

## Best Start for Preterm Babies: Human milk

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### Description of Session

Human milk is the healthiest choice for human babies. When a baby is born early, they need this optimal nutrition even more. This session will outline the potential options for human milk if mother's own breastmilk is not available. The session will differentiate between the types of human milk banks. The research on why human milk is so critical for preterm babies will be explored. Finally, the processes of donating human milk and obtaining human milk will be presented.

### Outline

- Preterm birth rates are slowly dropping. In 2013, the number of preterm birth was 11%.
  - Black mothers have the highest number of preterm births. 16.5% of preterm babies born were born to black mothers in the US in 2014. <http://www.marchofdimes.org/materials/premature-birth-report-card-united-states.pdf> According to the CDC this rate in 2013 was 16.26%. [http://www.cdc.gov/nchs/data/nvsr/nvsr63/nvsr63\\_02.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr63/nvsr63_02.pdf)
  - Black mothers are also more like to have a baby with a low birth weight, 13.08% of LBW babies were born to black mothers in 2013. [http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64\\_01.pdf](http://www.cdc.gov/nchs/data/nvsr/nvsr64/nvsr64_01.pdf)
1. The learner will be able to differentiate between informal human milk sharing, for-profit human milk banking, and non-profit human milk banking.
    - a. Informal milk sharing
      - i. levels
        1. Sister to sister, best friend, cousin- In person, close relationship
        2. Friend of a friend- Referral system
        3. Internet- No personal connection
      - ii. Major concerns for preterm babies
        1. Bacteria
        2. CMV?
    - b. For profit human milk banks
      - i. Often pose as altruistic
      - ii. Look as if they are a public service
      - iii. Sometimes offer pumps and storage bags
      - iv. Products are very expensive
        1. Human milk human milk fortifier- Prolacta
        2. Powdered human milk- Medolac
    - c. Non-profit human milk bank- HBANA Human Milk Banking Association of North American
      - i. Developed in 1985
      - ii. Community banks vs. hospital banks
      - iii. Do not pay for donated breastmilk
      - iv. Do screenings of mothers
      - v. Donated breastmilk held in very cold freezers, at least -20\* C, monitored by alarms for temperature, cold temperature to CMV growth and decrease bacterial replication
      - vi. Pasteurize breastmilk
        1. Holder Pasteurization 62.5\* C for 30 minutes then immediately cooled to 4\* C
        2. Small batch processing
        3. Does change breastmilk
        4. Does not change cytokines, chemokines, and growth factors (CCGF) (Groer et al, 2014)
      - vii. Cultured for bacteria growth

- viii. Labeled carefully by individual batch
  - ix. One random bottle per batch is utilized for microbiology testing by certified lab.
  - x. Distribute milk by priority
  - xi. Can be recalled and tracked for 21 years
  - xii. There has never been a documented case of disease transmission or death due to banked human milk
2. The learner will be able to list three reasons why human milk is critical for pre-term human babies.
- a. Benefits:
    - i. Optimal growth
      - 1. Weight gain
      - 2. Brain development
    - ii. Reduction of NEC (Necrotizing Enterocolitis)
      - 1. Evidence
        - a. Early studies showed little benefit but recent studies show significant benefits (Arslanoglu et al, 2010) (Lit Review, Quigley and McGuire, 2014)
        - b. Perhaps due to terminology and methods? (Lee, 2006)
        - c. In a prospective multicentre study on 926 preterm infants formally assigned to their early diet, necrotizing enterocolitis developed in 51 (5.5%). Mortality was 26% in stringently confirmed cases. In exclusively formula-fed babies confirmed disease was 6-10 times more common than in those fed breast milk alone and 3 times more common than in those who received formula plus breast milk. Pasteurized donor milk seemed to be as protective as raw maternal milk. Among babies born at more than 30 weeks' gestation confirmed necrotizing enterocolitis was rare in those whose diet included breast milk; it was 20 times more common in those fed formula only. One in five babies dies from NEC. (Lucas and Cole, 1990)
        - d. Banked human milk after lipase digestion does not contain unbound free fatty acids that are cytotoxic to intestinal cells. (Penn et al, 2012)
        - e. 207 Very Low Birth Weight infants showed a 50% reduction in NEC and an almost 90% reduction in NEC requiring surgical intervention in infants receiving human milk. (Sullivan et al, 2010)
      - 2. Long term effects of infants who survive NEC (necsociety.org)
        - a. Poor physiological and neurodevelopmental growth (Ganapathy et al, 2013)
          - i. Short gut syndrome
          - ii. Short bowel syndrome
        - b. Quality of life
        - c. Emotional toll
        - d. Financial cost
    - iii. Reduction of sepsis (Patel et al, 2013)
    - iv. Reduction of feeding intolerance
    - v. Reduced time on TPN “(total parenteral nutrition) “A completely human milk-based diet significantly reduces the likelihood of TPN use for extremely premature infants when compared to a diet including cow-based products. This likelihood may be reduced even further when the human milk fortifier is initiated earlier in the feeding process.” (Ghandehari et al, 2012)

- vi. Chronic Lung Disease
  - vii. Retinopathy of Prematurity
  - viii. NICU costs (Patel et al, 2013)
  - ix. Long term benefits
    - 1. Lower blood pressure
    - 2. Better cholesterol profiles
  - b. Possible concerns
    - i. Slower growth- Less protein, potentially less calories (Quigley and McGuire, 2014)
    - ii. Pasteurization diminishes: (Giuliani et al, 2014)
      - 1. Lactoferron
      - 2. IgA
      - 3. Lipase
      - 4. Lysozyme
      - 5. Fat
      - 6. Others
    - iii. After freezing and pasteurization: (Garcia-Lara et al, 2013)
      - 1. Less fat
      - 2. Less lactose
      - 3. Less energy content
    - iv. Donor human milk oligosaccharides compared to mother's own breastmilk (Marx et al, 2014)
      - 1. Donor human milk had more:
        - a. 3-sialyllactose
        - b. 3-fucosyllactose
      - 2. Donor human milk has less:
        - a. lacto-N-tetraose
        - b. lacto-N-neotetraose
        - c. lacto-N-fucopentaose 1
        - d. disialyllacto-N-tetraose
    - v. Need extra Vitamin D, iron, calcium, and phosphorus (Khorana and Jiamsaijamongkhon, 2014)
    - vi. No health differences between donor human milk and formula supplementation (Schanler et al, 2005) Quoted all the time! Has gone on to be a champion of an exclusive human milk diet.
    - vii. Muslim families and beliefs
  - c. Side note: Using Human milk-based human milk fortifier has the best results
    - i. Using an exclusive human milk diet, a human milk-based human milk fortifier (HMF), has life and cost savings compared to using a bovine milk-based human milk fortifier for very low birth weight babies <1500 grams (Ganapathy et al, 2012)
    - ii. **Results:** Mortality (2% versus 8%,  $p=0.004$ ) and NEC (5% versus 17%,  $p=0.002$ ) differed significantly between the HM and CM groups, respectively. For every 10% increase in the volume of milk containing CM, the risk of sepsis increased by 17.9% ( $p<0.001$ ). Growth rates were similar between groups. (Abrams et al, 2014)
    - iii. Changing to an EHM milk diet through 33 weeks PMA reduced the incidence of NEC associated with enteral feeding. (Herrmann and Carroll, 2014)
3. The learner will be able to locate their closest HMBANA human milk bank.
- a. There are currently as of 9-15, there are 19 milk banks <https://www.hmbana.org/locations>
  - b. There are 9 under development <https://www.hmbana.org/locations#Developing>

- c. Closest ones are:
    - i. Bronson's' Mother's Milk Bank, Kalamazoo, MI  
<https://www.bronsonhealth.com/services/pregnancy-and-childbirth-at-bronson/mothers-milk-bank/>
    - ii. Ohio Health Mothers' Milk Bank, Columbus, OH  
<https://www.ohiohealth.com/mothersmilkbank/>
    - iii. The Milk Bank, Indianapolis, IN [www.themilkbank.org](http://www.themilkbank.org)
4. The learner will be able to explain the process of donating to and obtaining human milk from a HMBANA human milk bank.
- a. Oral phone screening
    - i. Explain minimum donation
      - 1. Can be frozen and be up to 1 year of age
      - 2. Can donate X oz now and promise to donate the balance in the future. Each bank differs a bit. Anywhere from 100-300 oz commitment.
    - ii. Explain shipping and handling
      - 1. Use overnight mailing service at Bronson's Mothers' Milk Bank
      - 2. Pack in Styrofoam container with newspapers packed in, can use dry ice
      - 3. Make sure someone will be there to receive the milk at the milk bank- Don't ship on Friday or Saturday!
      - 4. Make sure milk is clearly labeled. Usually provide labels with mother's name and number
  - b. Paper questionnaire for mother
  - c. Paper questionnaire for health care providers to ensure mother and baby health
  - d. Mother's blood is tested.
    - i. Testing for:
      - 1. HIV 1, 2, and 0
      - 2. HTLV 1 and 2
      - 3. Hepatitis B and C
      - 4. Syphilis
    - ii. She will need to have further blood draws while she is a donor.
  - e. Disqualifications
    - i. Documented and reported certain medication use- Drug cocktails can be created due to pooling of milk
    - ii. Chronic diseases
    - iii. Travel restrictions- areas with mad cow
    - iv. Presence of transmittable disease in household
    - v. Herbal use
    - vi. Positive blood tests
    - vii. Positive bacterial counts after pasteurization
    - viii. Many other reasons
  - f. These above reasons, although good for safety of milk, can make it hard to become a donor through this channel. Mothers often end up doing informal milk sharing due to the process and restrictions.
5. Who is using donor banked human milk?
- a. Varies tremendously, from doctor to doctor, even within hospitals where there are policies (Hagadorn et al, 2014)

- b. Varies by geography. Used most in the north west and north east. Also, used more where a milk bank was in that state or a neighboring state. “In 2011, 30.8% of maternity hospitals reported that most infants were routinely provided human milk in advanced care units.” This is up from 14.4% in 2009 and 11.5 in 2007. (Perrine and Kelley, 2013)
  - c. Barriers include:
    - i. Lack of knowledge from NICU directors (Parker et al, 2013)
      - 1. How accessible is donor milk?
      - 2. How safe is donor milk?
      - 3. How will parent accept donor milk?
      - 4. The cost of donor milk
6. How to obtain banked human milk- Please contact your local HMBANA for particular details. Here are some general guidelines:
- a. Hospitals usually:
    - i. Need protocols for handling the donor banked milk once it arrives
    - ii. Need protocols within hospital for criteria for receiving donor human milk
    - iii. Need consent form for parents for their baby to receive donor human milk
    - iv. Need to have protocols for proper storage and tracking of donor human milk in place
    - v. Order shipment of donor human milk to have on hand and disperse
  - b. In hospital or outpatient for families
    - i. Need doctor’s prescription. Prescription must have:
      - 1. The medical necessity, or reason, for the milk
      - 2. The approximate amount of milk needed
      - 3. The approximate length of time the milk will be needed
    - ii. Need is prioritized
    - iii. Payment plan for banked milk- Insurance rarely covers banked human
    - iv. Will be shipped to hospital or home
7. Benefits of using donor banked milk
- a. Cost savings for hospitals (Arnold, 2008)
    - i. \$216, 666 per NEC survivor. Current estimate would be much higher (Bisquera et al, 2002)
    - ii. Average costs depending on surgical type \$398, 173 to \$276, 076 per baby (Stey et al, 2015)
    - iii. About \$4.50 per oz. Every \$ spent on banked human milk is \$11 saved.  
<http://www.nann.org/advocacy/agenda/reimbursement-for-donor-breast-milk-for-preterm-infants.html>
    - iv. A day in the NICU costs \$3500 vs about \$30 per day for banked human milk  
[http://www.marylandbreastfeedingcoalition.org/files/HB180\\_FACT\\_SHEET.pdf](http://www.marylandbreastfeedingcoalition.org/files/HB180_FACT_SHEET.pdf)
8. What can we do?
- a. Have faith in our families
    - i. Believe families want what is best for their babies
    - ii. Believe that banked human milk is the healthiest choice for most preterm babies
  - b. Educate
    - i. Families

1. Let families know the risks and benefits of using banked human milk if mother's own breastmilk is not available.
    - a. Having a preterm baby is usually an unexpected event
    - b. Banked human milk is life-saving medicine for these fragile infants
    - c. Informed consent is critical
    - d. Do not patronize your clients
  2. Share with families how to obtain banked human milk
    - a. Banked human milk is dispensed by a first come, first serve policy for out patient
- ii. Professionals
1. Promote human milk banking and the use of banked human milk for all babies but especially preterm babies
  2. Encourage mothers to donate their extra breastmilk to HMBANA
  3. Share research and findings with other medical professionals
  4. Help develop policies for hospitals that promote the use of banked human milk
  5. Share cost savings by NEC prevention
  6. Connect professionals that use banked human milk with ones that need more information. We learn best from our peers.
  7. Work on insurance coverage for banked human milk.

Thank you! Questions? [barbara@bfcaa.com](mailto:barbara@bfcaa.com) or 734-975-6534