



How the Breast Makes Milk

Learning Objectives

- Identify how the breast makes milk.
- Explain indications for expression of milk.
- Understand different mechanics of expression.
- Identify milk collection and storage guidelines.
- Explain different ways to troubleshoot common problems.

Mammogenesis

- Breast development begins during first weeks of fetal gestation
- Next major development during puberty

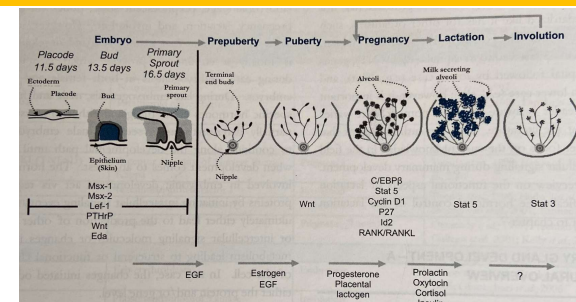


Figure from Hale & Hartmann, 2007

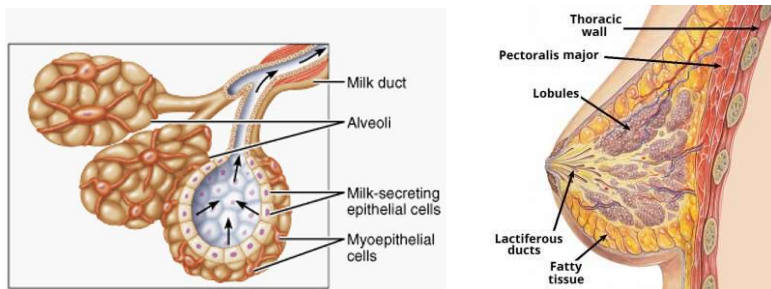
Mammogenesis in Early Pregnancy

- Estrogen – ductal system
- Progesterone – lobes and alveoli
- Prolactin – nipple growth
- Placental lactogen – areolar growth

Transition of breast from
non-secreting organ to secreting organ

Lactogenesis I

- Lactogenesis I = capacity of mammary gland to secrete milk from mid-pregnancy to late pregnancy
- Lactation occurs after 16 weeks of pregnancy
- Lactogenesis I continues until 2-3 days after birth



Medcaretips.com



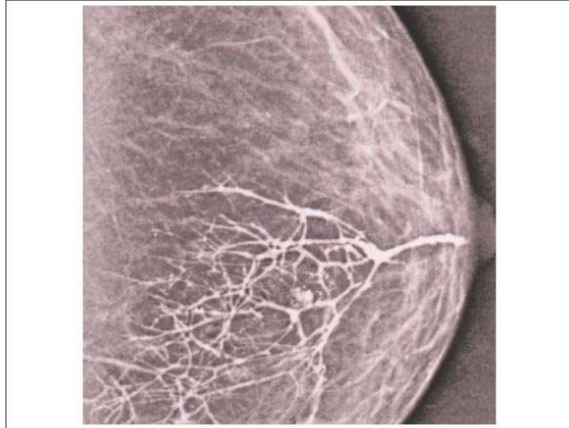
BabyCenter Australia

Colostrum

- Increased protein
 - Higher concentration of immunoglobulins
 - Overall dose to baby = 1 g/day
- Decreased fat
- Decreased lactose
- Low water/fluid volume

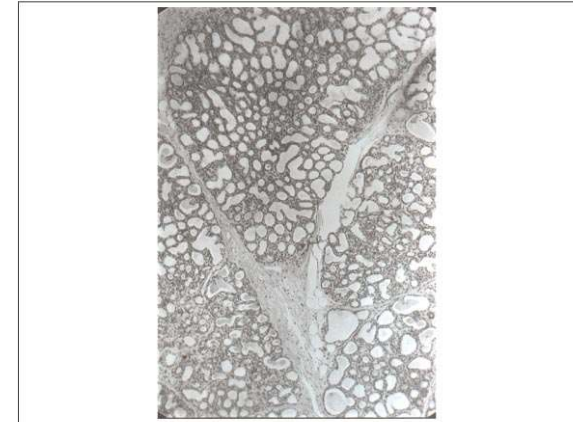
Milk ducts and ductules

Figure A.01



Milk droplets

Figure A.07



Lactogenesis II

- Onset of copious milk secretion after birth
- Milk volume increases rapidly, then abruptly levels off
- Triggered by a rapid drop of progesterone after delivery of placenta
- Occurs 2-3 days after birth

Secretory activation with delivery of placenta

Transitional-Mature Milk

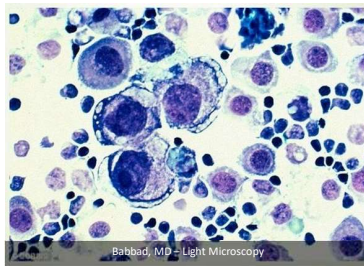
- Lower protein concentration
 - Overall dose to baby = 1 g/day
- Higher fat
 - Most recently made milk (end of feeding)
- Higher lactose
 - Less recently made milk (start of feeding)
- Higher water concentration (>85%)



Breastmilk at the beginning and end of a pumping session.
KellyMom.com. Photo used with permission.

Milk is a Bioactive Substance

- Immunoglobulins
 - Secretory IgA, IgG, IgM, IgD, IgE
- White blood cells
 - T & B cells, neuts, lymphs, macrophages
- Enzymes - lactase
- Lactoferrin
- Oligosaccharides
- Hormones



Delayed or Impaired Lactogenesis

Cesarean birth

Diabetes, type I

Obesity

Polycystic Ovary Syndrome (PCOS)

Hypertension

Stress

Retained Placenta

Postpartum Hemorrhage

Lactogenesis II

- Continued milk production
- What is it dependent on??
 - MILK REMOVAL
- Reflects infant's appetite rather than mom's ability to make milk
 - "supply and demand"



OBRC

Indications for Expression of Milk

Indications for Expression of Milk

- Delayed initiation of breastfeeding
- Interruption of breastfeeding
- Decreased milk supply
- Relief of engorgement
- Donating to a milk bank



Mannet, NICU OU Medical

Automatic Electric Pumps

- Double-pumping → ↑ milk collection
- Best for mothers working full-time
- Best for sustaining milk production (NICU moms)
- Faster pumping
- Less chance of injury

Hand Expression

- Most common form of milk expression
- Is more effective for expressing colostrum
- When mechanical breast pump not available
- Useful for stimulating milk ejection reflex (MER) before using mechanical pump
- When used after pumping, more effectively drains the breast: “hands-on pumping”

Milk Collection

Initiating and sustaining milk production for a preterm/sick infant:

- Initiate pumping w/in 6 hours of delivery
 - Consider starting with hand expression
- Double-pump with a hospital grade breast pump
- Stimulate MER (breast massage, heat,...)
- Hands-on pumping!
- Pump 8-10 times/day for 10-15 min each
- Practice kangaroo care daily

Pumping FAQs from moms

- ***When do I count the start of a pumping session?***

Pumping time starts from beginning of last session to beginning of next session

- ***How often do I need to clean/sanitize my pump parts?***

Sanitize pump once per day, rinse well after each use during the day

- ***Should I take some type of herbal supplement to increase my milk supply?***

There is no evidence to support, some will exclude you as a milk donor

Average Infant Intake

- Day 1: 2-10 ml/fdg
- Day 2: 5-15 ml/fdg
- Day 3: 15-30 ml/fdg
- Day 5: 30-60 ml/fdg

- ABM Protocol #3: Supplementary Feedings in the Healthy Term Breastfed Neonate 2017

Average Milk Volumes

PP Dy 1: 40 - 120 ml

PP Dy 2: 100 - 200 ml

PP Dy 3: 200 - 400 ml

PP Dy 5 – 10: 500 ml (~ 1oz/brst q 3 hrs)

By 1 month postpartum, most mothers are producing 700-800 ml/day.

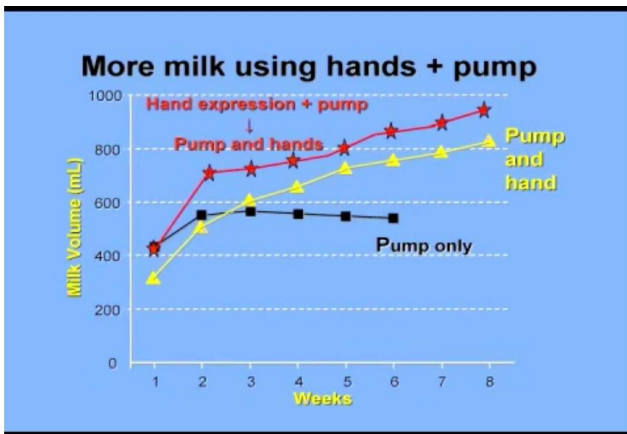
- ABM Protocol #3: Supplementary Feedings in the Healthy Term Breastfed Neonate 2017

Low or Decreasing Milk Production

- Insure frequent pumping (8-10x/day)
- Tips to elicit milk release
 - Relaxation tips
 - Breast massage, heat
 - Kangaroo care w/ baby
- Fatigue, stress, pain, anxiety/depression
- Rule out maternal medications
- Insure effective type of pump
- Hands-on pumping!



Mannel, OU Medical Center



Optimal Breastfeeding Care in the Hospital

Becky Mannel, MPH, IBCLC, FILCA
 Clinical Professor, University of Oklahoma Health Sciences Center
 Director, Oklahoma Breastfeeding Resource Center

OKLAHOMA PERINATAL NURSES FORUM

Pain with Pumping

- Ensure proper flange fit
- Decrease length of pumping sessions
- Decrease vacuum
- Ensure vacuum is released or interrupted during pumping sessions
- Rule out infection



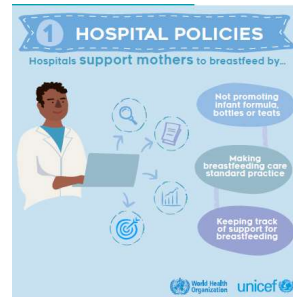
Mannel, OU Medical Center

Learning Objectives

Identify	Identify at least two of the Ten Steps to Successful Breastfeeding.
Describe	Describe the International Code of Marketing of breastmilk substitutes.
List	List two benefits of skin-to-skin contact.
Name	Name one resource for breastfeeding support after hospital discharge.

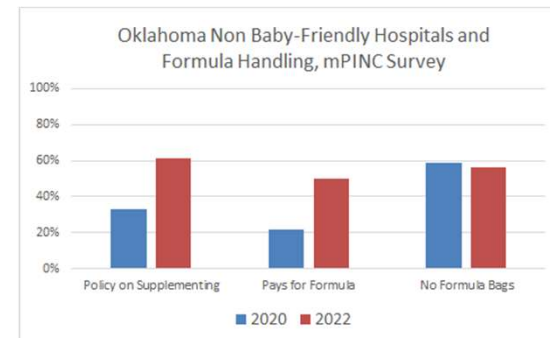
Step 1a

Comply fully with the International Code of Marketing of Breast-milk Substitutes and relevant World Health Assembly resolutions.



Step 1b

Have a written infant feeding policy that is routinely communicated to staff and parents.



More than half of parents and pregnant women exposed to aggressive formula milk marketing – WHO, UNICEF

New report details exploitative practices employed by \$55 billion formula industry, compromising child nutrition, violating international commitments

22 February 2022 | News release | Geneva | Reading time: 4 min (1055 words)

It uncovers systematic and unethical marketing strategies used by the formula milk industry – now worth a staggering US\$ 55 billion – to influence parents' infant feeding decisions.

Step 2

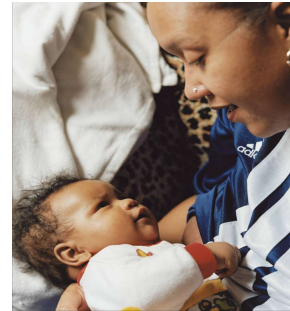
Ensure that staff have sufficient knowledge, competence and skills to support breastfeeding.



OB/GYN Department, OUHSC 2014

- *No requirements for education on human lactation in nursing schools*
- *Most medical schools & residency programs have no formal curriculum on breastfeeding & lactation.*

Prenatal Education



- Increases initiation rates
- Increases duration rates

Step 3

Discuss the importance & management of breastfeeding with pregnant women and their families



Mannell, OU Medical Center

OBRC's Online Breastfeeding Session for Families

https://obrc.ouhsc.edu/Families/Online_Patient_Education

- This is an interactive session with all the info you need to know about breastfeeding!
- Move at your own pace and review this session as much as you want!
- Also available in PDF! [Click here for English](#). [Click here for Spanish](#).

The Oklahoma Breastfeeding Resource Center
invites you to take our FREE online lesson



Step 4



Facilitate immediate and uninterrupted skin-to-skin contact and support mothers to initiate breastfeeding as soon as possible after birth.

OABC

Step 5

Support mothers to initiate and maintain breastfeeding and manage common difficulties.



Oxytocin-Stress Connection

- Oxytocin has anti-stress-like effects
 - ↓ blood pressure & cortisol levels
 - ↑ pain thresholds
 - Stimulates various types of positive social interaction
 - Promotes growth and healing

• 2005 Uvnas-Moberg & Peterson

Most effective = 1:1 teaching

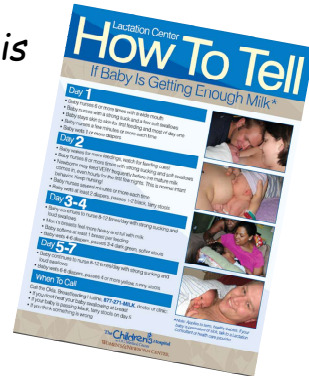
- 1:1 teaching, hands-on
- Videos
- Written information
- Prenatal Education!



Postpartum Teaching

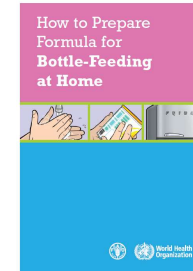
• "How do I know if my baby is getting enough milk?"

- S/S adequate intake:
 - Audible swallowing
 - Stool changes!!



Step 5 What about formula feeding moms?

Mothers who feed formula should receive written instruction, not specific to a particular brand, and verbal information about safe preparation, handling, storage, and feeding of infant formula.



Perceived Insufficient Milk

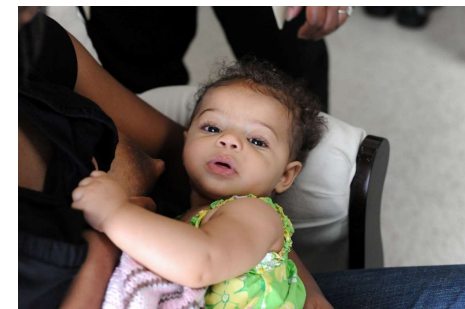


"I didn't have enough milk"

**is the #1 reason
worldwide that
mothers wean
prematurely**

Step 6

Do not provide breastfed newborns any food or fluids other than breast-milk, unless medically indicated.



US Breastfeeding Committee

Medical Recommendation for Breastfeeding Duration

- Exclusive breastfeeding (EBF) for 6 months
- Continued breastfeeding to age of 2 years or more
 - Adding age-appropriate complementary foods

American Academy of Pediatrics, 2022:
"continuation of breastfeeding for 2 years or longer as mutually desired by mother and infant"



Step 7

Enable mothers and their infants to remain together and to practice rooming-in 24 hours a day.



Mannet, OU Medical Center

"How did you get the formula for your baby the first time your baby was given formula in the hospital?"

28.1% - I asked for the formula



23.2% - Formula was in my room without me asking for it

28.0% - Staff brought me formula without me asking for it

20.8% - Staff fed my baby formula without me asking for it

CDC

Texas WIC Infant Feeding Practices Survey 2013

Step 8

Support mothers to recognize and respond to their infants' cues for feeding.



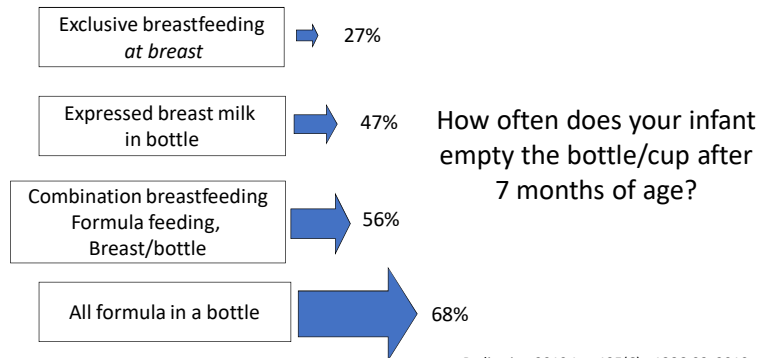
Feed on cue of baby - any sign of hunger cues

No time limits on breast

Avoid "scheduled" feeds - baby sets the schedule

Keep sleepy babies skin to skin

Breastfeeding Leads to Self-Regulation



Pediatrics. 2010 Jun;125(6):e1386-93. 2010.

Step 10

Coordinate discharge so that parents and their infants have timely access to ongoing support and care.



Step 9

Counsel mothers on the use and risks of feeding bottles, artificial nipples (teats) and pacifiers.



Resources in the Community



OBRC

- Oklahoma Breastfeeding Hotline
 - 877-271-MILK
 - Text OK2BF to 61222
- IBCLCs in your community
 - [LC Resource Guide](#)
- Children First nurses
- La Leche League
- WIC Breastfeeding Peer Counselors
- Mother support groups, Integris Milk Bars

Moms' Milk Circle
(Círculo de Leche de Mama)

Hosted by Oklahoma Breastfeeding Resource Center

The Oklahoma Breastfeeding Resource Center invites you to join
 El Centro de Recursos de Lactancia Materna de Oklahoma le invita a unirse al



Moms Milk Circle

Join us on Zoom:
1st Tuesdays at 12pm
3rd Thursdays at 12pm



SCAN TO REGISTER

A free virtual breastfeeding support group created to uplift, inform, and inspire nursing moms just like you!

What to Expect:

- Caring, expert-led info from lactation consultants
- Meet fellow moms
- Live, judgment-free zone
- Open Question and Answer time
- Access to free resources



Círculo de la leche de mamá

Unirse en Zoom:
2do Martes del Mes a las 12pm



ESCANEA PARA REGISTRARTE

Un grupo virtual gratuito de apoyo a la lactancia materna creado para elevar, informar e inspirar a mamás lactantes como tú.

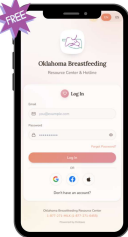
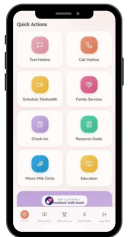
Qué puedes esperar:

- Información útil y experta de consultoras de lactancia
- Conoce a otras mamás
- Espacio en vivo y libre de juicios
- Tiempo abierto para preguntas y respuestas
- Acceso a recursos gratuitos

Oklahoma mPINC 2024 Data	
Measure	Oklahoma Hospitals with Ideal Response
Routine newborn exams, procedures, and care occur in the mother's room	39%
When breastfeeding mothers request infant formula, staff counsel them about possible consequences	32%
Few breastfeeding newborns receive infant formula	29%
Nurses are required to demonstrate competency in assessing breastfeeding (milk transfer & maternal pain), assisting with breastfeeding (position & latch), teaching hand expression & safe formula preparation/feeding, & demonstrating safe skin-to-skin practices.	66%
Hospital does NOT give mothers any of these items as free gifts or samples: Infant formula; feeding bottles/nipples, nipple shields, or pacifiers; coupons, discounts, or educational materials from companies that make/sell infant formula/feeding products	58%

Download the OK BF App
From the Oklahoma Breastfeeding Resource Center & Hotline

All of our **FREE** services and more in one place!

Search "OK BF" in your app store or scan the QR Code

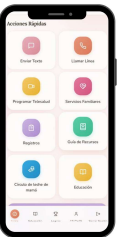
All services are offered by breastfeeding experts, International Board Certified Lactation Consultants.





Descarga la aplicación OK BF
Del Centro de Recursos de Lactancia Materna de Oklahoma y la Línea Directa

¡Todos nuestros servicios **GRATIS** y más en un solo lugar!

Busca "OK BF" en tu tienda de aplicaciones o escanea el código QR

Todos los servicios son ofrecidos por expertos en lactancia, consultores en lactancia certificados por la Junta Internacional.





OK BF
Mobile App

