the chance to win $50. We look forward to hearing from you! Your opinions will help us make this website better for child care providers in Colorado.

Sincerely,

Jennifer Anderson, PhD, RD
Professor
Colorado State University

Alena Clark, MPH, RD
PhD Candidate
Colorado State University

Appendix V

Recruitment Calling Script to Child Care Providers

Recruitment Calling Script to Child Care Providers

Hello, my name is Alena Clark and I am a graduate student at Colorado State University. I wanted to call you and thank you and your staff for participating in my infant feeding practices survey last spring. Based on the survey results, a website was developed for child care providers. I am calling now to see if you would be able to help me out with the next phase of my study.

I recently mailed your center a yellow postcard that invited you and your staff to participate in evaluating the website that I developed. You and your staff's opinions could win you $50!

To participate, all you and your staff need to do is enjoy the website for three months and complete 2 surveys. The evaluation will start in the middle of February. Everyone who completes the surveys will be entered into a drawing for the chance to win $50; there will be at least 10 winners. Your opinions will help us make this website better for child care providers in Colorado. If you are interested in participating and/or would like to find out more information please call me at 970-491-5676 by January 27. Thank you so much for your time in advance and I look forward to hearing from you!

Appendix W

Consent Form to Participate in Intervention and 6 Month Follow-up Study

Colorado State University - Consent to Participate in a Research Study

TITLE OF STUDY: Creating a Supportive Breastfeeding Environment: Evaluating a Website on Infant Feeding for Child Care Providers

PRINCIPAL INVESTIGATOR: Dr. Jennifer Anderson, RD; 970-491-7334

CO-PRINCIPAL INVESTIGATOR: Alena Clark, MPH, RD; 970-491-5676

WHY AM I BEING INVITED TO TAKE PART IN THIS RESEARCH STUDY?
You are being invited to participate in this study because you are a child care provider and have access to a computer with internet at your work.

WHO IS DOING THE STUDY?
Researchers in the Food Science and Human Nutrition Department at Colorado State University are conducting this research study.

WHAT IS THE PURPOSE OF THIS STUDY?
The purpose of this study is to evaluate and determine the effectiveness, strengths and weaknesses of a website as an appropriate training tool and education source for child care providers on infant feeding. Information about current infant feeding practices in child care centers will also be assessed.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The study will take place at your child care center. You will have access to the website for 3 months.

WHAT WILL I BE ASKED TO DO?
You will be asked to use the website for 3 months to find information on infant feeding including breastfeeding, bottle feeding and introducing solid foods. You will also be asked to review the website and use the information available to answer or clarify questions or concerns that you have about infant feeding. You will be asked to complete three surveys during this study: (1) before using the website, (2) 3 months after using the website and (3) 6 months after using the website. *There will be two different websites for this study and you will only be asked to look at one of them.*

ARE THERE REASONS WHY I SHOULD NOT TAKE PART IN THIS STUDY?
There are no known reasons why you should not take part in this study.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?
The only known risk would be the potential harm resulting from a breach of confidentiality, but every effort has been made so that this will not happen. It is not possible to identify all potential risks in research procedures, but the researchers have taken reasonable safeguards to minimize any known and potential, but unknown, risks.

WILL I BENEFIT FROM TAKING PART IN THIS STUDY?
There is no known direct benefit in participating in this study, but you may receive additional support and educational information from the website that you have been using.

DO I HAVE TO TAKE PART IN THE STUDY?
Your participation in this research is voluntary. If you decide to participate in this study, you may withdraw your consent and stop participating at any time without penalty or loss of benefits to which you are otherwise entitled.

 Participant's initials _____ **Date** _____

WHAT WILL IT COST ME TO PARTICIPATE?
There are no costs to you to participate in this study.

WHO WILL SEE THE INFORMATION THAT I GIVE?
We will keep private all research records that identify you, to the extent allowed by law. Your information will be combined with information from other people taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. You will not be identified in these written materials. We may publish the results of this study; however, we will keep your name and other identifying information private.

We will make every effort to prevent anyone who is not on the research team from knowing that you gave us information, or what that information is. For example, your name will be kept separate from your research records and these two things will be stored in different places under lock and key.

WILL I RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?
You will not receive compensation for your participation in this study, but you will be entered into a drawing for the chance to win $50.

WHAT HAPPENS IF I AM INJURED BECAUSE OF THE RESEARCH?
The Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to accept this invitation to take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, **Alena Clark** at **970-491-5676**. If you have any questions about your rights as a volunteer in this research, contact Janell Meldrum, Human Research Administrator at 970-491-1655. Please make a copy of this consent form for your records.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing 2 pages.

_____ _____
Signature of person agreeing to take part in the study Date

_____
Printed name of person agreeing to take part in the study

_____
Name of child care center where person is employed

_____ _____
Name of person providing information to participant Date

_____
Signature of Research Staff

Appendix X

Pre-test and Post-test Steps to Participate Letter to Child Care Providers
(Intervention and Control Groups)

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

January 27, 2006

Greetings! Thank you so much for agreeing to participate in our project to look at a website and give us your feedback. Your opinions are very important to us! As part of this research study, you will take two surveys and review a website during the next three months (February – April). There will be two different websites that will be reviewed and each child care center has been chosen to review one of them. This is so we can compare the survey results between the two different websites. Once this project is completed, you will be given the final website address.

Steps to Participate **(please do not start before February 13, 2006)**:

1. Consent letters to participate in this study were sent along with this letter. Each child care provider who will be participating should read, sign and date a consent form. Return 1 copy to Colorado State University by **February 20, 2006** in the provided envelope and keep one copy for your records.

2. Once the consent form is signed and sent back to Colorado State University, complete the survey that is found at *www.fshn.cahs.colostate.edu/childcareprovider/index.html.* Follow the instructions on the website on how to complete this survey. Please complete this survey **on or before February 24, 2006**.

3. Once you have completed the 1st survey, it is time to use and enjoy the website! Access the website at: *www.infanet.cahs.colostate.edu.* Please use, read and print off information from the website throughout the next three months (February – April). We hope you will be able to visit the website several times between **February and April 2006**.

4. After having access to the website for 3 months, you will be asked to complete a 2nd survey **during the week of May 1-5, 2006**. An email or phone call will be made to remind you of this 2nd survey.

This project would not be possible without you. Providers who complete the 2 surveys will be entered into a drawing for the chance to win $50 (up to 10 winners)! Please note that none of your answers will be shared with anyone outside of the research team. If you have any questions regarding the website or survey at anytime, please contact Alena Clark at the number and/or email address below. Thank you for your time and opinions; they will help to improve this website!

Sincerely,

Alena Clark, MPH, RD
PhD Candidate
Alena.Clark@Colostate.Edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

January 27, 2006

Greetings! Thank you so much for agreeing to participate in our project to look at a website and give us your feedback. Your opinions are very important to us! As part of this research study, you will take two surveys and review a website during the next three months (February – April). The following letter lists how to continue helping us with this project. There will be two different websites that will be reviewed and each child care center has been chosen to review one of them. This is so we can compare the survey results between the two different websites. Once this project is completed, you will be given the final website address.

Steps to Participate **(please do not start before February 13, 2006)**:

1. Consent letters to participate in this study were sent along with this letter. Each child care provider who will be participating should read, sign and date a consent form. Return 1 copy to Colorado State University **by February 20, 2006** in the provided envelope and keep one copy for your records.

2. Once the consent form is signed and sent back to Colorado State University, complete the survey that is found at *www.fshn.cahs.colostate.edu/childcareprovider/index.html*. Follow the instructions on the website on how to complete this survey. Please complete this survey **on or before February 24, 2006**.

3. Once you have completed the 1st survey, it is time to use and enjoy the website! Access the website at: *www.healthychildcare.org/section_SIDS.cfm.* Please use, read and print off information from the website throughout the next three months (February – April). We hope you will be able to visit the website several times between **February and April 2006**.

4. After having access to the website for 3 months, you will be asked to complete a 2nd survey **during the week of May 1-5, 2006**. An email or phone call will be made to remind you of this 2nd survey.

This project would not be possible without you. Providers who complete the 2 surveys will be entered into a drawing for the chance to win $50 (up to 10 winners)! Please note that none of your answers will be shared with anyone outside of the research team. If you have any questions regarding the website or survey at anytime, please contact Alena Clark at the number and/or email address below. Thank you for your time and opinions; they will help to improve this website!

Sincerely,

Alena Clark, MPH, RD
Ph.D. Candidate
Alena.Clark@Colostate.Edu
970-491-5676

Jennifer Anderson, PhD, RD
Professor

Colorado State University

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

May 26, 2006

Dear

Hello! Thank you so much for participating in my project. Your opinions on infant feeding and this website are very important to me! It is time to take the 2nd survey. This survey is available on the website listed below. Please complete this 2nd survey by **June 12.**

Your 2nd survey is located at:
http://www.infanet.cahs.colostate.edu/surveys.htm

This survey should take you about 15-20 minutes to complete. It is the **same survey** as last time with an additional brief survey about the InfaNET website.

As someone who has worked in child care, I understand that you are very busy, so I really appreciate your help with this project since it is part of my degree requirements. When you complete the 2nd survey, you will be entered into a drawing for the chance to win $50 (up to 10 winners)! Once this project is completed, you will be given the final website address. You may be contacted this fall to take the survey again to see if any of your thoughts have changed over the summer. If you have any questions or concerns with the survey, please contact me at the number and/or email address below. Thank you again for your time and thoughts! I really appreciate it.

Sincerely,

Alena Clark, MPH, RD
Alena.Clark@Colostate.Edu
970-491-5676

Colorado State University

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

May 26, 2006

Dear

Hello! Thank you so much for participating in my project. Your opinions on infant feeding are very important to me! It is time to take the 2nd survey. This survey is now available on the website listed below. Please complete this 2nd survey by **June 12**.

Your 2nd survey is located at:
www.fshn.cahs.colostate.edu/childcareprovider/index.html

This survey should take you about 10-15 minutes to complete. It is the **same survey** as last time.

As someone who has worked in child care, I understand that you are very busy, so I really appreciate your help with this project since it is part of my degree requirements. When you complete the 2nd survey, you will be entered into a drawing for the chance to win $50 (up to 10 winners)! You may be contacted this fall to take the survey again to see if any of your thoughts have changed over the summer. Once this project is completed, you will be given the final website address. If you have any questions or concerns with the survey, please contact me at the number and/or email address below. Thank you again for your time and thoughts! I appreciate it.

Sincerely,

Alena Clark, MPH, RD
Alena.Clark@Colostate.Edu
970-491-5676

Appendix Y

Website Evaluation Survey

Website Evaluation Survey
(Survey was available to providers in a web-based format)

Please answer the following questions about the InfaNET website. Your individual answers will be kept confidential.

1. Approximately how many times did you visit the website during the past 3 months? *(enter number)*

2. Which of the following would help you to view and use the InfaNET website more? (*click on each that apply)*
   a. More time
   b. Better access to a computer
   c. Computer in infant room
   d. More support from director
   e. More support from co-workers
   f. Other (please specify): _____
   g. None of the above

3. Where did you use or view the website? (*click on each that apply)*
   a. Child care center
   b. Home
   c. Other (please specify): _____
   d. None of the above

4. Which of the following would best remind you to go and read or print off information from the InfaNET website? (*click on each that apply)*
   a. Magnet with website address
   b. Pen with website address
   c. Pad of paper with website address
   d. None of the above

5. Which of the following would you change about the design of the website? *(click on each that apply)*
   a. Text style
   b. Text size
   c. Color of background
   d. Color of graphics
   e. Buttons that link to the other pages on the website
   f. Graphics
   g. Usability of website
   h. Navigation through website
   i. None of the above

6. If you selected items in question 5, what would you change? *(enter answer)*

Website Evaluation Survey
(Survey was available to providers in a web-based format)

7. Which of the following handouts from the website did you look at during the past 3 months? *(click on each that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. 10 Ways to Create and Promote a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents' Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. I did not look at any of the handouts.

8. Which of the following handouts from the website did you print off during the past 3 months? *(click on each that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. 10 Ways to Create and Promote a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents' Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. I did not print off any of the handouts.

Website Evaluation Survey
(Survey was available to providers in a web-based format)

9. Which of the following handouts from the website did you use during the past 3 months? *(click on each that apply)*
    a. Benefits of Breastfeeding
    b. Truth Behind Breastfeeding Myths
    c. 10 Ways to Create and Promote a Breastfeeding Friendly Environment in Your Child Care Center
    d. Parents' Guide to Breastfeeding and Child Care Centers
    e. Storage and Preparation of Breastmilk
    f. Breastmilk: How Much is Enough?
    g. Nutrition Needs for Moms When Breastfeeding
    h. Bottle Do's and Don'ts
    i. Different Formulas for Different Needs
    j. Storage and Preparation of Formula
    k. Formula: How Much is Enough?
    l. When, What, Why and How: Introducing Solid Foods
    m. Healthy Finger Foods for Infants
    n. I'm Hungry – Watching Infant's Feeding Cues
    o. I did not use any of the handouts.

10. Who did you use the handouts for? *(click on each that apply)*
    a. My own use
    b. Gave to parents of the infants at my center
    c. Gave to employees at my center
    d. Gave to co-workers at my center
    e. None of the above

11. If you gave the handouts to parents, did you receive any feedback from them about the handouts? *(click on one)*
    a. Yes *(go to question #12)*
    b. No *(go to question #13)*

12. What feedback did you receive from parents? *(enter answer)*

13. After reviewing the website, how closely do you feel your center is meeting the recommendations for infant feeding that were listed on the website? *(click on one)*
    a. I feel that my center meets the recommendations all of the time.
    b. I feel that my center meets the recommendations most of the time.
    c. I feel that my center meets the recommendations some of the time.
    d. I feel that my center does not meet the recommendations.

Website Evaluation Survey
(Survey was available to providers in a web-based format)

14. What changes, if any, do you think your center should make to meet the recommendations for infant feeding that were listed on the website? *(enter answer)*

15. I feel that this website is a good way to make infant feeding information available to me at my child care center. *(click on one)*
    a. Strongly agree
    b. Agree
    c. Neither agree or disagree
    d. Disagree
    e. Strongly disagree

16. This website has shown me ways to be a good role model to my co-workers when feeding infants. *(click on one)*
    a. Strongly agree
    b. Agree
    c. Neither agree or disagree
    d. Disagree
    e. Strongly disagree

17. I will continue to use this website in the future. *(click on one)*
    a. Strongly agree
    b. Agree
    c. Neither agree or disagree
    d. Disagree
    e. Strongly disagree

18. Because of this website, have you made any changes at work that have helped you to support working mothers to continue breastfeeding their infant? *(click on one)*
    a. Yes
    b. No
    c. Unsure

19. If you answered **"Yes"** to question 18, please list one or more examples of changes that you have made to support working mothers to continue breastfeeding their infant. *(enter answer)*

Website Evaluation Survey
(Survey was available to providers in a web-based format)

20. Please list any other ideas or comments regarding this website. *(enter answer)*

Thank you for taking this survey!

Appendix Z

6 Month Follow-up Steps to Participate Letter to Child Care Providers
(Intervention and Control Groups)

Department of Food Science
and Human Nutrition
Fort Collins, Colorado 80523-1571
(970) 491-3819
Fax: (970) 491-7252
www.fshn.colostate.edu

September 5, 2006

Dear

Hello! Thank you so much for participating in my project on infant feeding. I am hoping that you can find the time to complete one more survey. This will be the last survey! Your opinions on infant feeding are very important to me and I want to see if any of your thoughts have changed over the summer. The survey is available on the website listed below from September 6-22. Please complete this survey by **Friday, September 22**. If you are having difficulty accessing the survey, please contact me at the information below.

The survey is located at:
www.fshn.cahs.colostate.edu/childcareprovider/index.html

This survey should take you about 10-15 minutes to complete. It is the **same survey** as last time.

As someone who has worked in child care, I understand that you are very busy, so I really appreciate your help with this project since it is part of my degree requirements. If you complete the survey by **Friday, September 22**, you will receive a check for $10! For Colorado State University tax purposes, I will need your social security number to give you the check.

Once this project is completed in November, you will be given the final website address. If you have any questions or concerns with the survey or website, please contact me at the number and/or email address below. Thank you again for your time and thoughts! I really appreciate it.

Sincerely,

Alena Clark, MPH, RD
Alena.Clark@Colostate.Edu
970-491-5676