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# Relactation in Emergencies

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## Table of Contents

Abstract.....	4
Introduction.....	5
Purpose Statement.....	5
Overview of the Importance of Breastmilk .....	6
Health Benefits of Breastmilk for the Infant.....	6
Recommendations Regarding HIV-Positive Mothers Breastfeeding .....	7
Benefits of Breastfeeding for the Mother .....	8
Recommendations of Professional Societies Regarding Breastfeeding .....	9
Reasons Mothers do not Breastfeed their Infants .....	9
Overview of Infant Feeding in Emergencies .....	10
Formula-Fed Infants vs. Breastfed Infants in Disasters.....	10
Problems with Formula Donations in Emergencies.....	11
Issues Associated with Displaced Victims .....	12
Immunizations that are Considered Safe While Nursing.....	12
Separation of the Mother-Baby Dyad.....	13
Milk Banks, Wet-Nursing, and Direct Donor Milk .....	14
Overview of Relactation in Emergencies .....	16
Overview of Relactation Techniques.....	17
Specific Issues Associated with Relactation in Emergencies .....	18
Role of Galactogogues in Relactation.....	19
Protocol for Relactation .....	20
Conclusion and Recommendations.....	21
References.....	25
Appendices.....	29
Appendix 1: Relactation Protocol.....	29
Appendix 2: List of Competencies Met in CE.....	30

## Abstract

Disaster situations in the United States are unique entities that require solutions which are well thought out, appropriate for the population and planned well in advance. Infant and young child feeding in emergencies is no exception. While in peacetime infants may be safely nourished with both breastmilk and infant formula, disaster situations often add a level of complexity to feeding with infant formula, including lack of access to potable water and ability to effectively sterilize feeding items. Such complexities, along with the important and undeniable fact that breastmilk is the ideal form of food for all babies (and especially in disaster situations), make breastfeeding in disaster situations of the utmost importance. Even when a mother is no longer breastfeeding at the time of the emergency, she may be able to re-initiate breastfeeding her child through a process known as relactation. For these efforts to be successful, however, it is vital for such women to receive extensive support, both from those closest to them, from lactation and medical professionals and from emergency first responders. Often, relactation can be achieved without medical intervention, making this an ideal way to feed even a previously formula-fed baby in a disaster situation.

*Keywords:* breastfeeding, lactation, infant feeding, disaster, lactation induction

### **Relactation in Emergencies**

Disasters occur every day in different parts of the world, and are typically unpredictable and usually somewhat unexpected. These terrible situations are public health emergencies, as they create a perfect breeding ground for transmission of infection; crowded living conditions, lack of personal hygiene, no access to clean water, and destruction of local infrastructure that house our usual medical units and pharmaceuticals. Preventing these infections is difficult, if not impossible, but one reliable way to mitigate the spread of infection is to ensure a reasonable nutrition status for all victims, regardless of age. People are more susceptible to infection if their immune systems are not supported by a well-balanced, substantial diet; those who are malnourished are far more susceptible to infection than are those who are well-nourished. Transporting Meals-Ready-to-Eat (MREs) and clean, bottled water is a logistical nightmare in disaster situations, but providing appropriate nutrition for infants may be even more daunting. Infants who are exclusively breastfeeding at the time of a disaster tend to do much better when compared with infants who are formula feeding. Although this fact is relatively well-known, many women are not exclusively breastfeeding their infants at the time of an emergency, or those mothers who are may have been separated from their baby. If this is the case, it is important for the mothers, lactation professionals, and emergency aid workers to understand the principles and methods of relactation.

### **Purpose Statement**

The purpose of this project was to provide an overview of infant feeding in disasters, and, more specifically, to explore the role of relactation in these situations. The goal was to explore past disasters and the role that relactation could or did play in infant feeding and how this role could be improved or expanded.

### **Overview of the Importance of Breastmilk**

That breastfeeding provides for the optimal nutrition for the newborn and young infant is now a widely known and accepted fact by many professional organizations, including the World Health Organization (WHO), the United Nations Children's Fund (UNICEF), the American Academy of Family Physicians (AAFP), and the American Academy of Pediatrics (AAP), among others (American Public Health Association, 2007; Eidelman & Schanler, 2014; Montgomery et al., 2014; The Academy of Breastfeeding Medicine Protocol Committee, 2010; UNICEF, 2014; World Health Organization [WHO], 2015). The importance to the newborn, both in the short-term and in the long-term are universally acknowledged and provide the foundation for the current positions of these organizations regarding breastfeeding duration and exclusivity. Thus, the aforementioned organizations are working diligently toward increasing the rate of exclusive breastfeeding of newborns and extended breastfeeding of young infants in the United States and worldwide, in the hopes that by increasing the percentage of exclusively breastfed infants and breastfed young children, the rates of childhood disease and death will decline, and the overall health of the future adult population will greatly improve.

### **Health Benefits of Breastmilk for the Infant**

Human milk is widely recognized as the natural first food for newborns, and it is the optimal form of nutrition in the first few days, weeks, months, and years of life for many reasons. Breastmilk provides an infant with all of the essential nutrients throughout the first six months of life, and continues to provide up to half of the required nutrients for the remainder of the first year of life, and up to one third of these essential nutrients for the second year of life (WHO, 2015). A breastfeeding infant will have access through his mother's milk to the passive immunity, which is often quite effective against many common pathogens. An infant who is not

exclusively breastfed will have a higher chance of dying from common childhood infectious diseases such as diarrhea and pneumonia, which is especially important in developing nations (WHO, 2015). These infants will also be at a higher risk for developing childhood leukemia, type one diabetes mellitus, acute otitis media, necrotizing enterocolitis, allergies, asthma, gastroenteritis, atopic dermatitis and sudden infant death syndrome (SIDS). Important benefits of breastfeeding are known to follow a child into adulthood as well. An adult who was not breastfed will have an increased chance of developing type two diabetes mellitus and higher blood pressure averages, when compared with an adult who was breastfed (Montgomery et al., 2014).

### **Recommendations Regarding HIV-Positive Mothers Breastfeeding**

Important specific recommendations regarding exclusive breastfeeding are detailed by both the UNICEF's and the WHO's breastfeeding policies on HIV-positive mothers, particularly in developing nations. These policies are important to understand, as they represent a careful and delicate balance between maximizing long-term survival by minimizing the risk of HIV transmission from an infected mother to an uninfected infant, while trying to give the infant the best chance of short-term survival by minimizing the risk of infant mortality from common infectious diseases such as diarrhea, malnutrition and severe lower respiratory infections (which are common causes of death in many developing nations) (WHO, 2010). The UNICEF's policy states that all HIV-infected mothers should breastfeed their infants exclusively for six months, unless access to other appropriate sources of food becomes "acceptable, feasible, affordable, sustainable and safe before that time". When the baby is six months old, breastfeeding should continue with the addition of complementary foods until age one, or until the infant has access to alternative foods which are "acceptable, feasible, affordable, sustainable and safe". The infant

should be weaned from the mother's breastmilk as soon as he is able to effectively fulfill his nutritional requirements from other sources. This policy also states that such mothers should be provided with education regarding their HIV-positive status, and they should also be provided with available, appropriate healthcare to prevent transmission of HIV to their nursing offspring (United Nations Children's Fund [UNICEF], 2013). The WHO has a similar policy on HIV-infected mothers breastfeeding, but this organization specifies the importance of antiretroviral drugs being taken by the lactating mother. If the mother is taking antiretroviral drugs, it is recommended that she continue to breastfeed exclusively until the baby is one year old, as the risk of HIV transmission to her breastfeeding offspring is quite small at this point (WHO, 2010).

### **Benefits of Breastfeeding for the Mother**

Breastfeeding appears to be a sort of symbiotic relationship, as both mother and infant benefit. According to the 2014 position paper by the AAFP, breastfeeding conserves a family's resources, as no money is required to be spent on formula. It provides a natural, often quite effective way to naturally space out children, which can decrease the risk of a future premature birth. Breastfeeding an infant in developed nations also helps to protect against ovarian, breast cancer, hypertension, type two diabetes and cardiovascular disease. It provides the otherwise emotionally vulnerable mother with a sense of pride and contentment that she is providing her infant with everything that he needs, and has been shown to decrease the rates of postpartum depression. Breastfeeding also can help with postpartum weight loss, along with diet and exercise. Finally, breastfeeding can make a positive impact environmentally, in that less land is required for cattle grazing and fewer packaging supplies are required for formula preparation (Montgomery et al., 2014).

### **Recommendations of Professional Societies Regarding Breastfeeding**

As human breastmilk is widely accepted as the preferable food for the infant, specific guidelines for its initiation and continuation have been established by many of the larger medical and public health organizations around the United States and worldwide. The WHO and UNICEF specifically recommend that children be exclusively breastfed until age six months, and then that the mother continue to breastfeed with the addition of appropriate complementary foods until the child is at least two years old. These organizations also recommend that the infants not be given bottles, teats or pacifiers, that breastfeeding be initiated within one hour of life, and that the infant be fed on demand (WHO, 2015). Similarly, the AAFP and the AAP recommend that children be exclusively breastfed until age 6 months, followed by continued breastfeeding and the addition of appropriate complementary foods. Unlike the WHO and UNICEF, however, the AAFP and the AAP only recommend continued breastfeeding with complementary foods until the child is at least one year old (Eidelman & Schanler, 2014; Montgomery et al., 2014).

### **Reasons Mothers do not Breastfeed their Infants**

Although it is widely known that breastfeeding is the ideal form of infant food, many mothers discontinue breastfeeding before they had planned to, and certainly before they have breastfed their infant for the recommended minimum of one year. A study published in *Pediatrics* in 2013 explored the reasons for breastfeeding cessation in more than 1,100 mothers. The results showed that more than 60% of all mothers stopped breastfeeding earlier than they had wished. Their reasons were varied, but typically involved concern over infant growth and/or development, problems with lactation, maternal illness and the need for medications, and the inconvenience of having to pump their milk (Odom, Li, Scanlon, Perrine, & Grummer-Strawn, 2013). Because their infants are less than one year old when they discontinue breastfeeding (and

thus dependent on either human milk or iron-fortified infant formula for proper growth and development), these mothers often look to commercially prepared formula to provide the required nutrition to their children. According to formula producers such as Abbott Laboratories, which produces the popular formula Similac, such formula is available in both a powdered formulation, which must be mixed with water prior to use, and a ready-to-feed liquid formulation. Feeding a formula-fed baby requires bottles complete with nipples, access to clean water (if using the powdered formula), and a way to properly clean and sterilize the parts and pieces after each use. Often, a refrigeration source is helpful, if unused portions of each feeding are to be reused at a later time (Abbott Laboratories, 2015). Such requirements are not always easily met in an emergency situation such as a flood or hurricane, making formula-feeding somewhat more difficult in such scenarios.

### **Overview of Infant Feeding in Emergencies**

Unfortunately, emergencies are part of our lives, in all parts of the world. Emergencies can be natural (hurricanes, floods, blizzards, etc.) or human-made (war, nuclear disasters, terrorist attacks, etc.) and can affect small numbers of people, or entire countries or continents. They are often unpredictable and although significant effort is made to get ready for these events, we often find ourselves ill-prepared for the catastrophes that we face. Ensuring that people have adequate food and water is one of the most difficult aspects of handling and overcoming the challenges associated with an emergency situation. Infant feeding in particular is an even larger issue that is often not addressed until it is far too late.

### **Formula-Fed Infants vs. Breastfed Infants in Disasters**

Many formula-fed infants suffer disproportionately from infectious disease outbreaks in emergency scenarios when compared with exclusively breastfed infants. For example, a 2005-

2006 catastrophic flood in Botswana led to a diarrheal outbreak and the subsequent death of over 500 infants. It was later determined that an artificially [formula] fed infant was 30% more likely to require hospital treatment for diarrhea than was a breastfed infant, and in one village, 30% of the artificially fed infants died, while zero of the breastfed infants expired (Carothers & Gribble, 2014). Such differences in morbidity and mortality are likely multivariate and involve etiologies including use of expired or contaminated formula, lack of passive immunity present in a mother's breastmilk, use of contaminated water in preparation of the formula, lack of ability to properly clean the required parts and pieces of bottle-feeding, and the alteration of the infant's intestinal flora so as to make the baby more susceptible to affliction with dangerous infectious diseases such as diarrhea (Carothers & Gribble, 2014).

### **Problems with Formula Donations in Emergencies**

Although emergency situations are inherently bad for infants, some particular aspects of such scenarios increase an infant's risk of sickness or death. A position paper by Carothers and Gribble regarding infant feeding in emergencies describes the problem when uninformed, geographically separated people hear about a disaster, and are often moved to help; often in the form of donations. If infants' needs are included in these donations, the received items are often in the form of artificial baby milk (formula). While well-intentioned, this formula is often in powdered form (likely because it is cheapest this way and can keep longer), and may even be close to or past the expiration date. Additionally, the formula is frequently labeled in the wrong language and recipients of the product are unable to correctly interpret the instructions. Finally, the formula may be of the wrong type for the at-risk infants involved in the disaster; regular formula, when the infant requires pre-term formula, for example (Carothers & Gribble, 2014). Somewhat more concerning is the tendency of formula companies to capitalize on a disastrous

situation by making a show of donating copious amounts of their product to the affected areas. While this seems like a good problem to have, large donations of formula to areas where artificial feeding is not widespread can lead to unnecessary problems (Carothers & Gribble, 2014). For example, a 2006 earthquake in Indonesia led to the donations of formula to 70-80% of families with babies, despite the rates of formula feeding in this area being much lower prior to the natural disaster. Interestingly, this presumably well-intentioned deed led to the doubling of the spread of infectious diarrhea to infants in this area, likely because their little bodies were not used to this form of food (Carothers & Gribble, 2014).

### **Issues Associated with Displaced Victims**

In addition to inappropriate donations, emergency situations often lead to the displacement of large amounts of people, which ultimately result in crowded living conditions that quickly become unsanitary and thus are a breeding ground for many hazardous infectious diseases. Diarrhea, respiratory conditions, and other food/water borne infections are of particular concern in these conditions. All of these are disproportionately affected in artificially fed infants when compared with breastfed infants (Carothers & Gribble, 2014).

### **Immunizations that are Considered Safe While Nursing**

Of note, the poor living conditions and the increased likelihood of infection with communicable diseases in such emergency situations require that the victims be immunized against some infectious diseases likely to make an appearance in the aftermath of a disaster. For example, Tdap, pneumococcal, varicella and MMR vaccines should be administered to displaced adult evacuees in a disaster situation if no vaccination documentation can be provided (Office of Public Health Preparedness and Response, 2014). All of these vaccinations are safe and recommended for lactating mothers to receive, as such vaccinations will help to keep the

breastfeeding infant healthy with the passive immunity received from his mother's milk after she is immunized (Bienvenu, n.d.). Interestingly, the vaccination against Smallpox is contraindicated in breastfeeding women, and vaccination against Yellow Fever should be avoided if possible in nursing women. All other available vaccines are considered safe in lactating women, or there is not enough information to make a concrete conclusion (though no ill-effects are suspected to result from these women receiving these immunizations) (Centers for Disease Control and Prevention, 2010).

### **Separation of the Mother-Baby Dyad**

Also inherent to many emergency situations is the increased tendency for mothers and babies to be separated, either permanently (as in death), or temporarily (as when the mother or baby must be hospitalized due to illness, etc.). Although this problem is not as important in a formula-fed infant-mother dyad, such separation can be catastrophic for a breastfeeding infant (United States Breastfeeding Committee, 2011; Wight, Gartner, & O'Hara, 2005). During Hurricane Katrina, many mothers and infants were often separated. It was not part of the policy at that time to even attempt to keep these important dyads together. Although many of these dyads were formula-feeding at the time of the disaster, the authors of this article state that it would have been better if it were written policy at the time to keep families together if at all possible (Shaver & Oleck, 2006). It is therefore vital that as much as possible, a breastfeeding mother-baby dyad be supported in such a way that the two individuals are able to remain together during a disaster condition (Wight et al., 2005). If this is simply not possible (as in death or serious maternal injury), human milk donation or direct human milk donation, or "wet nursing" by another lactating mother is a possibility (American Academy of Pediatrics, 2015; United States Breastfeeding Committee, 2011).

**Milk Banks, Wet-Nursing, and Direct Donor Milk**

The AAP recommends that in an emergency situation where the mother's milk is not available, a non-mother human milk source is preferable to artificial feeding with infant formula, though it should be noted that the AAP does not recommend direct feeding of infants, as in wet-nursing practices (American Academy of Pediatrics, 2015). This is especially true in orphaned infants, where this source recommends HIV-negative donor milk over infant formula. Although this practice is preferable over the use of artificial infant formula, it is not without risks. The FDA recommends against the use of donor human milk from unscreened donors and from milk banks that do not take "other precautions" to ensure that the milk is safe for infant consumption. The FDA specifically recommends against the use of donor milk obtained directly from other people or through online donation sites (U.S. Food and Drug Administration, 2010). According to this source, the risks of using donor milk obtained through these unauthorized routes may include exposure to a multitude of infectious diseases (including HIV, CMV, GBS, HSV, *Klebsiella pneumonia*), exposure to possible chemical contaminants (intentional or not), and exposure to certain drugs (prescription and illicit). Additionally, the milk may also be unsafe to consume if it has not been stored and handled appropriately (U.S. Food and Drug Administration, 2010; Geraghty, Heier, & Rasmussen, 2011). Direct donation of human milk through "wet-nursing" would likely carry similar risks, so the decision to use donor human milk or to use the services of a "wet nurse" is not to be made in haste or without the direction and assistance of a licensed clinical provider (U.S. Food and Drug Administration, 2010).

A different, yet important concern regarding the plan to use human milk donation or even wet-nursing (in an emergency) as a food source for infant victims in disaster situations includes the societal view of such a practice. In recent years, informal human milk donation has become

quite popular in the United States, especially through internet blogs and social networking sites (Geraghty et al., 2011). The increasing awareness of the benefits of breastmilk for infants has likely fueled this practice in the United States and the use of such milk seems to help relieve some of the guilt associated with a mother not being able to provide her child with the recommended “liquid gold”. It is interesting that these practices continue to occur, despite these unregulated sites not being a recommended source of human milk, due to safety and infectious disease concerns (Geraghty et al., 2011). Although as discussed above, some US mothers may view the use of donor human milk as an acceptable substitution for their own breastmilk (even when obtained from less-than-ideal sources), many mothers will likely not be initially open to this idea, even if the milk is obtained from a regulated milk bank that takes precautions to reduce the risks of milk-sharing. A study performed in Africa evaluating mothers’ attitudes toward wet-nursing (or milk donation) from a non-familial woman is generally negative, especially in the HIV/AIDS community (Ogunlesi, Adekanmbi, Fetuga, & Ogundeyi, 2008). This is largely thought to be due to the incorrect belief that genetic disorders can be transmitted via breastmilk. A grandmother or other family member may be an acceptable substitution for a mother, especially in times of disaster, emergency, or severe illness. Obviously in this case, relactation would often be required, as most grandmothers have stopped breastfeeding (Ogunlesi et al., 2008). Relactation in the case of a post-menopausal woman has been debated, as the quality of breastmilk in this population of women is often questioned (Gindler, Nwankwo, Omene, Glew, & Roberts, 1985). A study evaluated the quality of breastmilk in a 65 year old Nigerian woman who had been breastfeeding three of her grandchildren. The results of the study showed that her milk did not differ significantly in either fat or lactose content, but the protein levels were significantly different, at 40% of the mean level (Gindler et al., 1985). While perhaps not ideal,

wet-nursing or milk donation from even older women may be preferable to formula in a disaster or emergency situation. Education of the mother regarding the safety of using properly screened and pasteurized donor human milk will likely go a long way in convincing her to try this form of infant feeding if necessary.

### **Overview of Relactation in Emergencies**

As previously discussed in this paper, breastmilk from the infant's own mother is the ideal form of infant food for the baby's first six months of life. This is a vital piece of information to keep in mind for both the mothers and the emergency relief workers, as many of the well-meaning donations in the first few days after a disaster tend to be substandard infant formula. It is during this time that support is especially needed for the lactating mother to continue what she was doing prior to the emergency (Bienvenu, n.d.). Mothers who are currently breastfeeding will obviously tend to make the transition to exclusive or increased breastfeeding in an emergency much easier than a woman who never breastfed her baby or weaned her baby a few months prior to the disaster, but it is not impossible for a mother who has already weaned her baby (or a mother who has never breastfed at all) to re-start her milk production, called relactation (Seema, Patwari, & Satyanarayana, 1997; United States Breastfeeding Committee, 2011). Undertaking a commitment to re-initiate lactation in mothers who have weaned in emergency situations is much preferable over artificial feeding with infant formula, as well as feeding the infant with donor-supplied human milk, but it is not without difficulty (United States Breastfeeding Committee, 2011; WHO Regional Office for Europe, 1997).

### **Overview of Relactation Techniques**

Relactation is a complex process that is not yet well-understood by many medical and lactation professionals. Although it has been done in animals for many years, relactation has not been widely attempted in humans until just recently; therefore much of the literature regarding the efficacy of relactation efforts is still undiscovered (Cho, Cho, Lee, & Lee, 2010; Hormann & Savage, 1998). The literature tends to agree on the general ways in which relactation is initiated in women who have either stopped breastfeeding, or who have not ever breastfed a baby. These methods involve frequent suckling of the infant on the mother's breasts, frequent skin-to-skin contact with the mother-baby dyad, extensive support of the mother's efforts to re-induce lactation, the use of supplementers (tube-feeding devices that allow the infant to receive milk or formula at the mother's breast), cessation of all bottles and pacifiers, and, occasionally, the use of galactogogues such as domperidone and metoclopramide (Hormann & Savage, 1998; Seema et al., 1997). A study published in the *Journal of Tropical Pediatrics* explored the success of 50 women who attempted relactation after they had stopped breastfeeding. The study population was randomly split into two groups; one receiving metoclopramide, and one group receiving placebo. Both groups received extensive education and support regarding the other relactation techniques, including frequent suckling, cessation of the use of bottles and pacifiers, the appropriate use of supplementers, and frequent manual stimulation of the nipples (Seema et al., 1997). The results of the study showed successful relactation in 98% of the mothers (49/50), with complete relactation being achieved in 92% of mothers (46/50). The authors concluded that there was no statistical difference between the use of the galactogogue and the use of a placebo pill, when concerning the overall rate of milk flow or the weight gain of the infants (Seema et al., 1997). It seems that with results such as these, more medical and lactation professionals should

be better educated regarding relactation techniques, especially in times of disaster and emergency.

### **Specific Issues Associated with Relactation in Emergencies**

Attempting relactation in an emergency situation is a unique situation with its own set of challenges. As with any public health intervention, it is vital to understand the population that will be subjected to the intervention, and to assess whether or not this particular population will be able to be successfully and universally implement the intervention. In order to evaluate a particular population, it is important to understand the factors that may affect whether a mother will be successful in her attempts at relactation. A study performed in Korea evaluated some of the most important factors linked to the mother and her infant that help to determine the success that a woman will have in the relactation process. These factors include the use of galactogogues, extensive family support and initial referral by medical personnel (Cho et al., 2010). In this Korean study involving 84 mothers, 75% were completely successful in achieving exclusive breastfeeding by the end of the 40 day study using relactation techniques. Even though this study showed a statistically significant association of the use of galactogogues and the success of relactation, the authors are careful to caution that these medications should only be used as a last resort, and that intensive counseling and support should be attempted prior to any use of these medications (Cho et al., 2010). Additionally, it is perhaps important to note that although electric pumps and supplementers are recommended in peacetime relactation, hand expression are preferred in emergency situations, since electric pumps and supplementers are not easily cleaned in these types of situations. The lack of relative comfort with hand-expression in American women may hamper the ability of these mothers to successfully stimulate lactation by manual expression of breastmilk.

**Role of Galactogogues in Relactation**

Galactogogues seem to have a questionable effect on the success of relactation. Very few studies have been done on this topic, and even fewer of the studies have been well-designed or appropriately powered. The Academy of Breastfeeding Medicine (ABM) developed clinical protocols in 2004 for the use of galactogogues in achieving successful exclusive breastfeeding in women who either have insufficient supply or who have stopped breastfeeding for a variety of reasons. Since that time, subsequent studies have failed to show their overall effectiveness, so the Academy was forced to revise their guidelines in 2011 (The Academy of Breastfeeding Medicine Protocol Committee, 2011). These revised guidelines state that although galactogogues are not routinely indicated for increasing breastmilk supply, galactogogues such as domperidone and metoclopramide may be clinically indicated for relactation in women who have completely stopped breastfeeding, or in adoptive mothers who wish to breastfeed their children. Two well-designed studies (though not highly powered) have evaluated the effectiveness of domperidone as a galactogogue. One of these studies showed a statistically significant increase in milk supply in women who had premature infants less than 31 weeks' gestation, and the other study showed that some women tend to respond to the medications better than others (primiparous tend to respond better than multiparous women, for example) (The Academy of Breastfeeding Medicine Protocol Committee, 2011). The other frequently-prescribed galactogogue, metoclopramide, was evaluated by four relatively well-designed studies, none of which showed a statistically significant advantage to using this medication over placebo. Although these studies show a potential benefit of the appropriate utilization of galactogogues in relactation (or lactation induction), the Academy cautions that the studies were not especially well-designed, nor did they have sufficient power to make broad conclusions valid

(The Academy of Breastfeeding Medicine Protocol Committee, 2011). More information will be needed before it is known for certain whether these medications are more effective than placebo.

### **Protocol for Relactation**

As the effectiveness of galactogogues is not known for certain, and these medications would likely not be widely available in an emergency situation, it is important to focus on non-medicinal techniques to induce relactation. According to an informational handout regarding the topic of relactation written by Linda Smith and the WHO monograph on this topic, relactation can often be achieved without medications; especially if attempted within two months of cessation of nipple stimulation, and ideally when the infant is two months old or younger (Hormann & Savage, 1998; Smith, 1991). According to this source, if relactation is attempted within this ideal time period, it can take as few as one to three weeks to build up enough milk supply to sustain the infant solely on breastmilk. Relactation can be achieved in older infants, but it may be more difficult to get the baby to be sufficiently interested in suckling at the mother's breast. The first step in this process as detailed by Linda Smith, is to stop using all pacifiers and to rent a hospital-grade pump (though this is not often possible in emergency situations, and hand expression is preferred in these situations). The mother should begin pumping both breasts simultaneously every two to three hours during the day and at least every four hours at night, for a total of six to twelve pumping sessions per 24 hour period. Each pumping session should last 10-15 minutes, for a total of at least 100 minutes per day. The more pumping sessions that a mother is able to perform, the more successful her relactation efforts are likely to be. The milk that the mother gets from these pumping sessions should be given to the infant, but the infant should also continue to receive his formula (or donor milk) so that he is not hungry (Smith, 1991). The second step (which should be initiated at the same time as step one)

involves increased skin-to-skin contact between mother and baby, as well as increased time spent baby-wearing (in a sling) and infant massages with skin-to-skin contact. The mother should be giving the infant all of his feedings during this process, as this will help to improve the success of relactation (Smith, 1991). The third and final step is to allow the baby to suckle at the breast for each feeding (once the mother is producing at least two ounces of milk per breast per pumping session) and for the mother to offer her expressed breastmilk without the use of an artificial nipple (use of a cup is encouraged). The mother should be holding and carrying the infant constantly during this step, and she should be maximizing the amount of time spent skin-to-skin with her infant. This process requires the strict attention of a physician or lactation consultant (if available in the emergency situation) to ensure that the infant is receiving the appropriate amount of milk per day, so daily weight checks are essential; with a goal weight gain of at least one ounce per day (Smith, 1991).

### **Conclusion and Recommendations**

Infant feeding in emergencies is a complex, multifaceted and difficult topic. Undoubtedly, breastfeeding in these emergency situations is the best option; both for the baby and for his mother. Even in situations where a mother has previously discontinued breastfeeding, such a mother is likely able to achieve successful relactation with extensive support, a little time, cooperation from the baby and a significant amount of determination on the part of the mother. It is therefore vital for emergency preparedness staff as well as first responders to understand the importance of their role in supporting and encouraging breastfeeding in families with infants; especially if we are to avoid the many problems associated with infant formula in these types of situations. A great statement was created by the United States Breastfeeding Committee regarding this subject, which includes both pre- and post-

disaster steps to take to improve infant and young child feeding in emergencies (United States Breastfeeding Committee, 2011).

Recommendations on this topic are numerous and really quite basic. Preparation must occur well before the emergency situation occurs, or is even impending. For example, the emergency planning team must know their population, especially in relation to the percentage of current pregnant women, breastfeeding mother-baby dyads and current formula-feeding infants and young children. Knowing this information allows the planning team to gauge how much and of what type of information that should be available and provided to the population regarding infant feeding in these special circumstances and what types of donations will be beneficial if and when an emergency situation occurs. Related to this issue, is the importance of knowing the current availability of breastfeeding support (lactation consultants, peer counselors, physicians knowledgeable on the topic, etc.) that is present in the community prior to any potential incident. Such support will be vital in an emergency situation, and it is important for the emergency preparedness staff to know their capabilities and where they are located so that these invaluable resources can be best utilized in the worst of situations. As discussed previously, relactation is especially successful if mothers receive significant support from knowledgeable people. Additionally, cultural barriers to the use of milk banking or (in severe emergency situations) wet-nursing must also be known, so that any educational materials or outreach programs may address these issues and provide re-education where necessary.

All people involved in the emergency situation must be well educated on the needs of the population so that appropriate donations may be requested and funneled to appropriate places. For example, useful donations that may be requested in a population that has a relatively high rate of current breastfeeding mother-baby dyads and significant lactation support will differ

significantly from useful donations in a population with mostly formula-feeding mothers with very little lactation support. A population with high levels of current breastfeeders may request breast pumps, supplementers and human milk donations (though with breast pumps and supplementers, it is important to have a way to clean this equipment if it is to be used), while a mostly formula-feeding population may benefit greatly from donations of single-use ready-to-feed liquid formula. All populations must be aware of the tendency of formula companies to use disaster situations to get their product and name out in the public view. Although seemingly well-intentioned, such donations may be inappropriate in the face of a disaster where proper formula preparation is not possible or easily achieved. Also, current breastfeeding mothers would do better to continue breastfeeding, rather than to be persuaded that the formula is a better option for feeding their children in emergency situations. Additionally, it is vital for emergency workers to be aware of the expiration dates on any donated formula, and ensure that all instructions are clear to anyone who may be given such donations (including clearing up language barriers, if present).

Education about the topic of the benefits of breastfeeding as well as the very real possibility of relactation is important to do prior to any disaster occurring. Such education must be done on several levels, including education of the mothers, lactation professionals, medical professionals and any emergency aid workers that may be involved in such an event. The importance of breastfeeding (including immunity to common infectious diseases found in disaster situations) should be emphasized, as well as the potential difficulties and dangers associated with formula feeding in emergencies. Medical and lactation professionals should be specifically educated on the techniques of relactation as well as safe human milk banking options in the area.

More information is needed on the topic of relactation in emergencies, especially if relactation is successful in a disaster situation.

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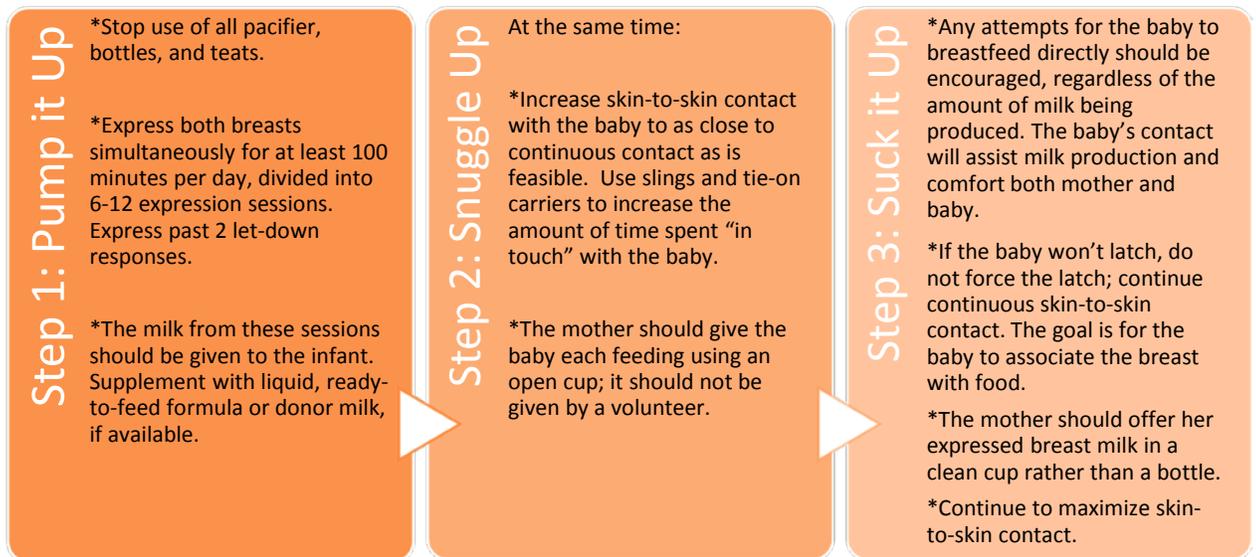
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## Appendix 1: Relactation Protocol



Source: Smith, 1991

## Appendix 2: List of Competencies Met in CE

**Tier 1 Core Public Health Competencies**

<b>Domain #1: Analytic/Assessment Skills</b>
Describes factors affecting the health of a community (e.g., equity, income, education, environment)
Identifies quantitative and qualitative data and information (e.g., vital statistics, electronic health records, transportation patterns, unemployment rates, community input, health equity impact assessments) that can be used for assessing the health of a community
Selects valid and reliable data
Selects comparable data (e.g., data being age-adjusted to the same year, data variables across datasets having similar definitions)
Identifies gaps in data
Collects valid and reliable quantitative and qualitative data
Describes public health applications of quantitative and qualitative data
Uses quantitative and qualitative data
Describes assets and resources that can be used for improving the health of a community (e.g., Boys & Girls Clubs, public libraries, hospitals, faith-based organizations, academic institutions, federal grants, fellowship programs)
Contributes to assessments of community health status and factors influencing health in a community (e.g., quality, availability, accessibility, and use of health services; access to affordable housing)
Explains how community health assessments use information about health status, factors influencing health, and assets and resources
Describes how evidence (e.g., data, findings reported in peer-reviewed literature) is used in decision making
<b>Domain #2: Policy Development/Program Planning Skills</b>
Contributes to state/Tribal/community health improvement planning (e.g., providing data to supplement community health assessments, communicating observations from work in the field)
Contributes to development of program goals and objectives
Describes organizational strategic plan (e.g., includes measurable objectives and targets; relationship to community health improvement plan, workforce development plan, quality improvement plan, and other plans)
Contributes to implementation of organizational strategic plan
Identifies current trends (e.g., health, fiscal, social, political, environmental) affecting the health of a community
Gathers information that can inform options for policies, programs, and services (e.g., secondhand smoking policies, data use policies, HR policies, immunization programs, food safety programs)
Describes implications of policies, programs, and services
Applies strategies for continuous quality improvement
Describes how public health informatics is used in developing, implementing, evaluating, and improving policies, programs, and services (e.g., integrated data systems, electronic reporting, knowledge management systems, geographic information systems)
<b>Domain #3: Communication Skills</b>
Identifies the literacy of populations served (e.g., ability to obtain, interpret, and use health and other information; social media literacy)
Communicates in writing and orally with linguistic and cultural proficiency (e.g., using age-appropriate materials, incorporating images)
Solicits input from individuals and organizations (e.g., chambers of commerce, religious organizations, schools, social service organizations, hospitals, government, community-based organizations, various populations served) for improving the health of a community
Suggests approaches for disseminating public health data and information (e.g., social media, newspapers, newsletters, journals, town hall meetings, libraries, neighborhood gatherings)
Describes the roles of governmental public health, health care, and other partners in improving the health of a community
<b>Domain #4: Cultural Competency Skills</b>
Describes the concept of diversity as it applies to individuals and populations (e.g., language, culture, values, socioeconomic status, geography, education, race, gender, age, ethnicity, sexual orientation, profession, religious affiliation, mental and physical abilities, historical experiences)
Describes the diversity of individuals and populations in a community
Describes the ways diversity may influence policies, programs, services, and the health of a community
Recognizes the contribution of diverse perspectives in developing, implementing, and evaluating policies, programs, and services that affect the health of a community
Addresses the diversity of individuals and populations when implementing policies, programs, and services that affect the health of a community

<b>Domain #5: Community Dimensions of Practice Skills</b>
Recognizes relationships that are affecting health in a community (e.g., relationships among health departments, hospitals, community health centers, primary care providers, schools, community-based organizations, and other types of organizations)
Suggests relationships that may be needed to improve health in a community
Supports relationships that improve health in a community
Provides input for developing, implementing, evaluating, and improving policies, programs, and services
Describes the importance of community-based participatory research
<b>Domain #6: Public Health Sciences Skills</b>
Retrieves evidence (e.g., research findings, case reports, community surveys) from print and electronic sources (e.g., PubMed, Journal of Public Health Management and Practice, Morbidity and Mortality Weekly Report, The World Health Report) to support decision making
Recognizes limitations of evidence (e.g., validity, reliability, sample size, bias, generalizability)
Describes evidence used in developing, implementing, evaluating, and improving policies, programs, and services
Suggests partnerships that may increase use of evidence in public health practice (e.g., between practice and academic organizations, with health sciences libraries)
<b>Domain #7: Financial Planning and Management Skills</b>
Describes the structures, functions, and authorizations of governmental public health programs and organizations
Describes government agencies with authority to impact the health of a community
Adheres to organizational policies and procedures
Describes how teams help achieve program and organizational goals (e.g., the value of different disciplines, sectors, skills, experiences, and perspectives; scope of work and timeline)
<b>Domain #8: Leadership and Systems Thinking Skills</b>
Incorporates ethical standards of practice (e.g., Public Health Code of Ethics) into all interactions with individuals, organizations, and communities
Describes public health as part of a larger inter-related system of organizations that influence the health of populations at local, national, and global levels
Describes the ways public health, health care, and other organizations can work together or individually to impact the health of a community
Contributes to development of a vision for a healthy community (e.g., emphasis on prevention, health equity for all, excellence and innovation)
Identifies internal and external facilitators and barriers that may affect the delivery of the 10 Essential Public Health Services (e.g., using root cause analysis and other quality improvement methods and tools, problem solving)
Describes needs for professional development (e.g., training, mentoring, peer advising, coaching)
Describes the impact of changes (e.g., social, political, economic, scientific) on organizational practices
Describes ways to improve individual and program performance

### Concentration Specific Competencies

<b>Emergency Preparedness:</b>
Demonstrate the understanding of model leadership in emergency conditions
Communicate and manage information related to an emergency
Demonstrate the mastery of the use of principles of crisis and risk management
Use research and/or evaluation science methodologies and instruments to collect, analyze and interpret quantitative and qualitative data
Employ ethical principles in the practice of public health emergency preparedness
Demonstrate an understanding of the protection of worker health and safety