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Breastfeeding Update

"Good health begins with breastfeeding."

MILK SUPPLY GOALS FOR MOTHERS OF INFANTS IN THE NICU

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Nancy E. Wight MD, IBCLC, FABM, FAAP

Many mothers of NICU infants are concerned about their milk volumes and wonder how much they ***should*** be making. NICU staff members may also wonder what a normal milk supply is and whether to expect any difference for mothers of premature infants. As human milk is the "gold standard" for human nutrition, we would all like to be able to support the mothers of fragile NICU patients in providing this valuable resource. The benefits of human milk for term infants are well recognized.[1] Current research suggests that human milk may ***especially*** benefit the preterm infant.[2] Human milk provides nutrition, digestive enzymes, immunologic factors of many types, growth factors, hormones, and other bioactive factors, with new components discovered regularly.[3]

The onset of lactogenesis II (when copious milk secretion begins) occurs on days 2-3 after delivery of the placenta.[4] Expected milk volumes for healthy post-partum mothers delivering at term are shown in Table 1 below.

Hours Post Birth	Volume (mL) (SD)/24hrs	Volume mL/ pumping
24	50 (± 100)	5-15
36	120 (± 20)	5-15
48	180 (± 20)	15-25
60	340 (± 30)	30-45
72	440 (± 50)	45-60
96	600 (± 60)	45-75
Day 10-14 Post-partum		
Ideal	> 750 mL/24 hrs	90 mL/pumping
Borderline	350-500 mL/24 hrs	
Low	< 350 mL/24 hrs	

Table 1: Expected Milk Volumes for mothers of hospitalized infants. Adapted from: Hurst NM, Meier PP. Chapt 13: Breastfeeding the Preterm Infant, in Riordan J, Ed: **Breastfeeding and Human Lactation**, 3rd Ed. Jones and Bartlett, Boston, 2005 and Neville MC: Lactogenesis in women. In Jansen RG. **Handbook of Milk Composition**. San Diego, Academic Press, 1995, pg 88.

Why would a mother need to produce so much milk, especially if she has a 500-1000 gram infant? Lactogenesis I (the hormonal preparation and growth of breast tissue) starts during pregnancy.[4] Some experts suggest that the mother of an extremely preterm infant may be at a disadvantage regarding milk production as she has not had the full time for breast growth and development. Also, Lactogenesis II may be delayed in mothers of very preterm infants.[5]

Early, frequent, and effective breastfeeding or pumping appears to be the most important factor in establishing normal lactation.[6-8] Prolactin bursts associated with the infant suckling or the mother breast pumping support the continued growth of secretory tissue in the maternal breast for several weeks or months after birth.[9] If the mother's body is not requested to make and maintain a certain amount of milk from the infant's birth, it will not be available when the infant is ready to consume a larger volume. That is why it is especially important for mothers of the tiniest infants to start pumping soon after delivery.

Research has shown the importance of establishing a full milk volume (> 750 mL/24 hrs) by day 10-14 postpartum in order to have sufficient breastmilk throughout hospitalization and for breastfeeding to continue after the infant is

Continued on page 2

Inside this issue:

Feature Article: Milk Supply Goals for Mothers of Infants in the NICU	1
Book Review	3
Save the Date	3
SDCBC 2006	4
Community Spotlight	4
BF Workplace Award	5
An Opinion: Baby Vs. Pump	5
Alternative Feeding Methods	6
Domperidone Update	7
Ask the Expert: Fenugreek	9
Research Corner: Milk Volume Day 4	10

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MILK SUPPLY GOALS FOR MOTHERS OF INFANTS IN THE NICU

Continued from page 1

discharged. [6, 8] An easy way to simplify the goal amounts for mothers is to encourage them to:

- Pump 8 times in 24 hrs (to mimic the stimulation pattern of a term infant), and
- Make the goal of filling one volufeed (60 ml) per breast at each pumping session by the time the baby is 1-2 weeks old.

If the mother pumps 7-8 times in 24 hours and produces 100-120 mL per pumping, she will make approximately 700-900 mL per 24 hrs. This will give the mother a tangible goal and an easy way to remember it.

Research indicates that preterm and ill infants greatly benefit, and will be able to go home sooner by receiving their mothers' milk. [1,10] In addition, pumping and providing milk for their babies contributes to the physical and emotional recovery of the mother. [11] Unfortunately, many of these mothers are a high risk for delayed lactogenesis and/or low milk supply. Some risk factors for delayed lactogenesis II (later than 72 hours postpartum) and for low milk supply are outlined in Tables 2 and 3 below.

Table 2: Risk factors for delayed lactogenesis: [12]

- Primiparity
- Unscheduled C-section
- Maternal exhaustion during labor/delivery
- Long duration of labor
- Overweight or obesity

Table 3: Maternal conditions that may contribute to low milk supply: [12]

- Chronic illness of any type
- Autoimmune disease
- Stress
- Retained placenta
- Eating disorder
- Postpartum hemorrhage
- Renal disease
- Psychiatric illness
- Breast surgery
- Primary mammary glandular insufficiency

How can we help these mothers be successful in providing the "gift" that only they can give to their babies? Research and experience provide some best practices that we can encourage. [13]

1. Early initiation of pumping (within the first 6-12 hrs post-delivery).
2. Pumping 8 times in 24 hrs using a hospital-grade pump.
3. Breast massage and manual expression prior to pumping to facilitate the letdown reflex.
4. Pump at the infant's bedside for sensory letdown cues.
5. Use even the smallest amount of milk produced for early trophic feeds to encourage mother to produce more to help her baby.
6. Kangaroo care (skin-to-skin care) stimulates milk production, let-down and increases duration of breastfeeding post-discharge.
7. Non-nutritive tasting at the breast ("dry" breastfeeding) stimulates milk production and lengthens time of breastfeeding post-discharge.
8. Using galactogogues (eg. Fenugreek or Reglan) after evaluation by a lactation consultant when milk supply declines.
9. Keeping a record of milk production.

We can provide consistent evidence-based information and support for our patient's families so that mothers recognize the truly unique value of their milk for their infants, are successful at establishing and maintaining their milk supply, and get to successfully breastfeed their infants. For more specific information and references, see the "Improving Nutrition for the VLBW Infant" toolkits at www.cpqcc.org.

References:

1. American Academy of Pediatrics. Section on Breastfeeding. Breastfeeding and The Use of Human Milk. Pediatrics 2005; 115(2): 496-506.
2. Schanler, R.J. The use of human milk for premature infants. Pediatric Clinics of North America 2001; 48(1), 207-220.
3. Hanson, L.A. Immunobiology of human milk: How breastfeeding protects babies. Pharmasoft Publishing: Amarillo, 2004.
4. Neville, M.C., Morton, J., & Umemura, S. Lactogenesis: The transition from pregnancy to lactation. Pediatric Clinics of North America 2001; 48(1), 35-52.
5. Henderson, J.J., Simmer, K., Newnham, J.P., Doherty, D.A., & Hartmann, P.E. (September, 2004). Impact of very preterm delivery on the timing of lactogenesis II in women. Poster # 34, 12th International Conference of the International Society for Research in Human Milk and Lactation. Queen's College, Cambridge.
6. Furman, L., Minich, N., & Hack, M. Correlates of lactation in mothers of very low birth weight infants. Pediatrics 2002 109(4), e57, www.pediatrics.org/cgi/content/full/109/4/e57.
7. Smith, M.M., Durkin, M., Hinton, V.J., Bellinger, D., & Kuhn, L. Initiation of breastfeeding among mothers of very low birth weight infants. Pediatrics 2003; 111, 1337-1342.
8. Wooldridge, J., & Hall, W.A. Posthospitalization breastfeeding patterns of moderately preterm infants. Journal of Perinatal Neonatal Nursing 2003; 17(1), 50-64.
9. Cox, D.B. et al. Breast growth and the urinary excretion of lactose during human pregnancy and early lactation: endocrine relationships. Exp Physiology 1999; 84, 421-434.
10. Schanler RJ, Shulman RJ, Lau C. Feeding strategies for Preterm infants: beneficial outcomes for feeding fortified milk versus Preterm formula. Pediatrics 1999; 103(6): 1150-1157.
11. Kavanaugh KL et al. The rewards outweigh the efforts: breastfeeding outcomes for mothers of Preterm infants. J Hum Lact 1997; 13: 15-21
12. Powers N. Chapter 10: Low Intake in the Breastfed Infant: Maternal and Infant Considerations, in Riordan J, ed. Breastfeeding and Human Lactation, 3rd Ed, Jones and Bartlett, Boston, 2005.
13. California Perinatal Quality Care Collaborative, Perinatal Quality Improvement Panel, Nutritional Support of the VLBW Infant, Part 1 (2004) & Part 2 (2005), www.cpqcc.org

BOOK REVIEW

Adventures in Tandem Nursing, Breastfeeding During Pregnancy and Beyond By Hilary Flower
Reviewed by: Eyla Boies MD, FAAP

Hilary Flower went to the bookstore when she found that she was pregnant while still nursing her two year old to find out more about nursing while pregnant. She was surprised to find no mention of the topic in books about pregnancy, however, breastfeeding books gave it a "green light." She consulted her midwife and even though there was little hard data decided to continue to breastfeed. As Ms. Flower relates in the introduction, her experience with breastfeeding while pregnant and breastfeeding two was a wild ride with a series of highs and lows.

Ms. Flower's assessment of the literature is accurate in that current obstetrical texts do not address the subject of nursing while pregnant and pediatric texts do not address tandem nursing. Furthermore, most obstetricians recommend that mothers not breastfeed while pregnant due to the risk of inducing labor with the stimulation of the breast during suckling. Most women who breastfeed while pregnant usually do so without telling their obstetrician; they usually elicit the help of a friend or midwife. Most mothers who nurse both an infant and the older sibling usually do so without consulting their pediatric care provider as I learned when the mother of a four month old in for his well child visit said, "Dr. Boies you know I am still breastfeeding my 18 month old?"

As Ms. Flower recognized the contradictory advice given by medical profession as she researched the scientific literature and communicated with many experts about the safety and health issues. She also sought and received tremendous input form the "mothering universe" via email and regular mail. She received input from over 200 mothers around the world and included 224 direct quotes from 97 mothers and fathers from 10 countries in the book.

Just a few of the many difficult questions tackled include:

- Is breastfeeding putting the pregnancy at risk?
- What happens to the milk and breast while breastfeeding during pregnancy?
- How does one eat for three?
- What effects does tandem nursing have on a mother's time and emotional state?
- What effect does tandem nursing have on the relationship of the two siblings?

Hilary Flower covers all of these questions and many more in an easy to read and delightful book. It is divided into three parts with the first covering a wide range of issues and practical advice, the second covering health issues including review of some of the applicable scientific literature, and the third a compendium of mothers' stories gathered from networking. She was reassured that a healthy woman with no risk factors was probably not putting her pregnancy at risk. She was surprised when nursing became painful in the second month of her pregnancy, and that more than half of mothers committed to breastfeeding while pregnant and tandem nursing ended up weaning. Most of the "mothering universe" agrees that it is not for everyone; but if it seems right, the pregnancy is not high risk, fetus and nurslings are healthy—go for it.

Ms. Flower did not write this book to be an authoritative medical reference. Rather, she wrote it to help other mothers or those helping mothers who are breastfeeding while pregnant and tandem nursing. In addition she hopes "this collection of facts, experiences, and burning questions may be of some use to future researchers who wish to push the envelope on this important but under-researched area of human experience."

As more mothers are nursing for extended periods as recommended by the American Academy of Pediatrics and other health organizations, these

Continued on page 9

SAVE THE DATE

January 12-16, 2006 — Orlando, Florida, USA
2006 International Conference on the Theory and Practices of Human Lactation Research and Breastfeeding Management
Sponsored by Healthy Children's Center for Breastfeeding
Phone: (508) 888-8044
Email: info@healthychildren.org
Website: www.healthychildren.org

March 3-4, 2006 — Berkeley, California, USA
6th Annual Bay Area Lactation Associates Conference
Sponsored by the Bay Area Lactation Associates (BALA)
Contact: Sue Wirth Phone: (510) 524-6917
Email: BALAconference@aol.com
Website: http://www.Bayarealactation.org

July 12-16, 2006 — Philadelphia, Pennsylvania, USA
Wyndham Franklin Plaza Hotel
ILCA's Annual International Conference and Meeting:Interdisciplinary Breastfeeding Practice: Integration through Innovation

July 24-26, 2006 — San Diego, California, USA
La Leche League Physician's Seminar

September 19-22, 2006 — Niagara Falls, New York, USA
Academy of Breastfeeding Medicine's 11th Annual International Meeting

August 15-19, 2007 — San Diego, California, USA
Town & Country Resort & Convention Center
ILCA's Annual International Conference and Meeting

SDCBC 2006 MEMBERSHIP DRIVE

Your continued support is needed! Become a member.
If you are interested in becoming a member or renewing your membership for 2006, please visit our website at **www.breastfeeding.org** or contact our office for more information at 1-800-371-MILK or email sdcbc@breastfeeding.org.

What is the San Diego County Breastfeeding Coalition? The San Diego County Breastfeeding Coalition is a non-profit association whose mission is to promote and support breastfeeding through education and outreach in our community. We work with many community partners in many ways, to increase breastfeeding initiation and duration rates, thereby improving the health of our community.

SDCBC Membership Levels
Sponsor - $100 *(Business/Organization/Professional)*
Contributing Member - $50 *(Individual)*
Friends of the Coalition - any amount under **$50**

What are the benefits of being a San Diego County Breastfeeding Coalition Member? As a full member of the San Diego County Breastfeeding Coalition you will:

- Network with a growing body of people dedicated to the promotion and support of breastfeeding,
- Have access to lactation professionals and the most up-to-date breastfeeding resources,
- Receive a free supply of Breastfeeding Resource Guides in English and Spanish,
- Receive a discount for Coalition sponsored education programs,
- Have a home page or link, as appropriate, on the SDCBC's website: *www.breastfeeding.org*,
- Be listed, with a Sponsor membership, as appropriate, in the "Breastfeeding Resource Guide" without a fee.
- Receive free CME credits for Coalition meeting education programs

You can show your support of the San Diego County Breastfeeding Coalition by:

- Making a monetary contribution to support coalition activities.
- Donating your time by serving on a committee:
  - Advocacy/Political Action
  - Community Outreach
  - Fundraising
  - Membership
  - Professional Outreach
  - Research and Evaluation
- Attending Coalition meetings and providing your expertise and experience.

Interested in what we do? Attend one of our meetings! General Coalition Meetings have been held the 2nd Thursday of each odd-numbered month at Sharp Mary Birch Hospital for Women, 3003 Health Center Drive, San Diego, in the Grace Benbough Room, located on the 2nd floor, from 3:00-5:00 pm. In 2006 we will be rotating the meetings around San Diego County to enable additional participation. Please call 858-939-4175 or visit our website for locations and directions (www.breastfeeding.org).

COMMUNITY SPOTLIGHT

COMPREHENSIVE PERINATAL SERVICES PROGRAM (CPSP)
Susan Conrad RN, PHN

CPSP provides a wide range of culturally competent services to pregnant women covered by Medi-Cal. These services are available from the very beginning of pregnancy until 60 days after the baby is born. The goal of CPSP services is to decrease the incidence of complications, such as low birth weight, and to improve the outcome of every pregnancy. CPSP also aims to lower health care costs by preventing catastrophic and chronic illness in infants and children.

The program was developed from the OB Access Project, a successful perinatal demonstration project for 7,000 low-income women that operated from 1979 to 1982 in 13 California counties. Comprehensive services were shown to reduce the low birth weight rate by one-third, and to save approximately $2 in short-term Neonatal Intensive Care Unit (NICU) costs for every $1 spent. Because of these positive results, CPSP was legislated in 1984, and included as part of the Medi-Cal program in 1987. Medi-Cal managed care health plans are required to provide access to CPSP services for all Medi-Cal-eligible enrollees.

There are 62 providers in San Diego County who provide CPSP services to their clients. These services include orientation to CPSP services, an initial assessment of the client's health, nutritional status, psychological needs, and reassessments in each trimester and postpartum. The services also include interventions and follow up services in obstetrics, nutrition, health education and psychosocial services. Each client has an individual case coordinator to assist her. CPSP also will pay for prenatal vitamins and mineral supplements. Linkages with Women, Infants and Children Supplemental Nutrition Program (WIC), genetic screening, dental care, family planning, and pediatric care are also CPSP responsibilities.

CPSP providers and care coordinators have opportunities for initial and ongoing training through the state and county CPSP programs as well as ongoing technical assistance to provide high quality services. Trainings include information on promoting breastfeeding, providing support to women who choose breastfeeding, and community resources such as pump rental stations and lactation consultants.

If you are interested in becoming a CPSP provider or have questions regarding the program, you can contact the CPSP Coordinator for San Diego County: Susan Conrad, PHN, at 619-542-4053, email: susan.conrad@sdcounty.ca.gov Address: Health and Human Services Agency, 3851 Rosecrans Street (MS: P511F), San Diego, CA.

BREASTFEEDING FRIENDLY WORKPLACE AWARD

2005 Breastfeeding-Friendly Workplace Award Given to Sharp Grossmont Hospital

From left to Right: Marilyn Garner, Lois Scott, Teresa Echegaray, Nancy Wight, Maryann Cone

"Low breastfeeding rates are a serious public health challenge, particularly in certain minority communities. With scientific evidence indicating that breastfeeding can play an important role in an infant's health, the time has come for us to work together to promote optimal breastfeeding practices." *David Satcher MD, former US Surgeon General & Assistant Secretary for Health*.

The San Diego County Breastfeeding Coalition was founded to make healthcare professionals and the public more aware of the benefits of breastfeeding, the risks of artificial feeding, and to help carry forward the art as well as the science of breastfeeding. As one of the major perceived obstacles to breastfeeding is working outside the home, we have paid special attention to the needs and challenges of these women. We have tried to educate employers as to the documented benefits of breastfeeding to their bottom line: less employee turnover, less days lost from work to care for a sick child, less health care expenses, and increased employee productivity, loyalty and morale. **When an employee returns from maternity leave, she wants to be productive...and a good mother at the same time.** As part of the global campaign to generate public awareness and support for breastfeeding, each year the San Diego County Breastfeeding Coalition recognizes an employer or workplace for it's contribution to the support of it's breastfeeding employees.

Past award winners have been:

1996 - Hewlett-Packard
1997 - US Naval Medical Center, San Diego
1998 - Sea World
1999 - Qualcomm and People's Organic Foods Market
2000 - Aetna US Healthcare
2001 - City of Escondido, Kyocera America, Inc. and the San Diego Spirit (women's soccer team)
2002 - Naval Hospital, Camp Pendleton
2003 - UCSD Healthcare
2004 – Solar Turbines

This year is very special as over 30 California counties presented over 120 similar awards on the same day! This year it was our privilege to present the Breastfeeding Friendly Workplace Award to **Sharp Grossmont Hospital** for their demonstrated support of their breastfeeding staff. A dedicated pumping room has been decorated and furnished with all the essentials for comfortable and efficient expression and storage of milk; policies and procedures support staff members who wish to pump for their infants; and administration actively supports breastfeeding both for patients and staff. Accepting the award for Sharp Grossmont staff on Wednesday August 24, 2005 at the Grossmont Women's Center were Marilyn Garner RN, IBCLC and Lois Scott RN, IBCLC of the Lactation Service , Maryann Cone RN, CNO/V.P. Patient Care Services and Jeanine Pyka RN, Manager of OBGYN, parent education and lactation. We salute Sharp Grossmont for their wisdom and action in support of breastfeeding families.

AN OPINION: BABY VS. PUMP

Eve Moeran RN, IBCLC
Milkmade at Home
President, San Diego County Breastfeeding Coalition

The following question is often asked by a new mother: doesn't the baby suck better than a pump? As I spend a lot of my time weighing babies who have not been getting sufficient milk, my response is somewhat measured. When breastfeeding is going well, i.e 8 or more feedings a day, the appropriate number of stools and voids, and baby is gaining weight, the answer will be yes. In a mother who has had low milk supply, who has been pumping and keeping records, who then breastfeeds, the answer is not as certain.

In certain circumstances with a newborn baby we can only tell how much milk a baby is getting by doing pre- and post weights. It is very difficult for a new mother who wants to do the very best for her baby to grasp that there are circumstances when this gorgeous baby is not able to move milk from point A (the mother's breast) to point B (the baby's mouth). Although milk is coming from the corner of baby's mouth, and you can hear suckling, he is not always moving milk. The baby who is very fussy at breast, repeatedly pulling away, or a baby who sucks twice and falls asleep, is a baby who needs to be observed and evaluated.

The causes of failure to transfer milk can be many: a disorganized suck, a mother who will turn out in the end to have insufficient breastmilk, or a nipple that is too small or too large. We need to respond to this question carefully because there are circumstances when a breast pump will do the job the baby was unable to do at that time. The most important issue is to see this baby is fed, hopefully with his own mother's milk, by whatever method mother decides. For a discussion of alternate feeding methods, please see the article elsewhere in this issue.

ALTERNATIVE FEEDING METHODS

Nancy E. Wight MD, IBCLC, FABM, FAAP

When mothers are having trouble with their milk supply, supplements may be necessary: expressed mother's own milk, donor human milk or various artificial breastmilk substitutes. In order to give necessary additional nutrition, other feeding methods are used. Alternative feeding methods have been used throughout history with different types of feeding vessels found in many cultures.[1] The bottle and nipple have so dominated western thinking, that the use of other artificial methods of infant feeding has been largely overlooked.[2] Currently, the most common alternative feeding methods include the cup (underdeveloped countries) and the bottle (developed countries). Other techniques include finger-feeding, dropper and spoon-feeding, syringe feeding and various supplemental nursing systems. Recognizing that human infants are amazingly adaptable, the goal of **any** alternative feeding method is still to achieve or restore full direct breastfeeding wherever possible.

Nipple Preference/Confusion. Radiographic and ultrasound studies show a distinct difference between tongue and jaw movements of breast and bottle-feeding infants.[3-5] In breastfeeding, breathing is coordinated with sucking and swallowing, usually in a 1:1:1 pattern. The fast easy flow through the bottle nipple generally results in breath holding and shortened expirations.[6] Preterm infants seem to have better coordination of sucking, swallowing and breathing during breastfeeding as compared to bottle-feeding with less bradycardia and more stable oxygen saturation.[7, 8] However, in full-term infants, physiologic stability did not differ with cup and bottle-feeding, but was significantly better in breastfeeding infants with lower heart rate and respiratory rate, and higher oxygen saturations in the breastfeeding group.[9]

Nipple preference/confusion is not a new concept.[10] Neifert et al suggested a definition: "an infant's difficulty in achieving the correct oral configuration, latching technique and suckling pattern necessary for successful breast-feeding after bottle feeding or other exposure to an artifical nipple".[11] Although several hypotheses have been offered [11] it seems reasonable that breastfed infants who have difficulty in obtaining milk will be more likely to prefer bottle-feeding if given the opportunity. It is likely that the infant learns to protect his airway regardless of feeding method. The infant also adjusts to a rate of flow (bottle faster, breast slower) and may learn to prefer one to the other.

Concerns Regarding Bottle Feeding. Concerns about bottle feeding a breastfed baby include: nipple preference/confusion, breast engorgement due to incomplete emptying of the breast once supplements are given to the infant, sore nipples because of different sucking techniques, reduced milk supply due to supplementation, and an overall shortened duration of breastfeeding.[12] There is some evidence that bottle-feeding may alter the normal development of the oral cavity, as that development depends on what is contained in the cavity and the motions of the tongue and jaw.[13] Tongue thrust, malocclusions, "cross bite" and a collapsed airway with obstructive apnea have all been associated with the altered facial development from lack of breastfeeding.[14-17] Pacifiers (dummies) have also been implicated in oral maldevelopment.[18-20]

Cup-Feeding. Cup-feeding is used in several developing countries, not only by mothers who have limited access to hospital facilities, but also by pediatric units and special care nurseries.[21, 22] A 10 year experience at the University of Kansas Medical Center, reported almost 60 years ago, noted ease of feeding for the infant, less regurgitation and colic, and better weight gain with cup feeding.[23] This type of feeding arose as a way to combat "nursing/hunger strikes" and to ensure bodily contact with the mother during feeding (prevent bottle-propping in non-breastfeeding dyads), but was extended to infants with birthweights as low as 860 gm. Evidence in term [9,24-8] and preterm [25, 29-31] infants confirm that physiologic stability is maintained with cup feedings, and that apnea, bradycardia, and choking episodes were no different than with bottle feedings. Experience in the developing world and in several European neonatal and transitional care units[22, 32,33] indicates that cup feeding is a skill easily learned by pre-term infants before efficient breast or bottle feeding is possible, and at a stage in development when it has been previously assumed that gavage tubes are a necessity.[34]

Recent studies concluded that cup-feeding extended breastfeeding when > 2-3 supplementary feeds were given full-term infants [27], and that the use of cups increased the proportion of preterm infants discharged home fully breastfeeding. [31] However, the cup-fed preterm infants had a longer length of stay than their bottle-fed counterparts. [31] Although current research confirms the safety of cup feeding for term and preterm infants, more research is required to ascertain whether cup-feeding promotes a higher success rate for exclusive or any breastfeeding post discharge, and whether it has any long term effects on oral motor development.

Finger-Feeding. Finger-feeding has been used as an alternate feeding method to avoid bottles and nipples, but also to help correct a "disorganized" suck, as correct sucking technique can be rewarded with bolus of milk. [35] It has the advantage over cup-feeding that the amount fed can be measured and either the baby or the caretaker can pace the feedings. Unfortunately it appears harder to learn than the cup, is more intrusive and requires more equipment.

Droppers, spoons and syringes. Droppers and spoons have been used for supplementation and have the advantage of being inexpensive, easy to clean and easy to learn. They tend to be time consuming, messy, imprecise and extremely impractical for long-term use. Periodontal syringes have also been used either alone or with finger-feeding, but remain expensive, hard to find, hard to clean and time consuming.

Supplemental Nursing Systems. Supplemental nursing systems have the advantage of supplying appropriate supplement while simultaneously stimulating the breast to produce more milk. The end of the tubing is taped to the breast with the end at the nipple. The infant latches on to the breast and tube and siphons the supplement from a reservoir. There are various commercial versions (Lact-Aid, Medela

Continued on page 8

INCREASING MILK SUPPLY: DOMPERIDONE UPDATE

Jason Sauberan PharmD

Since our February 2004 review of domperidone [1], the US FDA has been busy dissuading patients and pharmacists who take or dispense domperidone to boost a mother's diminished milk supply.[2] Leaders in the lactation medicine community consider the FDA's actions and opinions to be dubious and unconvincing. [3,4] We agree with these criticisms and stand by our earlier endorsement of domperidone. Never-the-less, there are genuine legal complications facing patients, physicians and pharmacists who use domperidone as a galactogogue.

To dispense domperidone, a pharmacist must compound it from domperidone powder. This powder is commercially available as a raw chemical. This chemical is legal in the US. Its use in humans is not. It is thus bought and sold without any labeling describing its appropriate use in humans. This, technically, violates labeling requirements of the federal Food, Drug, and Cosmetic Act. It also means that this chemical, manufactured for use in a chemistry laboratory, of unknown purity and sterility, is the only source of domperidone in the US. Furthermore, domperidone has no official USP monograph and thus, technically, no standard exists for its appropriate preparation for use as a human drug. Finally, because domperidone is not approved for any use by the FDA, it is, technically, a new drug and can not be introduced into interstate commerce.

This all means that the pharmacist choosing to dispense domperidone is at risk of regulatory action. FDA-initiated regulatory action against a pharmacist or pharmacy may include issuing a warning letter, seizure, injunction, and/or prosecution. [5] To date, we are only aware of warning letters having been sent to a handful of pharmacies known by the FDA to be dispensing domperidone. The agency has warned these pharmacies that they *could* take more action against them but are choosing not to at this time. In addition to regulatory risk, the pharmacist who dispenses domperidone may also be in breach of the standards of pharmacy practice. Violation of the law is a *de facto* breach. If a patient were harmed from some dispensed domperidone, the pharmacist would be exposed to significant risk of professional negligence liability. As such, not every pharmacist may be willing to dispense domperidone.

It appears the FDA is currently not pursuing pharmacists or pharmacies who compound and dispense domperidone as long as they:

1. Are not engaged in interstate (web) commerce of domperidone and,
2. Can document that the physician and patient are using compounded domperidone as a "last resort" after having tried supportive measures and approved drugs, or if approved drugs are contraindicated.

While this anecdotal lack of FDA enforcement may seem like good news, there are state regulators who might not be so generous. Regulation of pharmacy compounding is shared between the FDA and the States.[5] The California Board of Pharmacy must abide by all laws, regulations and statutes, both State and Federal. Even if it is true that the FDA is selectively enforcing the law, the Board of Pharmacy may investigate and take the appropriate disciplinary action if it is determined that a licensee of the California State Board of Pharmacy has not upheld the law. If a pharmacist chooses to honor an illegal drug, even if it is in the best interest of the patient, they run the risk of disciplinary action up to and including revocation of their license.

What is a physician to do? Because of the legal risks, a steady supply of pharmacy-compounded domperidone in the US is not assured. A pharmacy that is taking the chance and dispensing domperidone this week may change their mind the next. Finding a pharmacy will always be a challenge every time a new patient presents with diminished milk supply and domperidone is indicated. For now, the domperidone sources listed on the SDCBC's fact sheet [6] are reliable. Prescribers should consider contacting the Professional Compounding Centers of America [7] for recommendations on finding a pharmacy in their area who may be able to compound domperidone.

Advising the patient to purchase domperidone from pharmacies in other countries (either via the web or through travel to Canada or Mexico) is another option, but one which may also be short lived as the FDA continues to get tough [8] on illegal medication imports. The agency has issued alerts [9] to its field personnel regarding the specific importation of domperidone.

To conclude, the supply of domperidone can be as diminished as the breastmilk supply it treats. While this may be a discouraging reality, the drug is still inexpensive and somewhat available. We encourage lactation physicians and consultants to maintain market demand for domperidone but to plan ahead and locate a source convenient to the patient prior to prescribing. In this way, prescribing domperidone is not unlike prescribing a hospital-grade breast pump for outpatient use to mothers with MediCaid. Both of these treatment decisions are met by regulatory and market roadblocks that can negatively effect lactation success.

References:

1. Sauberan J, Wight NE, February 2004 www.breastfeeding.org/articles/domperidone.html
2. FDA Talk Paper, June 7, 2004 www.fda.gov/bbs/topics/ANSWERS/2004/ANS01292.html
3. Thomas Hale PhD, Christina Smillie MD www.breastfeedingtaskforla.org/domperidone.htm
4. Jack Newman, MD, FRCPC www.breastfeeding.org/articles/domperidone_jn.html
5. Guidance for FDA Staff and Industry, Compliance Policy Guides Manual, Sec. 460.200: Pharmacy Compounding www.fda.gov/ora/compliance_ref/cpg/cpgdrg/cpg460-200.html
6. SDCBC Domperidone Fact Sheet. www.breastfeeding.org/articles/domperidone_fact_sheet.html
7. Professional Compounding Centers of America. www.pccarx.com/contact.asp
8. FDA News December 1, 2004. www.fda.gov/bbs/topics/news/2004/NEW01142.html
9. FDA Import Alert # 61-07, 6-7-04. www.fda.gov/ora/fiars/ora_import_ia6107.html

Alternative Feeding Methods continued from page 6

SNS), and homemade versions are easy to make. Supplementing at the breast encourages latch-on because of the immediate reward, encourages correct infant suckling technique, allows baby-led pacing of the feeding, as well as measurement of the amount taken. Unfortunately, most supplemental nursing systems are extremely awkward to use, hard to clean, expensive and require moderately complex learning.

Bottle feeding. Bottle-feeding itself as an alternate feeding technique can be done correctly or incorrectly. The infant should be upright or semi-upright [36] in the caregivers lap with a full view of the caregiver's face. As with breastfeeding, the lower lip should be tickled with the nipple to elicit a root and a wide-open mouth before the nipple is introduced. The infant should be allowed to pace the feeding with the bottle removed for rest pauses. Bottles should never be propped. Bottles have the advantage of being familiar, socially acceptable and less time consuming than most other methods (a cup *may* be faster). Unfortunately the flow of milk through the nipple is dependent on gravity and the size of the hole in the nipple, and not the infant's efforts, resulting in lessened infant control over the feeding.

Conclusions. When selecting an alternative feeding method we should consider several criteria: cost and availability, ease of use and cleaning, stress to the infant, whether an adequate volume of milk can be fed to the infant in 20-30 minutes, whether the use will be short term or long term, and whether the method enhances the development of breastfeeding skills. We should also recognize that feeding is not just nutrition and try to avoid the "technique of the month" approach. One method does not fit all: finger feeding may be more appropriate for a neurologically damaged infant and cup feeding more appropriate for a growing premie. This remains to be studied. One of the main advantages of supplementing **without** a bottle is the non-verbal message to parents that the alternative method is **temporary**. The bottle is often seen as the beginning of the end of breastfeeding. No method is without potential risk (including the bottle) or potential benefit. Anything less than direct breastfeeding without gadgets is an intervention.

References:

1. Fildes V: Artificial feeding, feeding vessels, the evidence from artifacts and art. Breasts, bottles and babies. Edinburgh: Edinburgh University Press, 1986, p 307
2. Baumslag N, Michels DL: Milk, Money, and Madness: The Culture and Politics of Breastfeeding. Bergin & Garvey, Westport CT, 1995
3. Nowak AJ, Smith, WL, Erenberg A: Imaging Evaluation of Breast-Feeding and Bottle-Feeding Systems. J Pediatr 1995; 126:130
4. Smith WL, Erenberg A, Nowak A: Imaging Evaluation of the Human Nipple During Breast-feeding. AJDC 1988; 142:76
5. Weber F, Woolridge MW, Baum ID: An Ultrasonographic Study of Sucking and Swallowing by Newborn Infants. Dev Med & Child Neurol 1986; 28:19
6. Mathew OP & Bhatia J: Sucking and Breathing Patterns During Breast- and Bottle-feeding in Term Neonates. AJDC 1989; 143:588
7. Meier P, Anderson GC: Responses of small preterm infants to bottle - and breast -feeding. MCN: American Journal of Maternal Child Nursing 1987; 12:97
8. Meier P: Bottle- and breast-feeding: Effects on transcutaneous oxygen pressure and temperature in preterm infants. Nursing Research 1988; 37:36
9. Howard CR, deBlieck EA, ten Hoopen CB, et al: Physiologic stability of newborns during cup - and bottle-feeding. Pediatrics 1999; 104:1204
10. Davis HV, Sears RR, Miller HC, et al: Effects of Cup, Bottle and Breast Feeding on Oral Activities of Newborn Infants. Pediatrics 1948; 2:549
11. Neifert M, Lawrence R, Seacat J: Nipple confusion: Toward a formal definition. J Pediatr 1995; 126:125
12. Righard L: Are Breastfeeding Problems Related to Incorrect Breastfeeding Technique and the Use of Pacifiers and Bottles? Birth 1998; 25:40
13. Palmer B: The Influence of Breastfeeding on the Development of the Oral Cavity: A Commentary. J Hum Lact 1998; 14:93
14. David D, Bell P: Infant Feeding Practices and Occlusional Outcomes: A Longitudinal Study. Can Dent Assoc 1991; 57:593
15. Labbock MH, Hendershot G: Does breast-feeding protect against malocclusion? An analysis of the 1981 Child Health Supplement to the National Health Interview Survey. Am J Prev Med 1987; 3:227
16. Legovic M, Ostric L: The effects of feeding methods on the growth of the jaws of infants. J of Dent for Child 1991; 58:253
17. Pottenger FM, Krohn B: Influence of breastfeeding on facial development. Archives of Pediatrics 1950; 67:454
18. Bowden B: The effects of digital and dummy sucking on arch widths, overbite and overjet A longitudinal study. Australian Dent J 1966; 11:396
19. Drane D: The effect of use of dummies and teats on orofacial development. Breastfeeding Review 1996, 4:59
20. Viggiano D, Fasano D, Monaco G, Strohmenger L. Breastfeeding, bottle-feeding, and non-nutritive sucking: Effects on occlusion in deciduous dentition. Arch Dis Child 2005; 89:1121-1123
21. Armstrong HC: Breastfeeding low birthweight babies: advances in Kenya. J Hum Lact 1987; 3:2
22. Lang S, Lawrence CJ, L'eorme R: Cup feeding: An alternative method of infant feeding. Arch Dis Child 1994; 71:365
23. Fredeen R: Cup feeding of newborn infants. Pediatrics 1948; 2:544
24. Brown SJ, Alexander J, Thomas P: Feeding outcome in breast-fed term babies supplemented by cup or bottle. Midwifery 1999; 15:92
25. Malhotra N, Vishwambaran L, Sundaram KR, et al: A controlled trial of alternative methods of oral feeding in neonates. Early Hum Dev 199; 54:29
26. Schubiger G, Schwartz U, Tonz O: UNICEF/WHO baby-friendly hospital initiative: does the use of bottles and pacifiers in the neonatal nursery prevent successful breastfeeding? Eur J Pediatr 1997; 156:874
27. Howard et al. Randomized Clinical Trial of Pacifier Use and Bottle-Feeding or Cupfeeding and Their Effect on Breastfeeding. Pediatrics 2003; 111(3):511-518
28. Kramer MS et al. Promotion of breastfeeding intervention trial (PROBIT): a cluster-randomized trial in the republic of Belarus. JAMA 2001; 285:1-15
29. Gupta A, Khanna K, Chattree S: Cup feeding: an alternative to bottle feeding in a neonatal intensive care unit. J Trop Pediatr 1999; 45:108
30. Marinelli et al. A Comparison of the Safety of Cupfeedings and Bottlefeedings in Premature Infants Whose Mothers Intend to Breastfeed. J Perinatol 2001; 21(6):350-355
31. Collins CT, Ryan P, Crowther C et al. Effect of bottles, cups, and dummies on breast feeding in preterm infants: a RCT. BMJ, doi:10.1136/bmj.38131.675914.55 (published 18 June 2004)
32. Jones E: Breastfeeding in the pre-term infant. Modern Midwife 1994; 4:22
33. Moody J: A revolution in baby feeding. New Generation. 1993; 12:9
34. Steer PA, Lucas A, Sinclair JC: Feeding the low birthweight infant. *In* Sinclair JC, Bracken M (eds): Effective care of the newborn infant. Oxford: Oxford University Press, 1992, p 125
35. Oddy WH, Glenn K. Implementing the Baby Friendly Hospital Initiative: the role of finger feeding. Breastfeed Rev,2003; 11(1):5-10.
36. Tully SB, Bar-Haim Y, Bradley RL: Abnormal tympanography after supine bottle feeding. J Pediatr 1995; 126:105

ASK THE EXPERT: Fenugreek as a Galactogogue(Lactation Stimulant)

James G. Murphy, MD, trained in general pediatrics at the Naval Medical Center, San Diego, had the honor of serving as a Naval Medical Officer for 25 yrs retiring in 1995, and continues to serve as a General Pediatrician and Level 1&2 Nursery Attending at NMC San Diego. Dr Murphy maintains a special interest in immunization science and practice and promotion of breastfeeding, as a board member of the SDCBC.

The herb, Fenugreek, also known as Greek Hay or Greek Hay Seed, has been used since Biblical times to increase the production of milk for nursing and has been used safely for these thousands of years as a common ingredient of curry. More recently it is the main ingredient in imitation Maple Syrup and causes the urine and sweat to smell like Maple Syrup. Studies are currently underway to define the nature of this galactogogue effect. Until these studies are published, the only available information is from the experience of practitioners of various medical disciplines. Anecdotal evidence abounds of nursing mothers who had minimal milk supply until beginning Fenugreek then suddenly became engorged. Not everyone responds this way and side effects of nausea and GI distress in some appear to be dose dependent and may limit its use. The seeds of the plant are dried, ground and put into capsules of 500 mg to 610 mg available from a variety of web pharmacies and herbal stores. As the FDA does not monitor this herbal supplement, there are no true standards for measuring the actual amount of active ingredients in each brand of Fenugreek nor any guarantee of purity (absence of harmful contaminants). For this reason, authors recommend purchasing only from well-known reputable sources. Typically a bottle of 100 capsules costs $6-8 US.

The amount needed to effectively increase lactation in those for whom it is effective is 1000-5500 mg per day averaging 2 capsules three times per day. It has been suggested that when the mother's urine has clearly detectable Maple Syrup odor, this is the right dose and an increase in milk supply will occur within 2 days. Some authors note that milk flow, once established, can be maintained by frequent nursing and pumping without continuing the herb, while others note a decrease in the milk supply when the dose is reduced. This is apparently an individual response determined by trial and error. Only the dried seed in capsule form has been effective in effecting an increase in milk supply. The tea made from Fenugreek is not sufficiently potent and tastes rather bitter. The infant ingesting breastmilk from a mother who is taking Fenugreek may also smell like Maple Syrup and any physician providing care to this infant should be made aware of this as a genetic disease known as Maple Syrup Urine Disease has the same odor and is a serious problem while Fenugreek is benign.

While this herbal medication appears to be quite safe, there are precautions as there are several possible side effects including the lowering of blood sugar. This does not seem to be a problem for those with normal glucose metabolism but can be risky for someone with diabetes on treatment with oral or injectable medications. The herb is high in fiber which can be beneficial to some and cause diarrhea in others. There is an antigenic similarity to peanuts; thus those with severe peanut allergy should not take this herb. Those on anticoagulant medication must use this herb only with careful monitoring by their doctor as it also has "blood thinning" capability. As there is significant stimulation of the uterus, it should **never** be taken by a pregnant woman but may be beneficial in the postpartum period. There are reported benefits to the immune system and in protection against colon cancer. In much larger doses, Fenugreek has been shown to lower "bad cholesterol" (LDL) by inhibiting its absorption and does not lower "good cholesterol" (HDL). While depression has been associated with Reglan when used long term to stimulate lactation, this has not been described with Fenugreek.

Thus this appears to be a very safe herbal medication for most individuals, must be used with caution in some, and never in others. If you have any medical problems, consult your physician before taking this or any other herbal medication. The information provided in this article is intended to be for general understanding only and is not intended to serve as medical advice for any individual.

References:

1. Herbs and Breastfeeding, Ruth A. Lawarence, MD www.breastfeding.comreading_room/herbs.html
2. Baylor College of Medicine www.bcm.edu/cnrc/consumer/archives/fenugreek.htm
3. www.divine-herbs.com/id23.html
4. Up To Date at www.utdol.com/

Book Review continued from page 3

issues will be confronted more commonly. Even though the randomized controlled clinical trial is the gold standard by which we, as medical providers, are taught to evaluate medical information; we can use works such as this to give us insight into topics not otherwise covered in authoritative texts. It is a fun read with loads of practical advice and tales from mothers with much to share and also a critical look at the limited scientific data on the issues. I recommend it for medical providers dealing with mothers who are or are contemplating nursing while pregnant and/or tandem nursing.

Breastfeeding Update

"Insufficient Milk Supply"

SDCBC's Newsletter for November 2005
Volume 5, Issue 3

San Diego County Breastfeeding Coalition

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RESEARCH CORNER

Milk Volume on Day 4 and Income Predictive of Lactation Adequacy at 6 Weeks of Mothers of Nonnursing Preterm Infants. Hill PD, Aldag JC. J Perinatal Neonat Nurs 2005: 19 (3):273-282

Mothers of preterm infants who are dependent on breast pumps are at high risk for difficulty in maintaining an adequate milk supply. Eighty-one mothers of preterm infants ≤ 1500 g and ≤ 31 weeks who planned to lactate at least 12 weeks were recruited from 4 tertiary care NICUs. Basic demographic and perinatal data were collected and mothers recorded milk pumping times and volumes in a logbook. Mothers were instructed to express milk at least 8 times per day for a minimum of 10 minutes or until one breast was no longer dripping, then for another 2 minutes.

Adequate milk volume was defined as ≥ 500 mL/day at week 6. When compared to the mothers with adequate milk production, the mothers with inadequate milk production delivered significantly earlier (27 vs 28 wks, p 0.045), had lower infant birth weight (936 vs. 1108 g, p 0.004), began breast stimulation later (28 vs 21 hrs, p 0.046), fewer had decided to breastfeed prior to pregnancy (54% vs. 80%, p 0.019), fewer engaged in skin-to-skin care (32% vs. 65%, p 0.006) and fewer had income levels ≥ $50,000 (37% vs. 53%, p 0.023). While controlling for income, the 27 mothers with lowest milk production (< 140 mL/day) at 4 days were 9.5 times more likely to have an inadequate milk production at week 6 than the 54 mothers with higher milk production. Controlling for day 4 milk production, lower annual income mothers (< $50,000) were 5 times more at risk of inadequate milk production than those with higher income (≥ $50,000) at week 6.

This study underscores the importance of establishing a full milk supply in the early days of lactogenesis. Day 4 milk volume, along with income, are important predictors of milk adequacy at week 6.

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