Impact of Birthing Practices on Breastfeeding

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My journey to this point

WHO/UNICEF 2003

Global Strategy for Infant and Young Child Feeding

"Mothers and babies form an inseparable biological and social unit; the health and nutrition of one group cannot be divorced from the health and nutrition of the other."

Most US mothers Breastfeed

USA June 2010	Initiation	6 months	12 months	Exclusive 3 mos	Exclusive 6 mos
Total	75%	43.0	22.4	33.0	13.3

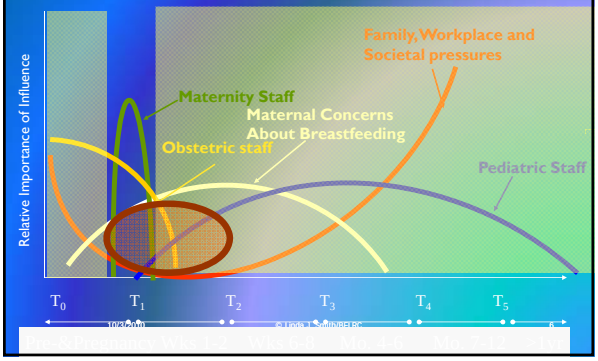
www.cdc.gov/breastfeeding
June 2010

Most Mothers Want to Breastfeed

- Listening to Mothers II 2005
- 70% intended to exclusively breastfeed
- By 1 week, 50 % are exclusively BF
- **20% (1 in 5) didn't reach own goals**

- Declercq, E., Labbok, M., Sakala, C., & O'Hara, M. (2009). Hospital Practices and Women's Likelihood of Fulfilling Their Intention to Exclusively Breastfeed. *Am J Public Health, 99(5), 929-935.*

Overcoming Potential Obstacles and Providing Support for Breastfeeding by Time Period – *M. Labbok, MD, IBCLC, MPH*



For Breastfeeding to Succeed

- The baby is able to feed: able to cue, suck, swallow, and breathe smoothly
- The mother is producing milk and willing to bring her baby to breast many times a day
- Breastfeeding is comfortable for both
- Surroundings support the dyad

First, do no harm

- If the newborn is unable to breastfeed, *AND/OR*
- If lactogenesis is delayed, or impaired *AND/OR*
- If the mother is unwilling to bring her baby to breast many times a day,
- **The baby will be fed formula, which**
  - **increases risk of sickness and death, *and***
  - **undermines the mother's goals**

Does breastfeeding really matter?

- There are NO advantages to Breastfeeding
- "Breastfed babies are healthier, leaner, smarter"
- No, they aren't.
- *Formula-fed babies are sicker, fatter, and dumber.*

Failure to breastfeed IS harmful

- Failure to breastfeed MEANS formula feeding
- Formula fed children are more likely to die, even in Industrialized countries
  - 720 postnatal neonatal deaths per year (Chen & Rogan, *Pediatrics* 2004)
  - **"[USA] excess 911 deaths, nearly all of which would be in infants ($10.5 billion and 741 deaths at 80% compliance" (Bartick & Reinhold, *Pediatrics* 2010)**
  - 25% increase in mortality for minorities (Forste, *Pediatrics* 2001)
  - ~doubles the risk of SIDS throughout infancy (Venneman, *Pediatrics* 2009)
  - **1,301,000 (13%) of infant deaths globally (Lancet 2003)**

- Increased rates of
  - Acute Otitis Media
  - Gastrointestinal Infections
  - Atopic Dermatitis
  - Lower Respiratory Tract Diseases
  - Asthma
  - Cardiovascular Diseases
- Poorer cognitive development
- Obesity (mother and baby)
- Type I and II Diabetes
- Childhood Leukemia
- Osteoporosis
- Postpartum Depression
- Breast & Ovarian Cancer
  - *(AHRQ 2007)*

Formula with beetles??

- **Abbott Recalls Infant Formula On Bug Contamination**
  - by The Associated Press
- WASHINGTON *September 22, 2010*
- Drugmaker Abbott Laboratories said Wednesday it is recalling millions of containers of its best-selling Similac infant formula that may be contaminated with insect parts.
- The voluntary action affects up to 5 million Similac-brand powder formulas sold in the U.S., Puerto Rico, Guam and some Caribbean countries. The company said the products may contain a small beetle or larvae, which could cause stomach ache and digestion problems.

Preventive action	Estimated deaths prevented*	%
Breastfeeding	**1,301**	**13**
Insecticide-treated materials	**691**	**7**
Complementary feeding	**587**	**6**
Clean delivery	411	4
H. influenzae type b vaccination	403	4
Zinc supplementation	351	4
Clean water	326	3
Vitamin A supplementation	176	2
Tetanus toxoid vaccination	161	2
Nevirapine and replacement feeding	150	2
Measles vaccination	103	1
Antimalarial treatment in pregnancy	22	1
Newborn temperature management	0	0
Antibiotics for PROM	0	0

Lancet Infant Survival Series, 2003

Making BF difficult increases maternal and infant mortality

- Exclusive breastfeeding for 6 months:
  - 24-hour breastfeeding on cue (Kent, *Pediatrics* 2006)
  - No bottles or pacifiers
- Exclusive BF for 6 months is recommended by:
  - American Academy of Pediatrics
  - American College of Obstetrics & Gynecology
  - World Health Organization & UNICEF
  - Canadian Pediatric Society
  - Many more…

Global Importance of BF

- WHO *Millennium Development Goals* 2000
- WHO *Global Health Statistics* 2009
- WHO/UNICEF *Global Strategy for Infant & Young Child Feeding* 2003
- *Global Breastfeeding Initiative for Child Survival* (gBICS)
- *World Breastfeeding Trends Initiative* (WBTi)
- Global Health Council *Position & Briefing Papers*
- UNICEF *State of the World's Children* 2009

"We measure what we value"

- **"Because 'failure to breastfeed' is not recognized as a possible harmful effect of medication, there are few methodological precedents in this area.**
- "This is the first report of a dose–response relationship between intrapartum neuraxial opioid analgesia and infant feeding.
- "When well-established determinants of infant feeding are accounted for, intrapartum fentanyl may impede breastfeeding, particularly at higher doses."
  - Jordan S, Emery S, Bradshaw C, Watkins A, Friswell W. The impact of intrapartum analgesia on infant feeding. *BJOG*. Jul 2005;112(7):927-934.

Research gaps

- Few studies of birth practices address breastfeeding outcomes
  - Lieberman, E., & O'Donoghue, C. (2002). Unintended effects of epidural analgesia during labor: a systematic review. *Am J Obstet Gynecol, 186*(5 Suppl Nature), S31-68.
  - hundreds of studies; **only 2 had BF outcomes**
- Few studies of breastfeeding & lactation investigate birth-related factors
  - Dewey, K. G. (2001). Maternal and fetal stress are associated with impaired lactogenesis in humans. *J Nutr, 131*(11), 3012S-3015S.
  - reported oxytocin responses, **no information on infant suck**
- Politics & Funding of Research
  - Brown LP, Bair AH, Meier PP. Does federal funding for breastfeeding research target our national health objectives? *Pediatrics*. Apr 2003;111(4 Pt 1):e360-364.
  - "Out of 362 abstracts… awarded ~40.4 million dollars…only **13.7%** (5.6 million dollars) was awarded to projects determined to have either a direct or indirect impact on achieving the Healthy People 2000 goals for increasing the incidence and duration of breastfeeding"

Epidural Effects on Infant Neurobehavior Hormonal Effects

All drugs reach the fetus/baby

- "Although the degree of placental transfer of sufentanil appeared greater than that of fentanyl, lower MV sufentanil concentrations resulted in less fetal exposure to sufentanil.
- The lower NACS *(Neurologic and Adaptive Capacity Score)* at 24 hours in group B-F may reflect the continued presence of fentanyl in the neonate."
  - Randomized; double-blind study of epidural sufentanil and fentanyl infused with bupivacaine
  - Loftus, J. R., Hill, H., & Cohen, S. E. (1995). Placental transfer and neonatal effects of epidural sufentanil and fentanyl administered with bupivacaine during labor. *Anesthesiology, 83*(2), 300-308.

All drugs reach the baby… even local lidocaine

"It has not previously been reported that the use of analgesia via pudendal block has an adverse effect on the initiation of developing breastfeeding behavior including sucking."

Ransjo-Arvidson, A., Matthiesen, A., Lilja, G., Nissen, E., Widstrom, A., & Uvnas-Moberg, K. (2001). Maternal analgesia during labor disturbs newborn behavior. *Birth, 28*, 5 - 12.

Strong evidence of consequences

- "Among women who breast-fed previously, those who were randomly assigned to receive high-dose labor epidural fentanyl were more likely to have stopped breast-feeding 6 weeks postpartum than women who were randomly assigned to receive less fentanyl or no fentanyl."
  - Beilin Y et al. Effect of labor epidural analgesia with and without fentanyl on infant breast-feeding: A **prospective, randomized, double-blind study**. *Anesthesiology* 2005, *103*(6), 1211-1217.

Cyanosis, unresponsive, visual skills, alertness, state, response to stress

- "infants with greater exposure to bupivacaine in utero were more likely to be cyanotic and unresponsive to their surroundings.
- Visual skills and alertness decreased significantly with increases in the cord blood concentration of bupivacaine, particularly on the first day of life but also **throughout the next six weeks**.
- Adverse effects of bupivacaine levels on the infant's motor organization, his ability to control his own state of consciousness and his physiological response to stress were also observed."
  - Rosenblatt, D. B., Belsey, E. M., Lieberman, B. A., Redshaw, M., Caldwell, J., Notarianni, L., et al. **(1981).** The influence of maternal analgesia on neonatal behaviour: II. Epidural bupivacaine. *Br J Obstet Gynaecol, 88*(4), 407-413.

Cueing, sucking, maternal attention

- "The epidural group showed poorer performance on the **orientation and motor clusters during the first month of life.** Epidural mothers reported spending less time with their infants in the hospital."
- "a dose effect was found for the mean orientation and motor cluster scores." *(i.e., cueing and sucking)*
- "The results are discussed in terms of possible effects of the infant's early disorganization on the mother-infant interaction."
  - Bupivicaine by epidural; observed for 30 days (then stopped)
  - Sepkoski, C. M., Lester, B. M., Ostheimer, G. W., & Brazelton, T. B. (1992). The effects of maternal epidural anesthesia on neonatal behavior during the first month. Dev Med Child Neurol, 34(12), 1072-1080.

Hand-to-mouth, temperature, crying

- "All infants made finger and hand movements, but the infant's massage-like hand movements were less frequent in infants whose mothers had received labor analgesia.
- "A significantly lower proportion of group 3 infants made hand-to-mouth movements ($p < 0.001$), and a significantly lower proportion of the infants in groups 2 and 3 touched the nipple with their hands before suckling ($p < 0.01$), made licking movements ($p < 0.01$), and sucked the breast ($p < 0.01$).
- "Nearly one-half of the infants, all in groups 2 or 3, **did not breastfeed within the first 2.5 hour of life.**
- "The infants whose mothers had received analgesia during labor had **higher temperatures** ($p = 0.03$) and they **cried more** ($p = 0.05$)"
  - mepivacaine via pudendal block; pethidine or bupivacaine or combination
  - Ransjo-Arvidson, A., Matthiesen, A., Lilja, G., Nissen, E., Widstrom, A., & Uvnas-Moberg, K. (2001). Maternal analgesia during labor disturbs newborn behavior. *Birth, 28*, 5 - 12.

Poor suck (IBFAT); early weaning

- "infants of unmedicated mothers had higher IBFAT suckling scores than those of medicated mothers (x = 11.1 vs. x = 8.2 respectively, P = .001).
- "dyads with low IBFAT scores weaned earlier"
  - Bupivacaine, lidocaine, chloroprocaine, fentanyl, sufentanil by epidural
  - Riordan, J., Gross, A., Angeron, J., Krumwiede, B., & Melin, J. (2000). The effect of labor pain relief medication on neonatal suckling and breastfeeding duration. *J Hum Lact, 16*(1), 7-12.

More instruments, less SVD, longer labors, maternal fever, septic workups

- "lower rate of spontaneous vaginal delivery, a higher rate of instrumental vaginal delivery and longer labors, particularly in nulliparous women.
- "Women receiving epidural are also more likely to have intrapartum fever and their infants are more likely to be evaluated and treated for suspected sepsis."
- *Not reported: Infant sucking ability*
  - Epidurals; systematic review
  - Lieberman, E., & O'Donoghue, C. (2002). Unintended effects of epidural analgesia during labor: a systematic review. *Am J Obstet Gynecol, 186*(5 Suppl Nature), S31-68.

Ineffective feeds; bottle supplements

- "more likely to receive a bottle supplement while hospitalized (OR 2.63; P < .001)"
- "Labor epidural anesthesia had a negative impact on breast-feeding in the first 24 hours of life even though it did not inhibit the percentage of breast-feeding attempts in the first hour"
  - Epidurals
  - Baumgarder, D. J., Muehl, P., Fischer, M., & Pribbenow, B. (2003). Effect of labor epidural anesthesia on breast-feeding of healthy full-term newborns delivered vaginally. *J Am Board Fam Pract, 16*(1), 7-13.

Breastfeed for shorter duration

- "In the subgroup of women with spontaneous onset of labour and vaginal deliveries, after controlling for other obstetric and demographic factors, epidural analgesia but not narcotic analgesia was significantly associated with reduced breast-feeding duration (adjusted hazard ratio 1.44, 95% confidence interval 1.04-1.99)."
  - Epidural
  - Henderson, J. J., Dickinson, J. E., Evans, S. F., McDonald, S. J., & Paech, M. J. (2003). Impact of intrapartum epidural analgesia on breast-feeding duration. *Aust N Z J Obstet Gynaecol, 43*(5), 372-377.

"Not enough milk;" formula use

- "67% of the mothers who had laboured with epidural analgesia and 29% of the mothers who laboured without epidural analgesia reported partial breast feeding or formula feeding (P = 0.003).
- The problem of "not having enough milk" was more often reported by those who had had epidural analgesia"
- Not reported: *infant sucking ability*
  - Volmanen, P., Valanne, J., & Alahuhta, S. (2004). Breast-feeding problems after epidural analgesia for labour: a retrospective cohort study of pain, obstetrical procedures and breast-feeding practices. *Int J Obstet Anesth, 13*(1), 25-29.
  - Epidural

Breastfeeding difficulties, stop BF sooner

- "Intrapartum analgesia and type of birth were associated with partial breastfeeding and breastfeeding difficulties in the first postpartum week (p < 0.0001).
- "Analgesia, maternal age and education were associated with breastfeeding cessation in the first 24 weeks (**p < 0.0001**), with women who had epidurals being more likely to stop breastfeeding than women who used non-pharmacological methods of pain relief (adjusted hazard ratio 2.02, 95% CI 1.53, 2.67).
- "CONCLUSION: Women in this cohort who had epidurals were less likely to fully breastfeed their infant in the few days after birth and more likely to stop breastfeeding in the first 24 weeks"
  - Torvaldsen, S., Roberts, C. L., Simpson, J. M., Thompson, J. F., & Ellwood, D. A. (2006). Intrapartum epidural analgesia and breastfeeding: a prospective cohort study. *Int Breastfeed J, 1*, 24.
  - epidural

Reduced warming effect of STS

- "Skin temperature increased significantly (p=0.001) during the entire experimental period in the infants belonging to the control group.
- The same response was observed in infants whose mothers received OT intravenously during labour (p=0.008).
- **No such rise was observed in infants whose mothers were given an EDA during labour.**
- CONCLUSION: The results show that the skin temperature in newborns rises when newborns are put skin-to-skin to breastfeed two days postpartum. This effect on temperature may be **hampered by medical interventions during labour such as EDA."**
  - Jonas, W., Wiklund, I., Nissen, E., Ransjo-Arvidson, A. B., & Uvnas-Moberg, K. (2007). Newborn skin temperature two days postpartum during breastfeeding related to different labour ward practices. *Early Hum Dev, 83*(1), 55-62.
  - Epidural

Delayed spontaneous breastfeeding; increased formula supplementation

- "Significantly fewer babies of mothers with EDA during labour suckled the breast within the **first 4 hours of life** [odds ratio (OR) **3.79**].
- These babies were also more often given artificial milk during their hospital stay (OR 2.19) and fewer were fully breast fed at discharge (OR 1.79).
- Delayed initiation of breast feeding was also associated with a prolonged first (OR 2.81) and second stage (OR 2.49) and with the administration of oxytocin (OR 3.28).
- Key conclusions: **the study shows that EDA is associated with impaired spontaneous breastfeeding including breastfeeding at discharge from the hospital."**
  - Wiklund, I., Norman, M., Uvnas-Moberg, K., Ransjo-Arvidson, A. B., & Andolf, E. (2009). Epidural analgesia: breast-feeding success and related factors. *Midwifery, 25*(2), e31-38.

Hormone effects

- Reduced oxytocin
  - Rahm, V. A., Hallgren, A., Hogberg, H., Hurtig, I., & Odlind, V. (2002). Plasma oxytocin levels in women during labor with or without epidural analgesia: a prospective study. *Acta Obstet Gynecol Scand, 81*(11), 1033-1039.
- Reduced pulsatile oxytocin
  - Nissen, E., Uvnas-Moberg, K., Svensson, K., Stock, S., Widstrom, A. M., & Winberg, J. (1996). Different patterns of oxytocin, prolactin but not cortisol release during breastfeeding in women delivered by caesarean section or by the vaginal route. Early Hum Dev, 45(1-2), 103-118.
- Reduced maternal socialization; increased anxiety and aggression
  - Jonas, W., Nissen, E., Ransjo-Arvidson, A. B., Matthiesen, A. S., & Uvnas-Moberg, K. (2008). Influence of oxytocin or epidural analgesia on personality profile in breastfeeding women: a comparative study. *Arch Womens Ment Health, 11*(5-6), 335-345.
- Lowered endogenous oxytocin with epidural + oxytocin infusion
  - Jonas, W., Johansson, L. M., Nissen, E., Ejdeback, M., Ransjo-Arvidson, A. B., & Uvnas-Moberg, K. (2009). Effects of Intrapartum Oxytocin Administration and Epidural Analgesia on the Concentration of Plasma Oxytocin and Prolactin, in Response to Suckling During the Second Day Postpartum. *Breastfeed Med, 4*(2), 71-82

Natural pain relief: endorphins

- "beta-endorphin is 18 to 33 times more potent than morphine"
  - Loh, *Proc Natl Acad Sci USA* 1976
- Epidurals reduce maternal endorphins
  - Abboud, T. K., Khoo, S. S., Miller, F., Doan, T., & Henriksen, E. H. (1982). Maternal, fetal, and neonatal responses after epidural anesthesia with bupivacaine, 2-chloroprocaine, or lidocaine. *Anesth Analg, 61*(8), 638-644.
- Cesarean without labor reduces endorphins in milk
  - Zanardo, V., Nicolussi, S., Giacomin, C., Faggian, D., Favaro, F., & Plebani, M. (2001). Labor pain effects on colostral milk beta-endorphin concentrations of lactating mothers. *Biol Neonate, 79*(2), 87-90

Clinical implications

- Babies with altered neurobehavior do not feed effectively, causing…
- Inadequate nutrition for infant
  - Risk of formula supplementation
- Milk retention in breast
  - Suppressed onset of lactation / lactogenesis
  - Maternal pain
- Undermining of mothers' confidence

Clinical implications

- Epidurals reduce / block maternal endorphins released in labor
  - unrelieved maternal pain
- Birth without labor (C/S) reduces endorphins in fetus/baby
- Epidurals & birth without labor reduce endorphin concentrations in milk
  - Unrelieved infant pain?
  - Inability to access pain-relieving effect of breastfeeding

Clinical implications

- Non-pulsatile oxytocin: reduced milk release
  - Milk retention; compromised lactogenesis
  - Inadequate infant nutrition
  - Increased risk of formula supplementation
- Suppressed oxytocin: behavioral effects
  - Reduced maternal socialization
  - Increased anxiety and aggression
  - Reduced digestion, healing
  - Reduced trust
  - Reduced facial recognition

BREASTFEEDING Just 10 Steps The Baby-Friendly Way

Elective Cesarean Surgery

Any Cesarean Surgery

Immediate Skin-to-Skin after Cesarean

Elective Cesarean: Infant respiratory problems

- Results Of 24,077 repeat cesarean deliveries at term, 13,258 were performed electively;
  - of these, 35.8% were performed before 39 completed weeks of gestation (6.3% at 37 weeks and 29.5% at 38 weeks) and 49.1% at 39 weeks of gestation. One neonatal death occurred.
  - As compared with births at 39 weeks, births at 37 weeks and at 38 weeks were associated with an increased risk of the primary outcome (adjusted odds ratio for births at 37 weeks, 2.1; 95% confidence interval [CI], 1.7 to 2.5; adjusted odds ratio for births at 38 weeks, 1.5; 95% CI, 1.3 to 1.7; P for trend <0.001).
  - The rates of adverse respiratory outcomes, mechanical ventilation, newborn sepsis, hypoglycemia, admission to the neonatal ICU, and hospitalization for 5 days or more were increased by a factor of 1.8 to 4.2 for births at 37 weeks and 1.3 to 2.1 for births at 38 weeks.
- Conclusions **Elective repeat cesarean delivery before 39 weeks of gestation is common and is associated with respiratory and other adverse neonatal outcomes.**
  - Tita, A. T. N., Landon, M. B., Spong, C. Y., Lai, Y., Leveno, K. J., Varner, M. W., et al. (2009). Timing of Elective Repeat Cesarean Delivery at Term and Neonatal Outcomes. *N Engl J Med, 360*(2), 111-120.

Elective Cesarean : Infant respiratory morbidity, fetal laceration, deaths

- "ECD is associated with greater risk for neonatal respiratory morbidity and fetal laceration and potentially decreased risk for brachial plexus injury, neonatal sepsis, intracranial hemorrhage, intrapartum asphyxia, and neonatal encephalopathy.
- Although neonatal deaths may be increased among infants delivered via elective cesarean, overall perinatal mortality may be reduced because of prevention of antepartum stillbirths.
- **To minimize potential neonatal risks in ECDs, these deliveries should not be undertaken before 39 weeks' gestation.**
- Patients considering ECD should be made aware of available data on potential risks and benefits to fetus and neonate.
  - Signore, C., & Klebanoff, M. (2008). Neonatal morbidity and mortality after elective cesarean delivery. *Clin Perinatol, 35*(2), 361-371, vi.

Elective Cesarean: Infant respiratory problems, NICU

- RESULTS: Neonates born by cesarean delivery had higher NICU admission rates compared with the VBAC group (9.3% compared with 4.9%, P=.025) and higher rates of oxygen supplementation for delivery room resuscitation (41.5% compared with 23.2%, P<.01) and after NICU admission (5.8% compared with 2.4%, P<.028).
- Neonates born by VBAC required the least delivery room resuscitation with oxygen, whereas neonates delivered after failed VBAC required the greatest degree of delivery room resuscitation.
- The costs of elective repeat cesarean were significantly greater than VBAC. However, failed VBAC accounted for the most expensive total birth experience (delivery and NICU use).
- CONCLUSION: In comparison with vaginal birth after cesarean, **neonates born after elective repeat cesarean delivery have significantly higher rates of respiratory morbidity and NICU-admission and longer length of hospital stay**.
  - Kamath, B. D., Todd, J. K., Glazner, J. E., Lezotte, D., & Lynch, A. M. (2009). Neonatal outcomes after elective cesarean delivery. *Obstet Gynecol, 113*(6), 1231-1238.

Elective Cesarean: Increased infant mortality

- RESULTS: The unadjusted **neonatal mortality rate for cesarean deliveries with no labor complications or procedures was 2.4 times that for planned vaginal deliveries.**
- In the most conservative model, the adjusted odds ratio for neonatal mortality was 1.69 (95% CI 1.35-2.11) for cesareans with no labor complications or procedures, compared with planned vaginal deliveries.
- CONCLUSIONS: The finding that cesarean deliveries with no labor complications or procedures remained at a **69 percent higher risk of neonatal mortality than planned vaginal deliveries** is important, given the rapid increase in the number of primary cesarean deliveries without a reported medical indication.
  - MacDorman, M. F., Declercq, E., Menacker, F., & Malloy, M. H. (2008). Neonatal mortality for primary cesarean and vaginal births to low-risk women: application of an "intention-to-treat" model. *Birth, 35*(1), 3-8.

Elective Cesarean: Poorer maternal health

- RESULTS: **Women requesting cesarean section experienced their health as less good (p<0.001) and were more often planning for one child only (p<0.001).**
- They more often reported anxiety for lack of support during labor (p<0.001), for loss of control (p<0.001), and concern for fetal injury/death (p<0.001).
- After planned cesarean section women in this group reported a better birth experience compared to women planning a vaginal birth (p<0.001).
- **They were breastfeeding to a lesser extent three months after birth (p<0.001).**
  - Wiklund, I., Edman, G., & Andolf, E. (2007). Cesarean section on maternal request: reasons for the request, self-estimated health, expectations, experience of birth and signs of depression among first-time mothers. *Acta Obstet Gynecol Scand, 86*(4), 451-456.

Any Cesarean: Increased Allergies / atopy

- RESULTS: After adjustment for other covariates, children born by cesarean section had 2-fold higher odds of atopy than those born by vaginal delivery (odds ratio, **2.1**; 95% CI, 1.1-3.9). In multivariate analyses birth by cesarean section was significantly associated with increased odds of allergic rhinitis (odds ratio, **1.8;** 95% CI, 1.0-3.1) but not with asthma.
- CONCLUSIONS: Our findings suggest that **cesarean delivery is associated with allergic rhinitis and atopy among children with a parental history of asthma or allergies**. This could be explained by lack of contact with the maternal vaginal/fecal flora or reduced/absent labor during cesarean delivery.
  - Pistiner, M., Gold, D. R., Abdulkerim, H., Hoffman, E., & Celedon, J. C. (2008). Birth by cesarean section, allergic rhinitis, and allergic sensitization among children with a parental history of atopy. *J Allergy Clin Immunol, 122*(2), 274-279.

Any Cesarean: Increased Risk of Asthma

- Cesarean section, with a total prevalence of 8.5%, was associated with an increased risk of asthma (odds ratio [OR], **1.79**; 95% confidence interval [CI], 1.27-2.51).
- This association was stronger among predisposed children (with two allergic parents: **OR, 2.91**; 95% CI, 1.20-7.05; with only one: OR, 1.86; 95% CI, 1.12-3.09) than in children with non-allergic parents (OR, 1.36; 95% CI, 0.77-2.42).
- The association between cesarean section and sensitization at the age of 8 years was significant only in children of non-allergic parents (**OR, 2.14**; 95% CI, 1.16-3.98).
- CONCLUSIONS: **Children born by cesarean section have a higher risk of asthma than those born by vaginal delivery**, particularly children of allergic parents. Cesarean section increases the risk for sensitization to common allergens, in children with non-allergic parents only.
  - Roduit, C., Scholtens, S., de Jongste, J. C., Wijga, A. H., Gerritsen, J., Postma, D. S., et al. (2008). Asthma at 8 years of age in children born by cesarean section. *Thorax*.

Any Cesarean: Maternal Amniotic fluid embolism

- The incidence of amniotic fluid embolism was higher with cesarean section, 5,000 of 22,937,000 (22/100,000) than with vaginal delivery, 7,000 of 89,775,000 (8/100,000) (**relative risk 2.80**, 95% CI 2.70-2.90) (**p < 0.0001**).
- CONCLUSIONS: The incidence of amniotic fluid embolism has decreased since the early 1990s. The risk is higher with cesarean section and higher in women aged > or =30 years.
  - Stein, P. D., Matta, F., & Yaekoub, A. Y. (2009). Incidence of amniotic fluid embolism: relation to cesarean section and to age. *J Womens Health (Larchmt), 18*(3), 327-329.

Any Cesarean: Higher risk of stroke

- RESULTS: The regression model indicated that, compared with patients who delivered vaginally, the hazard ratio for postpartum stroke among those who delivered by cesarean section was 1.67 times greater within 3 months of delivery (95% CI, 1.29-2.16), was 1.61 times greater within 6 months of delivery (95% CI, 1.31-1.98), and was 1.49 times greater within 12 months of delivery (95% CI, 1.27-1.76).
- CONCLUSION: Our data indicates that **cesarean section delivery is an independent risk factor for stroke**.
  - Lin, S. Y., Hu, C. J., & Lin, H. C. (2008). Increased risk of stroke in patients who undergo cesarean section delivery: a nationwide population-based study. *Am J Obstet Gynecol, 198*(4), 391 e391-397.

Any Cesarean: More lasting pain

- RESULTS: The most frequently cited postpartum difficulty was among mothers with a cesarean section, 79 percent of whom reported experiencing pain at the incision in the first 2 months after birth, with 33 percent describing it as a major problem and 18 percent reporting persistence of the pain into the sixth month postpartum.
- Mothers with planned cesareans without labor were as likely as those with cesareans with labor to report problems with postpartum pain.
- Almost half (48%) of mothers with vaginal births (68% among those with instrumental delivery, 63% with episiotomy, 43% spontaneous vaginal birth with no episiotomy) reported experiencing a painful perineum, with 2 percent reporting the pain persisting for at **least 6 months.**
- CONCLUSIONS: **Substantial proportions of mothers reported problems with postpartum pain. Women experiencing a cesarean section or an assisted vaginal delivery were most likely to report that the pain persisted for an extended period.**
  - Declercq, E., Cunningham, D. K., Johnson, C., & Sakala, C. (2008). Mothers' reports of postpartum pain associated with vaginal and cesarean deliveries: results of a national survey. *Birth, 35*(1), 16-24.

Any Cesarean: Delayed onset of lactogenesis

- Risk factors for delayed lactation were being primiparous (adjusted OR 3.16, 95% CI 1.58-6.33) and having delivered by **caesarean section** (adjusted OR **2.40**, 95% CI 1.28-4.51).
- Scott, J. A., Binns, C. W., & Oddy, W. H. (2007). Predictors of delayed onset of lactation. *Matern Child Nutr, 3*(3), 186-193.

Any Cesarean: Barrier to BF initiation

- Cesarean section was negatively related to breastfeeding initiation in multivariable logistic regression models (odds ratio**=.64**; 95% CI=0.51-0.81) after controlling for confounding variables.
  - Perez-Rios, N., Ramos-Valencia, G., & Ortiz, A. P. (2008). Cesarean delivery as a barrier for breastfeeding initiation: the Puerto Rican experience. *J Hum Lact, 24*(3), 293-302.

ACOG: new VBAC guidelines

For Release: July 21, 2010

Ob-Gyns Issue Less Restrictive VBAC Guidelines

Washington, DC -- Attempting a vaginal birth after cesarean (VBAC) is a safe and appropriate choice for most women who have had a prior cesarean delivery, including for some women who have had two previous cesareans, according to guidelines released today by The American College of Obstetricians and Gynecologists.

www.acog.org/from_home/publications/press_releases/nr07-21-10-1.cfm

Clinical Implications

- WHO: 10 – 15% probably medically justified
- ACOG: New VBAC guidelines July 21, 2010

- Plan for infant respiratory and suck problems
- Plan for delayed onset of lactation
  - Prenatal expression of colostrum from 36 weeks?
  - Begin hand-expression by 6 hours PP
- Plan for extended maternal pain
  - Most pain relievers are compatible with BF
- Assure close skilled follow up

Induction of labor

WHO: ~10% is medically justified

Chance or Choice? Induction

- This isn't new!
  - The U.S. Food and Drug Administration disapproved of elective inductions in the 1970s due to iatrogenic prematurity, overcrowded neonatal intensive care units, and huge unnecessary costs
- Increased risk of infant death
  - Kramer, M. S., Demissie, K., Yang, H., Platt, R. W., Sauve, R., & Liston, R. (2000). The contribution of mild and moderate preterm birth to infant mortality. Fetal and Infant Health Study Group of the Canadian Perinatal Surveillance System. *JAMA, 284*(7), 843-849.
- Doubled risk of Cesarean
  - Crosby, W. (2008). Elective induction of labor: part 2. *J Okla State Med Assoc, 101*(12), 369-373.

"Insufficient evidence"

- "The evidence regarding elective induction of labor prior to 41 weeks of gestation is insufficient to draw any conclusion.
- There is a paucity of information from prospective RCTs examining other maternal or neonatal outcomes in the setting of elective induction of labor."
  - Caughey, A. B., Sundaram, V., Kaimal, A. J., Cheng, Y. W., Gienger, A., Little, S. E., et al. (2009). Maternal and neonatal outcomes of elective induction of labor. *Evid Rep Technol Assess (Full Rep)*(176), 1-257.

No information on BF outcomes

- As of May 10, 2010:
- NO studies have specifically investigated breastfeeding outcomes related to induction
- Yet…

Indirect outcomes

- Synthetic oxytocin = stronger contractions
  - ↑ pressure on baby's head
  - Increased cranial molding, probably stressful
- ↑ infant pain ?
- ↑ maternal pain
  - ↑ Maternal desire for pain relief drugs
  - Reduced natural endorphins in mother & baby/fetus
- Less-mature baby
  - "Mild- and moderate-preterm birth infants are at high relative risk for death during infancy and are responsible for an important fraction of infant deaths" (Kramer, JAMA 2000)

Excess forces to baby's head

- Induction & augmentation
- Pushing on fundus
- Supine position
- Immobility
- Instruments and Cesarean
- Result: more molding; abnormal molding

More / excessive molding

- Facial and/or jaw asymmetry
  - Wall, V., & Glass, R. (2006). Mandibular Asymmetry and Breastfeeding Problems: Experience From 11 Cases. *J Hum Lact, 22(3), 328-334.*
- Torticollis
  - Stellwagen, L., Hubbard, E., Chambers, C., & Jones, K. L. (2008). Torticollis, facial asymmetry and plagiocephaly in normal newborns. *Arch Dis Child, 93(10), 827-831.*
  - Stellwagen, L. M., Hubbard, E., & Vaux, K. (2004). Look for the "stuck baby" to identify congenital torticollis. *Contempory Pediatrics, 21(May), 55.*

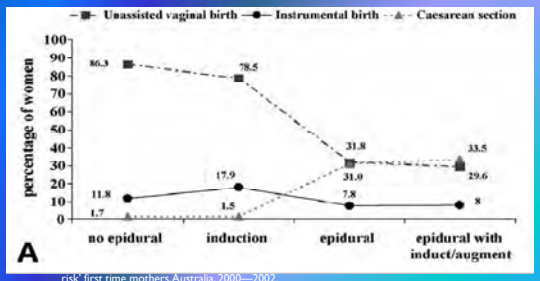
Clinical implications

- Immaturity: more respiratory problems
- Difficulty coordinating suck/swallow/breathe
- ? Effect on lactogenesis ?
  - May contribute to delayed lactogenesis
- Head pain from excess forces?
- More drugs to metabolize
- Begins a cascade of interventions
- Reduces chance for unassisted vaginal birth (Tracy)

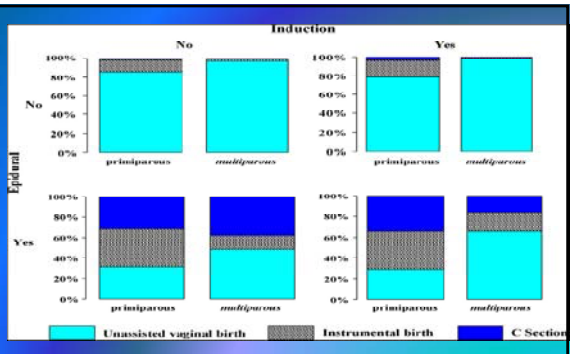
Cumulative effect of interventions

- "RESULTS: We observed increased rates of operative birth in association with each of the interventions offered during the labour process. For first time mothers the association was particularly strong.
- CONCLUSIONS: This study underlines the need for better clinical evidence of the effects of epidurals and pharmacological agents introduced in labour.
- At a population level it demonstrates the magnitude of the fall in rates of unassisted vaginal birth in association with a cascade of interventions in labour and interventions at birth particularly amongst women with no identified risk markers and having their first baby."
  - Tracy, S. K., Sullivan, E., Wang, Y. A., Black, D., & Tracy, M. (2007). Birth outcomes associated with interventions in labour amongst low risk women: a population-based study. *Women Birth, 20*(2), 41-48.

Tracy, S. K., Sullivan, E., Wang, Y. A., Black, D., & Tracy, M. (2007). Birth outcomes associated with interventions in labour amongst low risk women: a population-based study. *Women Birth, 20*(2), 41-48.



risk' first time mothers,Australia, 2000—2002.

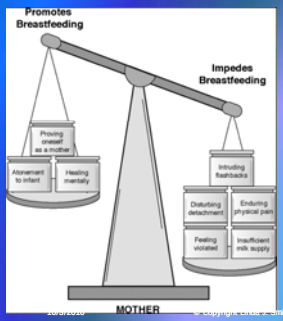


Rate of unassisted vaginal birth in association with instrumental and caesarean births amongst 'low risk' multiparous women,Australia, 2000—2002.

Traumatic birth impedes BF

- **"RESULTS**: Eight themes emerged about whether mothers' breast-feeding attempts were promoted or impeded. These themes included (a) proving oneself as a mother: sheer determination to succeed, (b) making up for an awful arrival: atonement to the baby, (c) helping to heal mentally: time-out from the pain in one's head, (d) just one more thing to be violated: mothers' breasts, (e) enduring the physical pain: seeming at times an insurmountable ordeal, (f) dangerous mix: birth trauma and insufficient milk supply, (g) intruding flashbacks: stealing anticipated joy, and (h) disturbing detachment: an empty affair.
- **CONCLUSIONS**: The impact of birth trauma on mothers' breast-feeding experiences can lead women down two strikingly different paths. One path can propel women into persevering in breast-feeding, whereas the other path can lead to distressing impediments that curtailed women's breast-feeding attempts."
  - Beck, C. T., & Watson, S. (2008). Impact of birth trauma on breast-feeding: a tale of two pathways. *Nurs Res, 57*(4), 228-236.

Birth Trauma and Breastfeeding



- Beck CT, Watson S. Impact of birth trauma on breast-feeding: a tale of two pathways. *Nurs Res.* Jul-Aug 2008;57(4):228-236.

Prevent or Reduce Complications

Level the playing field through evidence-based policies

BFHI 2006: added "Mother-friendly care" to Steps 2 & 3

- Continuous companion in labor
- Light foods & fluids during labor
- Move about freely including delivery
- Non-drug pain relief
- Avoid unnecessary interventions

Companion of the Mother's Choice

No study has confirmed the safety and efficacy of laboring alone

How did we get here?

- Women have always had labor companion(s)
- Obstetric care replaced midwives - 1840s
- Birth moved into hospitals by the late 1940's
  - Companions prohibited – "sterile" concept
- 1980: Sosa, Kennell and Klaus' research
- Doula-training organizations multiply
- Staff reactions mostly positive

Breastfeeding Outcomes
Strongly supports breastfeeding

- Reduction in labor length & complications
  - 50% fewer Cesareans (p<.002)
  - 25% shorter labors (p<.001)
  - 30% less Pitocin inductions (P<.001)
  - 30% less analgesia, vacuum extractors
  - 40% fewer forceps deliveries
  - Less meconium aspiration, asphyxia

- Mother cares for baby as she was cared for in labor
- More exclusive breastfeeding
  - More flexible feeding interval, finds mothering easy
  - Less "feeding problems, baby with poor appetite"

Freely move about in labor and birth
"Gravity works"

No study has confirmed the safety and efficacy of horizontal and/or immobile positions for labor or birth

How did we get here?

- Women have always moved freely and usually choose upright positions for birth
- 1857: Simpson introduced ether (chloroform)
- 1913: DeLee promoted lithotomy
- 1979: Caldeyro-Barcia's research on upright positions
- Staff responses: mixed

Breastfeeding outcomes

- Horizontal position = longer 1st stage, poorer fetal oxygenation
- Horizontal position = longer 2nd stage, excess molding, more fetal distress, more instruments & surgery
- Long labors = delayed lactogenesis (Chen)
- No direct research on BF outcomes

Freely move about (Gravity works)
No direct research re: breastfeeding

Ohio, USA home birth (LJS)

Cambodia, hospital birth (MK)

Eat and Drink Freely
"Labor is work"

No study has confirmed the safety and efficacy of withholding food and drink during labor and birth

How did we get here?

- Women have always consumed food and drink until hard labor begins and liquids thereafter
- 1857: Simpson introduced ether (chloroform)
- 1946: Mendelson studied gastric aspiration
  - 44,016 births with general anesthesia
    - 66 aspirations (0.15%) (40 aspirated liquid, 5 aspirated food)
    - 2 deaths (0.005%) (probably from solid food)
- *This was **before** intubation, cricoid pressure, H2 antagonists, regional anesthesia, and training of OB anesthesiologists was widespread*

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Light eating & drinking in labor
No direct research re: breastfeeding

- Labor is vigorous exercise / work
- Fasting & starvation slows, complicates labor
- "Most obstetric anesthesiologists agree that a rigid NPO policy in labor is no longer appropriate"
  - O'Sullivan, *Anesthesiol Clin North America* 2003
- "Consumption of a light diet during labour did not influence obstetric or neonatal outcomes in participants, nor did it increase the incidence of vomiting."
  - O'Sullivan, BMJ 2009

Cambodia 2001- Offering oral fluids was "new" policy for these midwives (MK)

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2009 Policy changes

- "The oral intake of modest amounts of clear liquids may be allowed for patients with uncomplicated labor. The patient without complications undergoing elective cesarean delivery may have modest amounts of clear liquids up to 2 hours before induction of anesthesia.
  - ACOG Committee on Obstetric Practice (2009). ACOG Committee Opinion No. 441: Oral intake during labor. *Obstet Gynecol, 114*(3), 714.

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Breastfeeding outcomes

- When liquids are prohibited, IV hydration is given
  - ***60% of mothers with pitting edema had delayed onset of lactogenesis II***
  - ***IV fluids, induction, Cesarean, and other interventions were associated with edema***
  - Nommsen-Rivers, L. A., Chantry, C. J., Peerson, J. M., Cohen, R. J., & Dewey, K. G. (2010). Delayed onset of lactogenesis among first-time mothers is related to maternal obesity and factors associated with ineffective breastfeeding. *Am J Clin Nutr. (e-pub ahead of print)*
- Indirect Maternal Risks
  - Psychological risks
  - Pain & stress
  - Restriction of movement
- Indirect Newborn Risks
  - Electrolyte imbalances
  - Fluid overload, excess loss of birth weight
  - Separation from mother
  - Disruption in early breastfeeding

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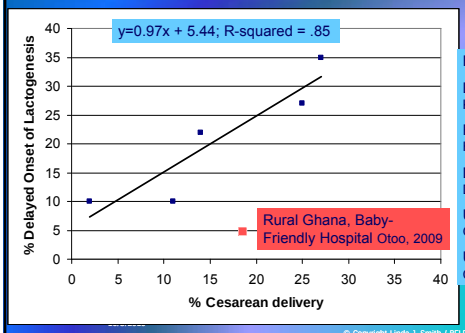
Ecologic analysis of delayed onset of lactogenesis by birth setting (Nommsen-Rivers, Dewey, et al., *JOGNN* 2009)



From L to R:

Lusaka, Zambia Kasonka, 2002

Rural Guatemala Hruschka, 2003

Davis, California Dewey, 2003

Urban Guatemala Grajeda, 2002

Urban Connecticut Chapman, 1999

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For Breastfeeding to Succeed

- The baby is able to feed: able to cue, suck, swallow, and breathe smoothly
- The mother is producing milk and willing to bring her baby to breast many times a day
- Breastfeeding is comfortable for both
- Surroundings support the dyad

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Practice changes

Use 10 Steps to implement birth reform

- Breastfeeding saves lives – OR, more accurately, "formula-feeding is risky"
- Sympathy for the BABY currently outranks caring for the MOTHER (*I don't like this either*)
- BFHI is well-supported globally & in the USA and now includes 'Mother-friendly Module'
- We've tried "birth reform" from the birth angle for 30+ years, and we're losing!

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Baby Friendly Hospital Initiative

- Roots: WHO code, 1981; UNICEF launch 1992
- 2006: major revision integration and expansion
  - Collaboration with MPS, NHD, CHD at WHO
- May 2010: 20,000 hospitals in 156 nations
  - WHA Resolution passed on IYCF
- Sept. 15, 2010: 99 facilities in the USA
- WHO: "Best Practice" intervention
- Internet: www.unicef.org/nutrition/index_24850.html

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Effect on birth practices

- Ukraine: "When MFM was introduced, the OB community changed practices 'from the top down' in 6 months"
  - *Dr. Elena Sherstyuk and Dr. Lidiia Romanenko, June 2008*
- Washington DC: Neonatologist took OB's to task for "too many 37-weekers in my NICU" – and inductions dropped!

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Reports from BFUSA

- "Several hospitals have reported that the process of making improvements with such positive outcomes became addictive, and caused them to think about what other improvement processes they could implement to further mother-baby health."
  – Cindy Turner-Maffei, BFUSA, April 2009

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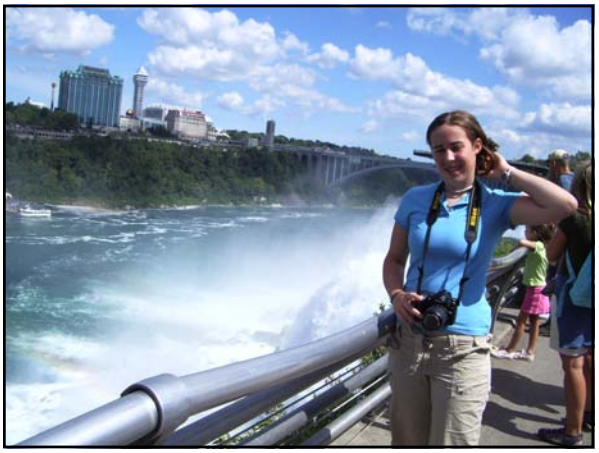

Recovery and Restoration

Immediate, uninterrupted and sustained skin-to-skin contact

Video: *Skin-to-Skin in the First Hour after Birth*

www.healthychildren.cc

508-888-8044

Recovery and restoration

- Immediate and sustained skin-to-skin contact
  "Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour and encourage mothers to recognize when their babies are ready to breastfeed, offering help if needed." BFHI Step 4
- 24-hour rooming-in with safe bedding-in
  - BFHI Step 7
- Lactation support from skilled provider teams
- Follow-up care & support in the community
  - BFHI Step 10

Support the mother!

- Listen to mothers tell their birth story *until they don't need to tell it any longer*
- Provide sensitive lactation support as long as mother wants / needs help
- Help her start, maintain, or wind down BF
- Document, share evidence with MDs
- Other?

Role of birth professionals

- Document labor profiles of difficult breastfeeding cases
- Hold joint OB, Peds, CBE, doula, and LC discussions on problem cases and investigate the possible reasons and contributing factors for the BF difficulties
- Start a dialogue with local obstetric and pediatric nurses, midwives, and doctors
- Form / join / connect local birth & breastfeeding coalitions

Community breastfeeding activist and baby, Malawi (MK)

Use Public Health / Policy Tools

- Globally: Millennium Development Goals
- Nationally (USA)
  - 2010 / 2020 Health Goals for the Nation
  - CDC mPINC surveys www.cdc.gov/mpinc
  - CDC Breastfeeding Report Cards
  - Joint Commission Perinatal Core Measures
- Locally / professionally (this means YOU)
  - 20-hours (Step 2) training is minimum competence
- To Parents: teach effect of birth practices on BF

Summary

Use breastfeeding & BFHI to drive birth reform

Effects of birth meds, delivery, other practices on BF

Next steps toward the Future of Birth

BFHI Step 1

Have a written breast-feeding policy that is routinely communicated to all health care staff.

BFHI Step 2

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

2006:

- *Training expands to 20 hours (from 18)*
- *Orientation / training for non-clinical staff*

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BFHI Step 3

Inform all pregnant women about the benefits and management of breastfeeding

BFHI Step 4

Help mothers initiate breast-feeding within a half-hour of birth

2006:

- *Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour and encourage mothers to recognize when their babies are ready to breastfeed, offering help if needed.*

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BFHI Step 5

Show mothers how to breast-feed, and how to maintain lactation even if they should be separated from their infants

BFHI Step 6

Give newborn infants no food or drink other than breast milk, unless *medically* indicated

- *Includes no "free" supplies*
- *Formula must be purchased*

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BFHI Step 7

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

- *Includes safe bed-sharing*

BFHI Step 8

Encourage breast-feeding on demand

2006:

- *Encourage breastfeeding on cue*

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BFHI Step 9

Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants

BFHI Step 10

Foster the establishment of breast-feeding support groups and refer mothers to them on discharge from the hospital or clinic

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Stages of Change

1. There is no problem.
2. There is a problem, but it's not mine.
3. There is a problem, but I have doubts.
4. There is a problem, but I am afraid of risks.
5. I see the problem and want to find solutions.
6. We believe we can do it.
7. We can do it, and obstacles cannot stop us.
8. We were successful and want to show others.

Goals for yourself

- Learn more about breastfeeding
- 20-hour courses that meet BFHI objectives
- Join & collaborate with BF Coalitions
- Beg, borrow or buy BF textbooks
- Use free on-line resources
  - www.usbreastfeeding.org
  - www.cdc.gov/breastfeeding
  - www.wellstart.org

Summary

- Failure to breastfeed is harmful
- Cesarean surgery (planned or emergent) negatively affects breastfeeding initiation
- All labor pain-relief drugs including narcotics given via epidural negatively affect infant neurobehavior
- Cumulative effects of interventions on BF
- Mother-Friendly Practices are integrated in BFHI
- Use BFHI and breastfeeding to change birth practices

Thanks to…

- UNICEF / WHO for integrating Mother-Friendly birth practices into BFHI
- Lamaze and ICEA for inviting me here
- ILCA for support of BFHI worldwide
- Jones & Bartlett Learning (Publishers)

- **To *all y'all* for thinking about this issue from now on!**

Thank you!

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- *Impact of Birthing Practices on Breastfeeding*, 2nd Ed.
- www.jblearning.com