




A Fresh Look, A Mother-centric Approach  
to Reduce Early Breastfeeding Cessation  
Part I: The Science



Becoming Baby Friendly  
in Oklahoma, 9<sup>th</sup> Annual Summit  
February 26, 2021

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 9<sup>th</sup> Annual BBFOK Summit   
February 26, 2021


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- In order to obtain nursing contact hours, you must attend the entire program and complete the evaluation form
- No conflicts of interest were identified for any member of the planning committee or any author of the program content
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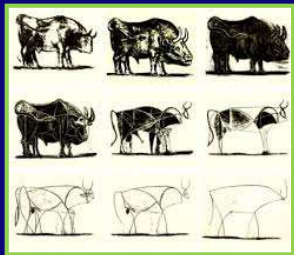
A Fresh Look, A Mother-centric Approach  
to Reduce Early Breastfeeding Cessation  
Part I: The Science

★ *OUTLINE*

- The Challenge:
  - Prevent early complications and cessation
- The Science:
  - A,B,C for low-risk dyads



Keep it simple!  
says Picasso and Steve Jobs

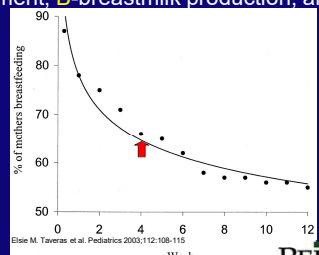


Simple = Memorable  
**Reasons for Early Cessation**

- A** Attachment
  - Difficulty with latch or milk transfer
- B** Breastmilk production
  - Mothers who won't make enough milk
- C** Calories
  - Babies who won't receive enough milk

What we do (or do not do) in the first 3 days (1<sup>st</sup> hours) directly relates to these complications and early cessation

>20% drop off by 1 month in low-risk, term dyads:  
Reasons relate to  
**A**-attachment, **B**-breastmilk production, and **C**-caloric



90  
80  
70  
60  
50

% of mothers breastfeeding

0 2 4 6 8 10 12

Week

Elsie M. Taveras et al. Pediatrics 2003;112:108-115

**PEDIATRICS**

### Reasons for Early Cessation of Breastfeeding Among Women with Low Income Hornsby PP, 2019

- Low-income women reported similar reasons for early breastfeeding cessation
- Returning to work/school is and uncommon reason for cessation by 1 month.

### Prevent Early Complications and Cessation

- Complications related to A, B and C
  - Major causes for stopping earlier than planned, with drop-off (~20%) in any breastfeeding before 1 month
  - Result in serious health and financial burdens (hyperbilirubinemia, dehydration, hypernatremia)
  - Key reasons for delayed discharge and readmission (within 2 wks) GLOBALLY

### Prevent early complications and cessation

Risk for early cessation increases if < 39 wks

- Breastfeeding rates: (40 wk) > (37-39 wk) > (< 30 wk) ≥ (34-36wk)
- Morbidity doubles for each gestational wk earlier than 38
- The population of early babies (< 39 wks) is unlikely to decrease due to
  - demographic factors (obesity, advanced maternal age)
  - obstetrical practices (31.7% cesarean rate, inductions, multiples)

### What are the opportunities to prevent problems?

- Drop off by 1 month in primiparous mothers: \*
  - Term: 23.5%
  - Early term (37-<39wk): 27.4%
  - LPT (34-36+wk): 36.2%
- LPT infant breastfeeding rates not impacted by Baby-friendly practices (1<sup>st</sup> hr. skin-to-skin, rooming-in, no pacifiers) \*\*

\*Hackman NM, Breastfeeding Medicine 2016

\*\*Goyal NK. Birth 2014, Eidelman A. 2016, Breastfeeding Medicine, editorial 10(3) 2016

### A Fresh Look, A Mother-centric Approach to Reduce Early Breastfeeding Cessation Part I: The Science

#### OUTLINE

- The Challenge:
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- ★ The Science:
  - A,B,C for low-risk dyads



### A: attachment: Key Points

1. Time sensitive: Interval between birth and first feed
2. Not always automatic. (surgery, drugs, preterm)
3. Improves with uninterrupted contact
4. Improvement is PRODUCTION dependent

**A:** attachment  
Time sensitive

- **The olfactory continuity**  
Prenatal priming for first feed, the last step of the birth process
- Rooting, swallowing, sucking prenatally
- Amniotic fluid pheromones, unique to each mother (genetics/diet)
  - Stimulate nutritive behavior
  - Chemically similar in colostrum and Montgomery gland secretions

Not always perfect

The longer the interval between birth and first feed, the more likely dysfunctional attachment

Carberry AE. Breastfeeding Medicine 2013; Dewey KG. Pediatrics 2003

The time-sensitive nature of ATTACHMENT

**The time-sensitive nature of ATTACHMENT**  
Breastfeeding in 1<sup>st</sup> hour vs. later reduces feeding problems  
Carberry AE, 2013, Breastfeeding Medicine

- Timing of 1st feed in healthy term infants:  $\leq 1$  hr., 1-2 hr., 2-4 hr.,  $\geq 4$  hrs.
- The longer the interval between birth and 1st feed, the greater risk for poor feeding. (scored)
- Predictors of breastfeeding difficulties included primiparous ( $p < 0.001$ ), emergency cesarean delivery ( $p = 0.04$ ), and elective cesarean delivery ( $p = 0.02$ ).
- But even when stratified by delivery type and parity the risk of delay remained.

Not always automatic



Lessons from the preterm infant:  
Attachment improves with skin-to-skin and  
**ROBUST PRODUCTION**

### B = breastmilk production: Key Points

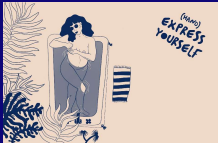
1. Production is the strongest determinant of duration and exclusivity of breastfeeding.

The cornerstone of breastfeeding

### B = breastmilk production: Key Points

“Program your breasts from the FIRST HOUR”

2. Hormones set the stage, but subsequent milk production potential depends on colostrum removal.



Early  
Frequent  
Effective  
**All 3 are critical**

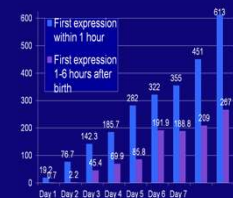
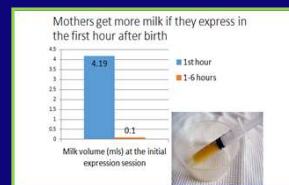
EARLY

### Time sensitivity nature of BREASTMILK PRODUCTION

### The time-sensitive nature of BREASTMILK PRODUCTION

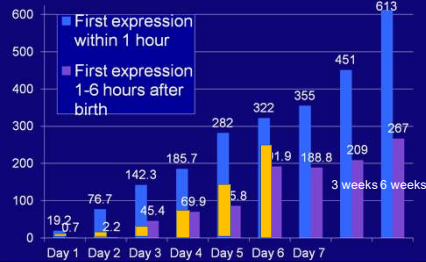
Parker LA. J Perinatol. 2012, Breastfeeding Medicine 2015

- First hour expression ( vs. hrs. 2-6) **largest volume and ↑ production** by 130% at 6 weeks (613.0 vs. 267.2)



## EARLY but not FREQUENT

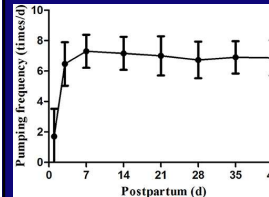
First hour expression followed by low frequency  $\leq 4 \times /d$  over 3 days  
Parker LA, 2020



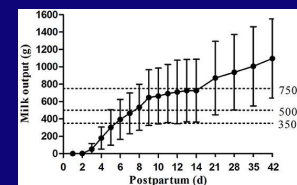
## Tipping point for pumping frequency to establish 750 ml/d by Day 14 is $\geq 6$ times/d

Furman L, 2002; RU X, 2020 Front Pediatr

PUMPING FREQUENCY



DAILY MILK OUTPUT



## Frequency of breastfeeding to initiate an adequate supply

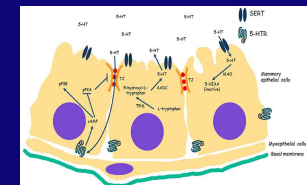
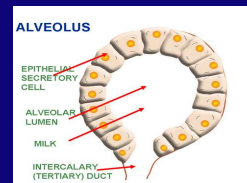
Breastfeeding (10 x/day) associated with increased production and infant weight gain

Huang SK, Breastfeeding Medicine 2020

- Compared differences between:
  - Group I, low frequency feeds ( $< 10 \times /d$ )
  - Group II, high frequency feeds ( $> 10 \times /d$ )
- By Day 28, Group II vs. Group I:
  - Ingested more per feeding 72 vs. 54 mL
  - Gained more weight from birth 143% vs. 130%

Given clinical variants, are biomarkers reliable indicator of EFFECTIVE removal?

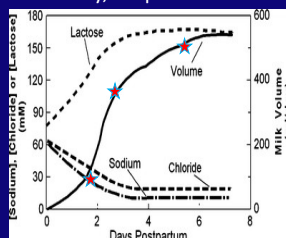
## Biomarkers: colostrum removal stimulates TJ closure



- Frequent** and **effective** removal (8-12x/d) of colostrum affects the closure of the cell junctions, resulting in the drop in milk sodium and the subsequent increase in production.

## Biomarkers (Na, Na:K, Lactose, Citrate, Protein)

- By 48 hours, compositional changes reflecting paracellular junction closure directly relate to early, frequent and effective colostrum removal



The decline in sodium heralds the rise in volume

## EFFECTIVE Colostrum Removal

### A Personal Story:

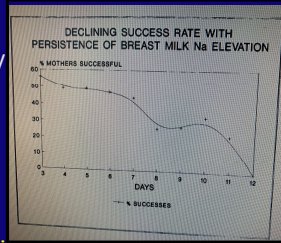
Insufficient milk production became the most troublesome problem for my mothers. Despite correcting attachment problems, encouraging frequent feeds and prn milk expression, production remained the most stubborn problem.

This question led to a study...

### The Clinical Usefulness of Breast Milk Sodium in the Assessment of Lactogenesis Morton J. Pediatrics 1994

- N=130; Day 3 through Day 12
- A normal drop in sodium is highly predictive of successful lactation by 1 month.
- The longer the sodium remained elevated the higher the risk of impaired production

By day 3, many mothers faced an uphill battle to establish production.



### BIOMARKERS reflect

**FREQUENT** and **EFFECTIVE** colostrum removal:

- **EFFECTIVE** removal (**8-12x/d**) in first 3 days is associated with biological biomarkers ( $\downarrow$  breastmilk  $\text{Na}^+$ ,  $\text{Na}:\text{K}$ ) predictive of exclusive breastfeeding.

Hoban R, Breastfeeding Med. 2018

Murase M, J Peds 2016

Galipeau R, Breastfeed Med. 2012

Manganaro R, Br J of Nut. 2007

**On day 3: inverse relationship of milk sodium to daily milk intake (pre/post feed weights x 24 hrs.)**

Humenick SS, Can J Nurs Res. 1998

Morton JA, Pediatrics. 1994;93(5):802-806.

### production. production. **PRODUCTION**

- Production is strongest determinant of duration and exclusivity of breastfeeding
- Complications pose serious health risks
- Less remedial with time

Mother's Experience:

- Exhaustive and demoralizing remedial regimens, i.e. triple feeding
- Despite her best efforts, her baby is now in harm's way

*The Experience of Breastfeeding the LPT Infant  
A Qualitative Study. Kair LR. 2015 Breastfeeding Med*

### Cochrane Database Syst Rev 2020

**Oral galactagogues (natural therapies or drugs) for increasing breast milk production in mothers of non-hospitalised term infants . Foong AC.**

Due to extremely limited, very low certainty evidence, we do not know whether galactagogues have any effect on proportion of mothers who continued breastfeeding at 3, 4 and 6 months. There is low-certainty evidence that pharmacological galactagogues may increase milk volume.

### What we know already...

1. Production is the strongest determinant of duration and exclusivity of breastfeeding.
2. Hormones set the stage, yet the **early, frequent** and **effective** removal of colostrum determines future production potential
3. **Early:** 1<sup>st</sup> hour colostrum removal sends a strong signal
4. **Frequency:** high frequency necessary for establishment
5. **Effective:** Can you rely on the newborn to remove enough colostrum early and frequently enough for optimal intake and production stimulation? If not, from the first hour, what is the most effective way to remove viscous colostrum? What is the evidence?

To be discussed in next talk

Like launching a rocket...  
Boost off takes the most energy.  
**EARLY-FREQUENT-EFFECTIVE**



Production within first 4 days  
predictive of future potential.

### C: CALORIES for TERM INFANTS

- Colostrum has only 80% of calories compared to mature milk or formula. Average intake of colostrum is small. ( $15 \pm 11$  g in first day). Santoro W Jr. 2010.
- The AGA TERM newborn's fuel (glucose and ketones) comes mainly from endogenous sources (reserves), not from colostrum: \*
  - Breakdown of starch (glycogenolysis)
  - Synthesis from amino acids (gluconeogenesis)
  - Breakdown of fatty acids (ketogenesis)

### C = caloric intake

#### Born Hungry? Protection vs. Nutrition

- Cord cut = last "supper", so what's the hurry?
- More protective than nutritious. Unlike donor milk, a mother's own colostrum provides "tailor-made", unique active and passive immunity for the mother's own infant.
  - Passive: Maternal immunoglobulins
  - Active: Bioactive components potentiate the infant's own immune function within the GI lymphoid tissues, and enable a beneficial microbiome

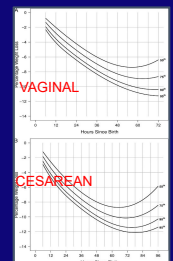
### C = caloric intake, Key Points

- The AGA TERM newborn's needs are initially small
- Never too much colostrum
- Early clinical indicators:

Weight loss trajectory  
Bilirubin  
Stool color and frequency

### Weight Loss Trajectory

- Average weight loss is 6-7%
- By 6 hours**, weight loss differentials for infants at risk for excessive weight loss (>10%) are evident.
- By 24 hours**, weight loss  $\geq 5\%$  predicts eventual excessive weight loss
- By 48 hours**, 5% vaginal and >10% cesarean births have lost  $\geq 10\%$  of wt.
- Nomograms predicting wt. loss per hr. of life help determine infants at-risk for excessive wt. loss



Flaherman VJ. Pediatrics 2015, Flaherman VJ. JAMA Pediatrics 2019

The Newborn Weight Tool, or Newt, [www.newbornweight.org](http://www.newbornweight.org), Hershy

### RBC's breakdown

Bilirubin

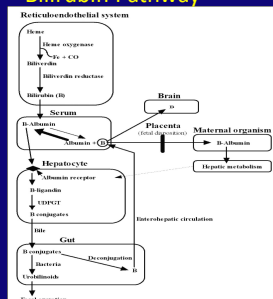
"UPS" = Liver  
"packages" (conjugates)  
and delivers to gut.

(Colostrum is a laxative)

Excreted  
If suboptimal intake, bilirubin

REABSORBED → HYPERBILIRUBINEMIA

### Bilirubin Pathway



### Bilirubin

- 4 primary risk factors for hyperbilirubinemia are UNDERFEEDING, prematurity, genetics (Asian) and hemolytic diseases.

- Bilirubin can be modified by early, frequent and effective feedings



"First and best supplement to **PREVENT** hyperbilirubinemia is hand expressed spoon/cup-fed colostrum ..."

Flaherman VJ, Maisels MJ. ABM Clinical Protocol #22:

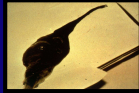
Guidelines for Management of Jaundice

Breastfeeding Medicine. 2017;12(5):250-257

## Stool Color and Frequency

- **Stool color:** Delayed transition of bowel movements to bright yellow by day 5 is a reliable indicator of inadequate breastmilk intake.

Day 1-2



Day 5



Shrago LC, Reijnsnider E, Insel K. The neonatal bowel output study: indicators of adequate breast milk intake in neonates. *Pediatr Nurs.* 2006 May-Jun;32(3):195-201.

Salariya EM, Robertson CM. The development of a neonatal stool colour comparator. *Midwifery* 1993 Mar;9(1):35-40.

# DAY 5

## The time-sensitive nature of the ABC's

### A=Attachment:

The longer the interval between birth and the first feed, the more likely the infant is to have suboptimal attachment.

Carberry AE. *Breastfeeding Medicine* 2013; Dewey KG. *Pediatrics* 2003

### B=Breastmilk production:

Affects duration and exclusivity, cornerstone of breastfeeding

Depends on early, frequent and effective removal of colostrum

First hour vs. hrs. 2-6 expression: **larger first expressed volumes** and **↑ production**

High frequency most important for establishment

### C=Calories:

Delaying 1<sup>st</sup> feed past first hour may be associated with reduced intake extending over next few days. (To be discussed)

When all goes well.....

**A** promotes **B** promotes **C**

When all does NOT go well.....

**A** does not promote **B** does not promote **C**

- Science has spotlighted the time-sensitive window of opportunities in the first hours, the natural conclusion of the birth chapter. Are we enabling mothers to take full advantage of this time and prevent common breastfeeding problems with A, B and C?
- Or are we bending too far to the hands-off, “wait and see”, problem-oriented approach and inadvertently fostering preventable problems with demanding regimens and less remedial solutions?
- What we do (or do not do) in the first 3 days (1<sup>st</sup> hours) directly relates to the complications that lead to early cessation.

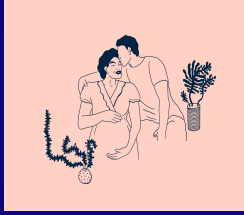


QUESTION: Might normalizing the use of hand techniques with breastfeeding from the first hour reduce complications associated with early cessation and offer a “leg up” to all high risk dyads?

**A question needing an answer.**



Thank you and sorry we can't be together to share!



Questions, comments and suggestions?

## Objectives

The learner shall be able to:

1. – identify 3 key reasons mothers give for prematurely stopping breastfeeding in the first month.
2. - give 2 evidence facts about the time-sensitive nature of the first hour, regarding A, B and C.
3. - identify which factor, A, B or C is the strongest determinant of duration and exclusivity of breastfeeding.