



# Mother's Own Milk (MOM) Initiative

January 2017 Learning Session:  
**Improving Lactation Success in  
Mothers of VLBW Infants**

Partnering to Improve Health Care Quality  
for Mothers and Babies

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# Welcome!

- **Please enter your Audio PIN on your phone or we will be unable to un-mute you for discussion.**
- If you have a question, please enter it in the Question box or Raise your hand to be un-muted.
- This webinar is being recorded.
- Please provide feedback on our post-webinar survey.

# Agenda

1/12/2017

- 👶 Project Announcements
- 👶 **Improving Lactation Success in Mothers of VLBW Infants – Dr. Leslie Parker**
- 👶 Q&A and Discussion

# Announcements

Begin Registering Your Team!

## **Mother's Own Milk (MOM) Initiative Mid-Project Meeting**

 **March 14, 2017**

 **Orlando, FL**

 **9 am – 4 pm**

 **Let's re-energize!**

 **Attendance at this meeting is part of your hospital's project participation commitment**

# Florida Perinatal Quality Collaborative

## ANNUAL CONFERENCE

April 27-28, 2017

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### Topics of Particular Interest for Neonatal Providers:

- Health Outcomes and Cost of Human Milk Feedings for Premature Infants with Implications for Donor Human Milk Use with Dr. Paula Meier
- A Parent Perspective with Heather Barrow of High Risk Hope
- Challenges with the Periviable Infant - Panel
- Co-Producing Care with Patients and Families with Maren Batalden
- Neonatal Abstinence Syndrome - Breakout
- Antibiotic Stewardship - Breakout

**REGISTRATION NOW OPEN**

**FPQC.org**

# 1 Day Pre-Conference

## Quality Improvement Methods Training for Perinatal Providers

**Wednesday**  
**April 26<sup>th</sup>**

Tampa, FL

Holiday Inn Westshore

*Conference*  
*Dates: April 27-*  
*28*



# Announcements: Resources

- 👶 Would your hospital like a site visit with personalized technical assistance from FPQC?
  - 👶 Customized to your needs
  - 👶 Can include targeted education, discussion of trouble areas for your unit, review of data, etc.
  
- 👶 If you're interested, please contact [FPQC@health.usf.edu](mailto:FPQC@health.usf.edu) or Ivonne [ihernand@health.usf.edu](mailto:ihernand@health.usf.edu)



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# Improving Lactation Success in Mothers of VLBW Infants

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# Breast Milk Is Critical To Optimize Care of VLBW Infants



Protective Bioactive Substances

# Anti-Infective Properties

- ▶ Secretory IgA
  - Highest level in colostrum
  - Higher levels in mothers of critically ill infants
- ▶ Lactoferrin
- ▶ Lysosymes



Meier, et al. (2010). Clin Perinatol. 37, 217

# Intestinal Maturation Inducing Substances

- ▶ Growth Factors and hormones
  - Important in gastrointestinal development
  - Epidermal growth factor, G-CSF, Epogen
  - Substitute for amniotic fluid



# Oligosaccharides

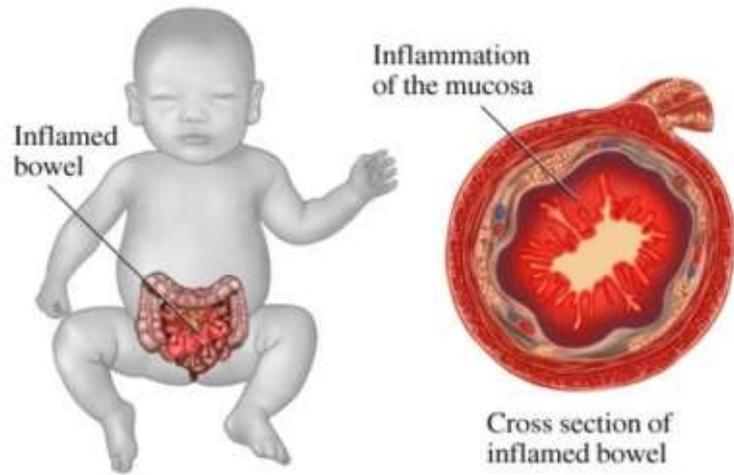
- ▶ A prebiotic
- ▶ Promotes commensal bacteria
- ▶ Prevent pathogens from binding to receptors
- ▶ Structural diversity unique to humans
- ▶ 200 different types identified
- ▶ Trace amounts in bovine formulas
- ▶ Especially high levels in colostrum



# Anti-Inflammatory Substances

- ▶ Prostaglandins
- ▶ Anti-inflammatory cytokines
  - Mediates and regulates inflammatory responses
- ▶ Antioxidants
- ▶ PAF-AH (platelet-activating factor acetylhydrolase)
  - Degrades PAF
  - PAF important in development of NEC





**Necrotizing Enterocolitis**



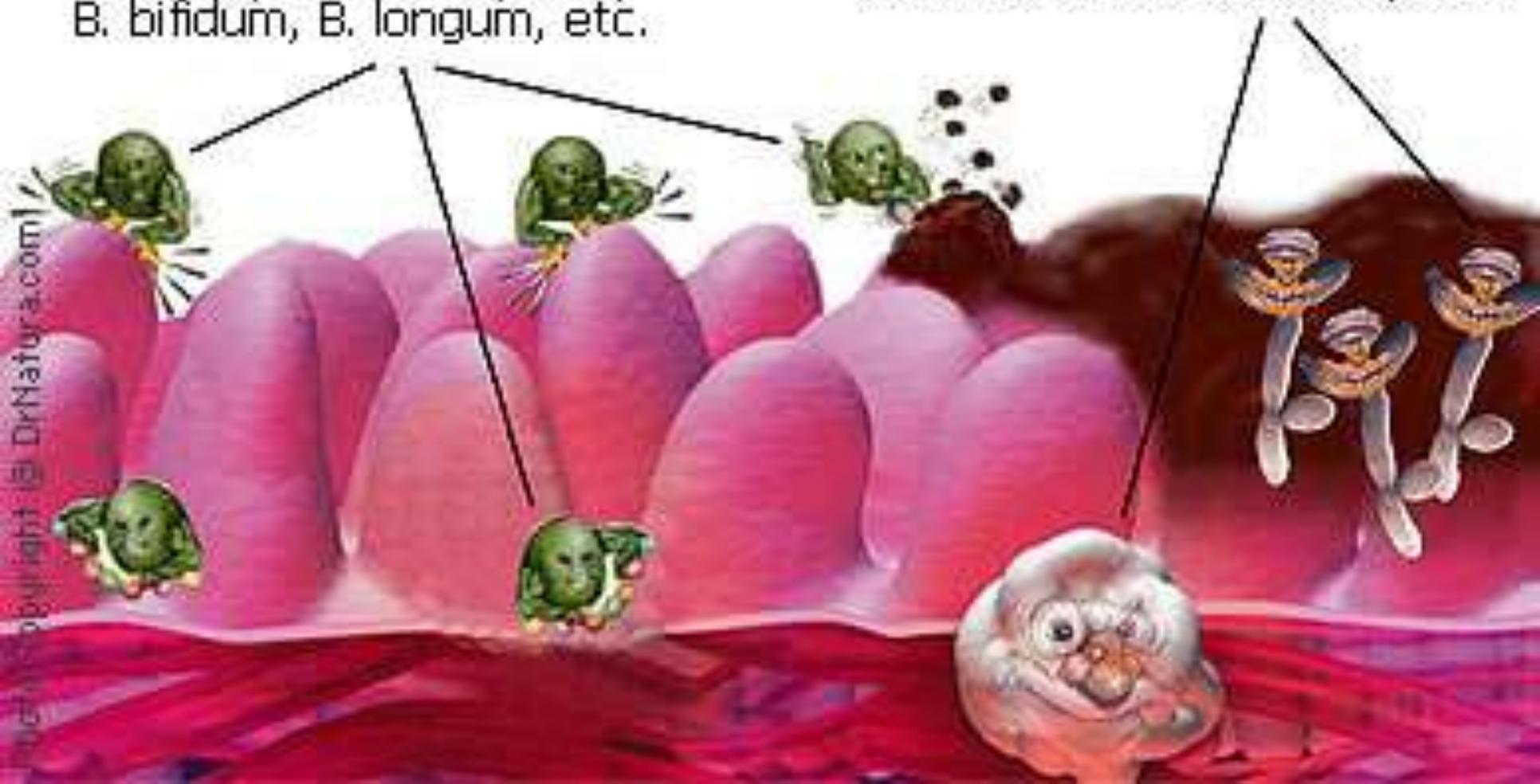
**Sepsis**

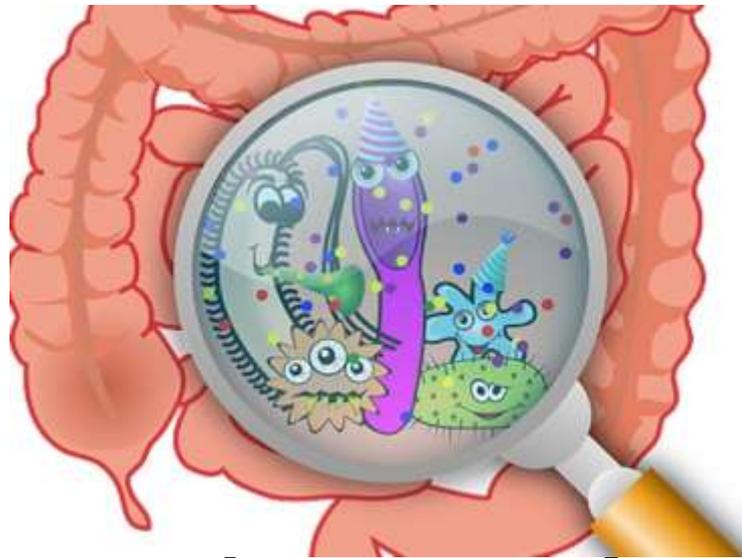
## Friendly Bacteria

*L. acidophilus*, *L. salivarius*,  
*L. casei*, *L. thermophilus*,  
*B. bifidum*, *B. longum*, etc.

## Unfriendly Bacteria

Pathogenic bacteria & fungi,  
such as *Candida albicans*, etc.





**Necrotizing Enterocolitis**



**Sepsis**

# Clinical Benefits



# Necrotizing Enterocolitis

- ▶ 6.5X less risk if exclusively fed breast milk
- ▶ Dose dependent benefits
  - $\geq 50\%$  of feedings
- ▶ Cases are less severe
- ▶ Lower incidence of intestinal perforation



# Late Onset Sepsis

- ▶ Decreased rate of infection (49% vs. 26%)
- ▶ Every 10mL/kg/d decreased risk by 19%
- ▶ Associated with decreased hospital costs



# Improved Neurodevelopmental Outcomes

- ▶ Higher verbal, performance and overall scores
  - 18 and 30 months
- ▶ Due to long-chain polyunsaturated fatty acids
- ▶ Dose dependent
  - Each 10mL/kg/d associated with increased scores
  - $\geq 110$ mL/kg/d vs exclusive formula = extra 5 IQ points
- ▶ Especially important in this population

# Other Clinical Benefits

- ▶ Decreased incidence of ROP
  - Antioxidants
  - PFA and other lipids
- ▶ Chronic lung disease
- ▶ Decreased risk of re-hospitalization
- ▶ Improved adolescent health
  - Less obesity
  - Decreased blood pressure
  - Less insulin resistance

Vohr, et al. 2007; Pediatrics, 120, e953; Singhal et al. 2004 Lancet, 363, 1572

# Maternal Benefits

- ▶ Enhanced maternal involvement and attachment
- ▶ Increased confidence
- ▶ Empowering
- ▶ Feel more control over the situation
- ▶ What are the short and long term benefits?



“The one thing I could do for my baby”



**“I Felt Like I Was Helping  
Him Get Healthy”**





**BREASTFEEDING**

It Rocks!

# Barriers to Consumption of MOM by VLBW Infants

- ▶ Decreased rate of initiation
- ▶ Difficulty with supply
- ▶ Difficulty with breast feeding



# First Step: A Willing Accomplice

- ▶ Initial contact should be before delivery
  - Initiate in high risk clinic
  - Neonatal consultation
- ▶ Informed consent is imperative
- ▶ Talk them into it!!
  - Knowledge is power
  - Does not increase anxiety or guilt

# Difficulty With Milk Supply



# Decreased Breast Milk Production

- ▶ Production is decreased in preterm mothers
- ▶ Dramatic decrease in volume at 4–6 weeks
- ▶ Etiology
  - Decreased mammary gland development
  - Limited exposure to prolactin, cortisol and other hormones during pregnancy
  - Comorbidities
  - Pump dependence

# Delayed Lactogenesis Stage II

- ▶ 1–3 day delay if delivers at <28 weeks
- ▶ 85% have impaired lactogenesis stage II
- ▶ Consequences
  - Delayed feedings
  - Donor milk or formula feedings
- ▶ Earlier onset with early initiation of breastfeeding



# Present Techniques Just Aren't Good Enough

- ▶ Limits the benefit to the most vulnerable infants
- ▶ 51% fail to produce adequate volume at 6 wks
- ▶ 65% failure to continue pumping for 6 wks
- ▶ Healthy People 2020 goals
  - 75% initiation rate
  - 50% continue for six months
  - 25% continue for the 12 months

# Early Milk Volume Correlates with Later Milk Volume



Early Strategies Are  
Critical For Adequate Production

# Is There Anything We Can Do?



“They also left a pamphlet on the benefits of breast feeding.”

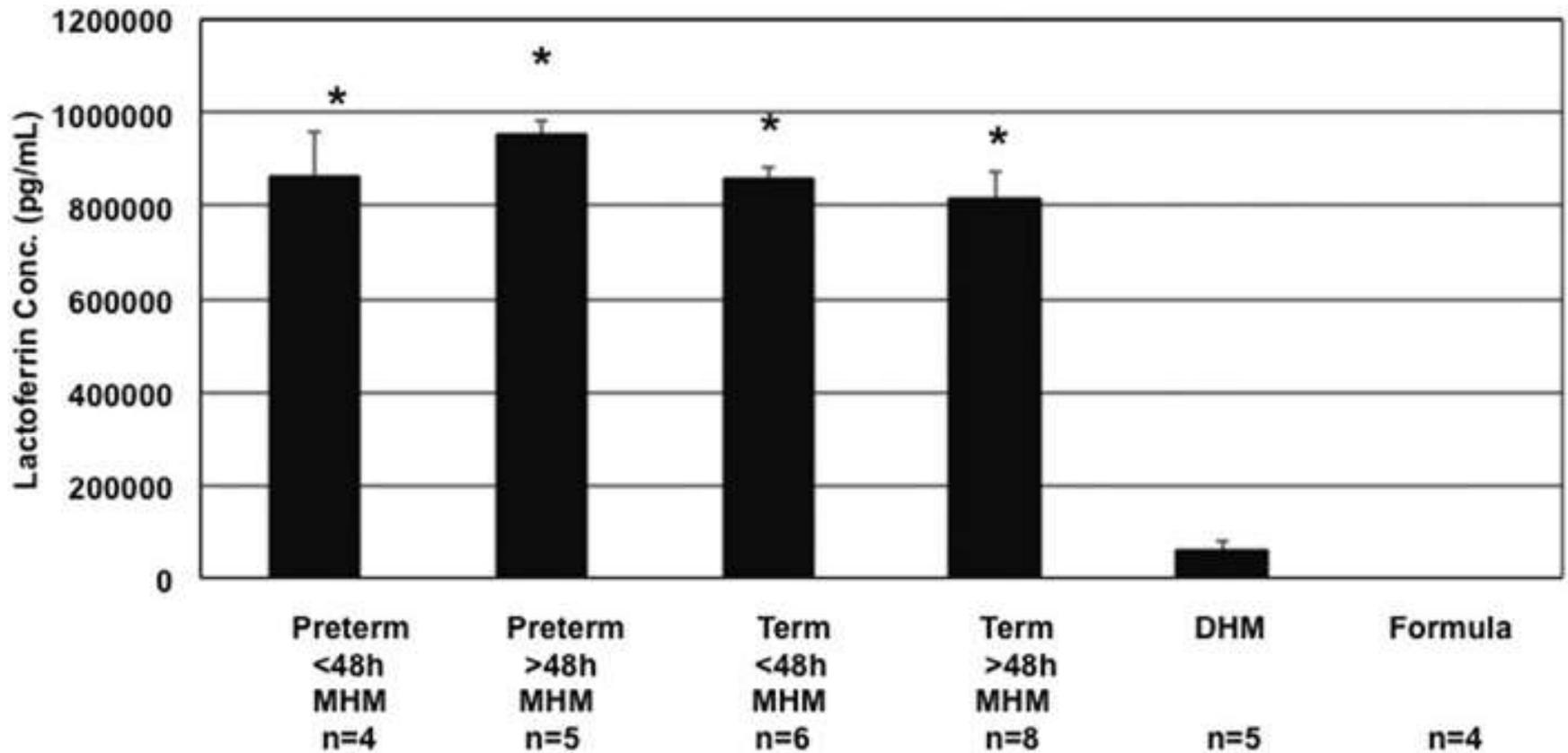
# Feed Them Donor Milk – Of Course!

- ▶ World Health Organization recommends donor milk if mother's milk is unavailable
- ▶ US Surgeon General's Call to Action to Support Breastfeeding: The use of donor human milk should be increased

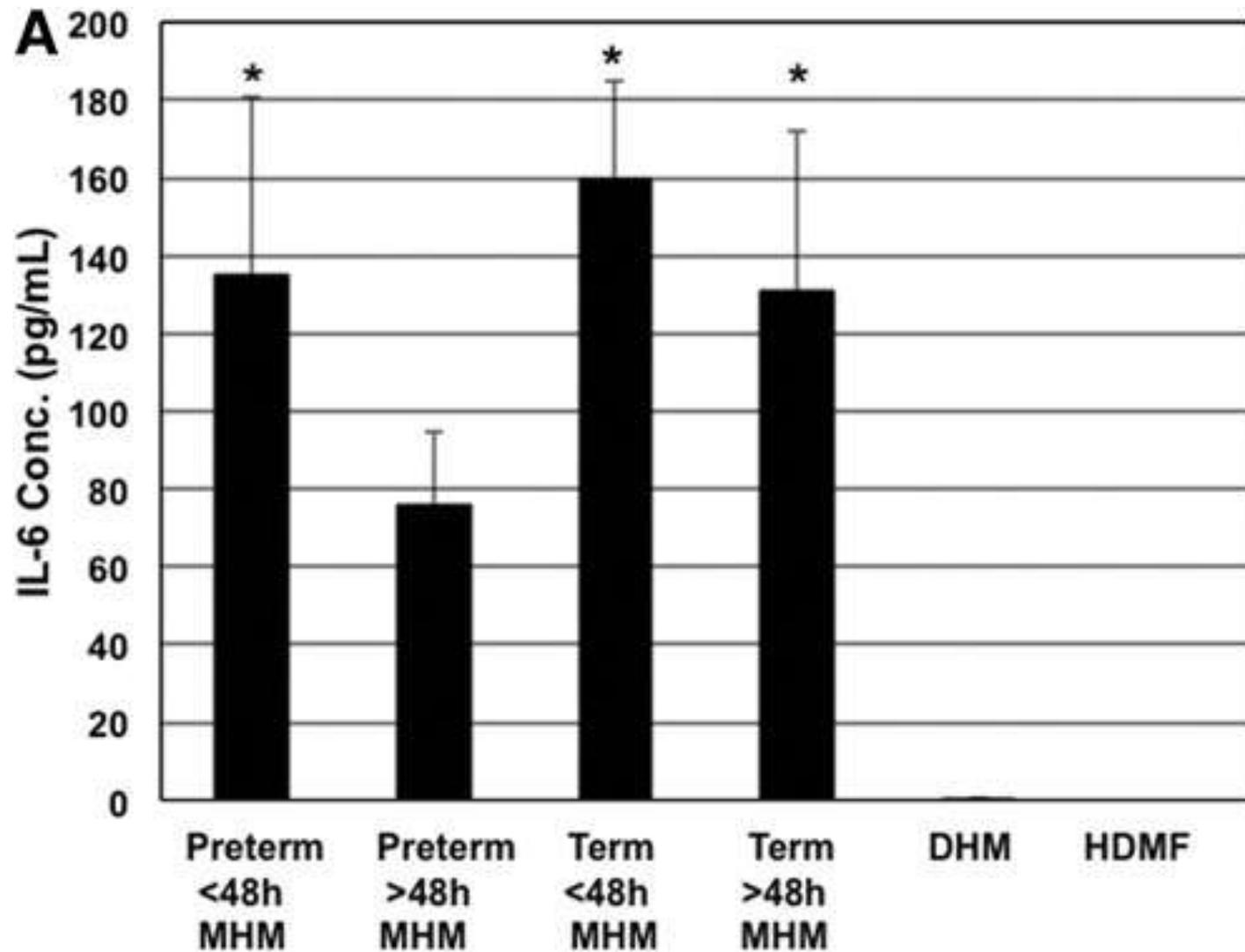


“The potent benefits of human milk are such that all preterm infants should receive human milk. Mother’s own milk, fresh or frozen, should be the primary diet, and it should be fortified appropriately for the infant born weighing less than 1.5 kg. If mother’s own milk is unavailable *despite significant lactation support*, pasteurized donor milk should be used”

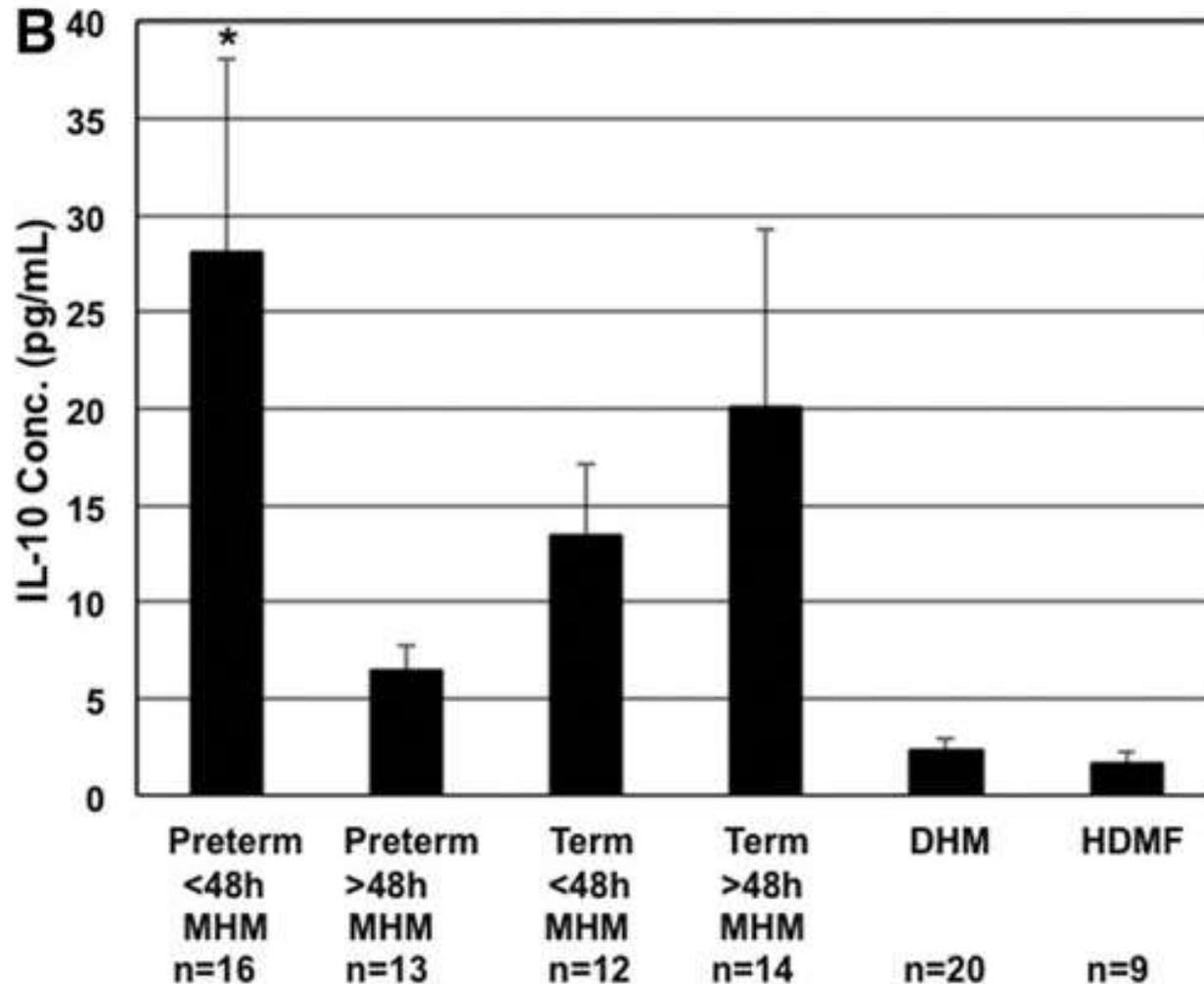
# Lactoferrin levels



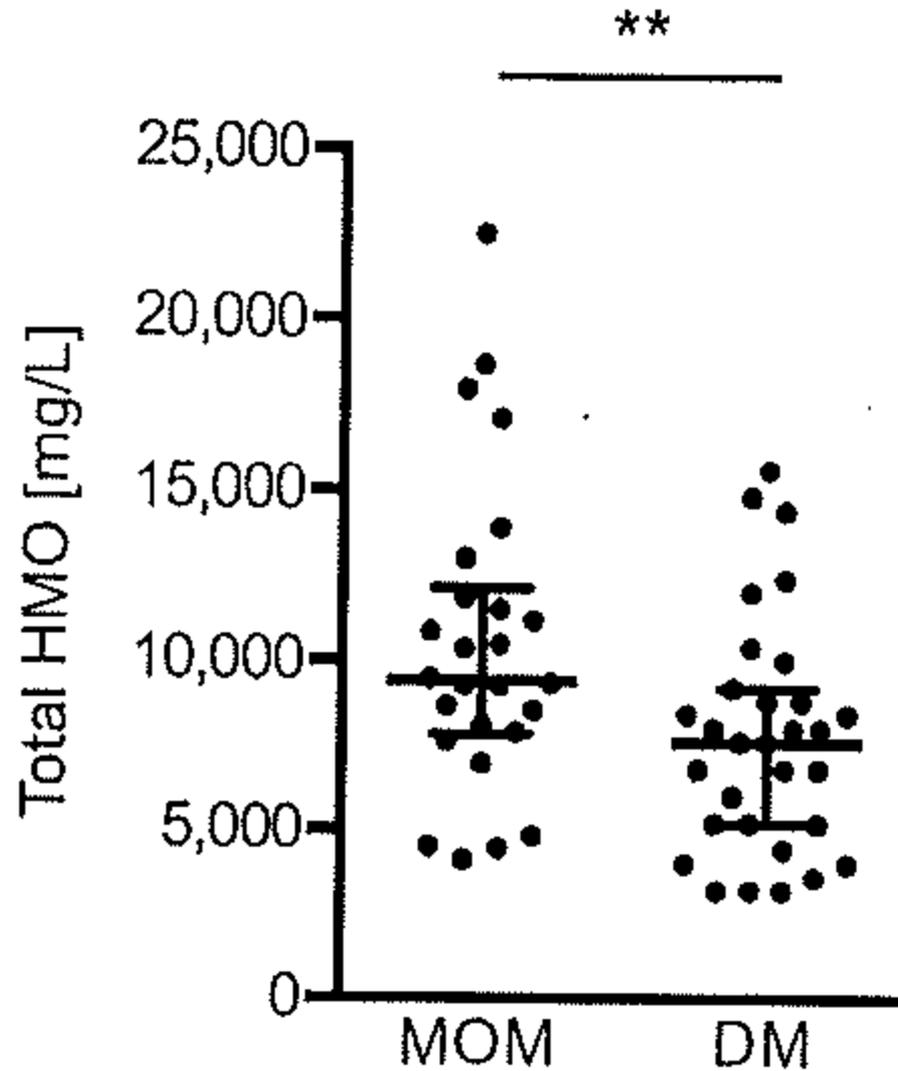
# Interleukin-6



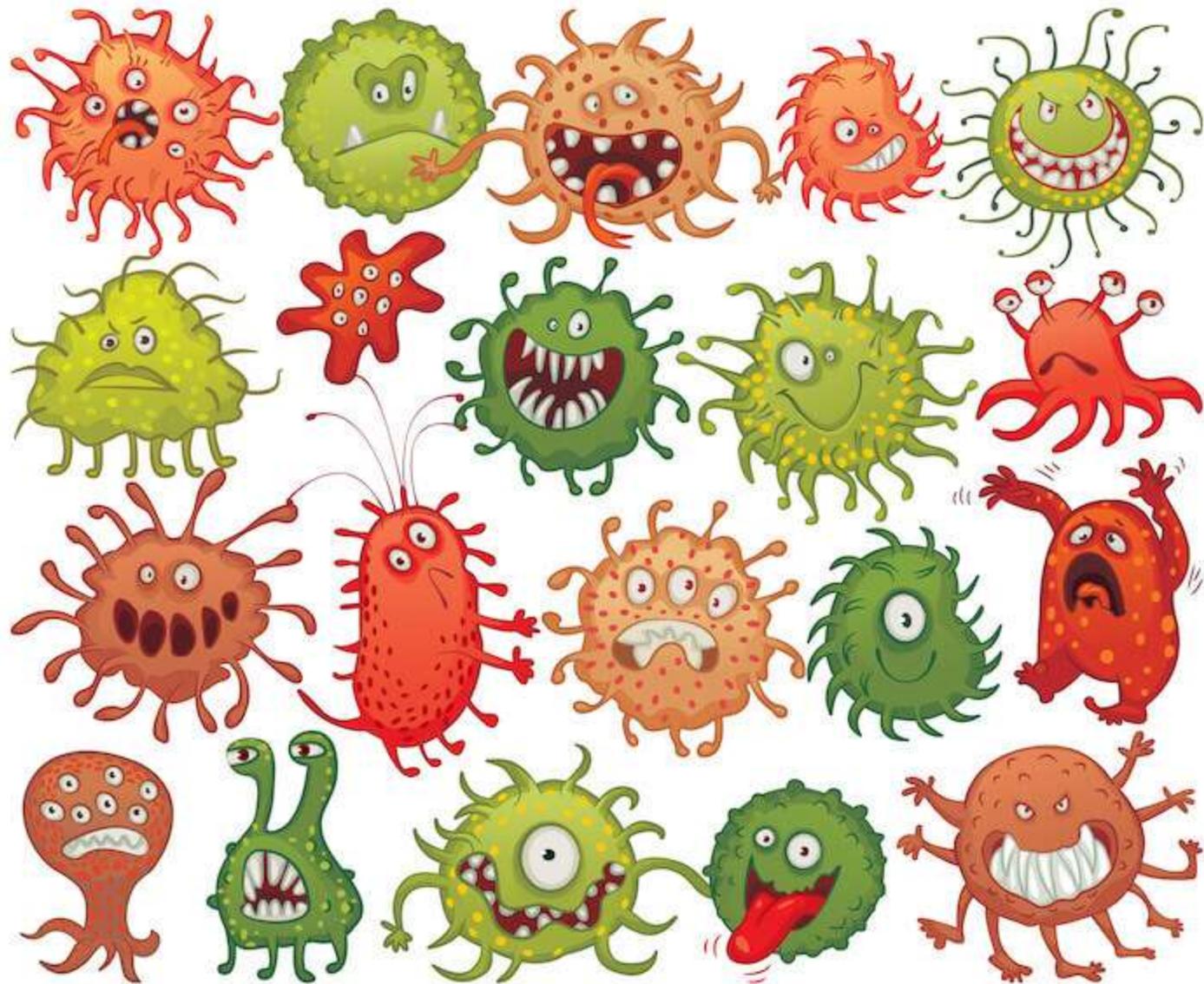
# Interleukin-10



# Oligosaccharides



# Absence of Commensal Bacteria



# Donor Milk and Necrotizing Enterocolitis

## ▶ 2 meta-analyses

- Decreased risk of NEC
- Compared DHM compared with formula
- Benefit was lost when DHM was used with MOM
- Only 2 studies included fortified DBM
  - Reported no difference in the incidence of NEC

## ▶ 3 RCTs

- 1 study indicated less NEC if MOM was supplemented with DHM versus formula

# Does Donor Milk Promote Adequate Growth?

- ▶ Decreased protein content
  - Mothers of older infants
  - Mothers who have excessive production
- ▶ Reduced fat absorption
  - Negligible lipase activity
- ▶ Majority of studies indicate poorer growth

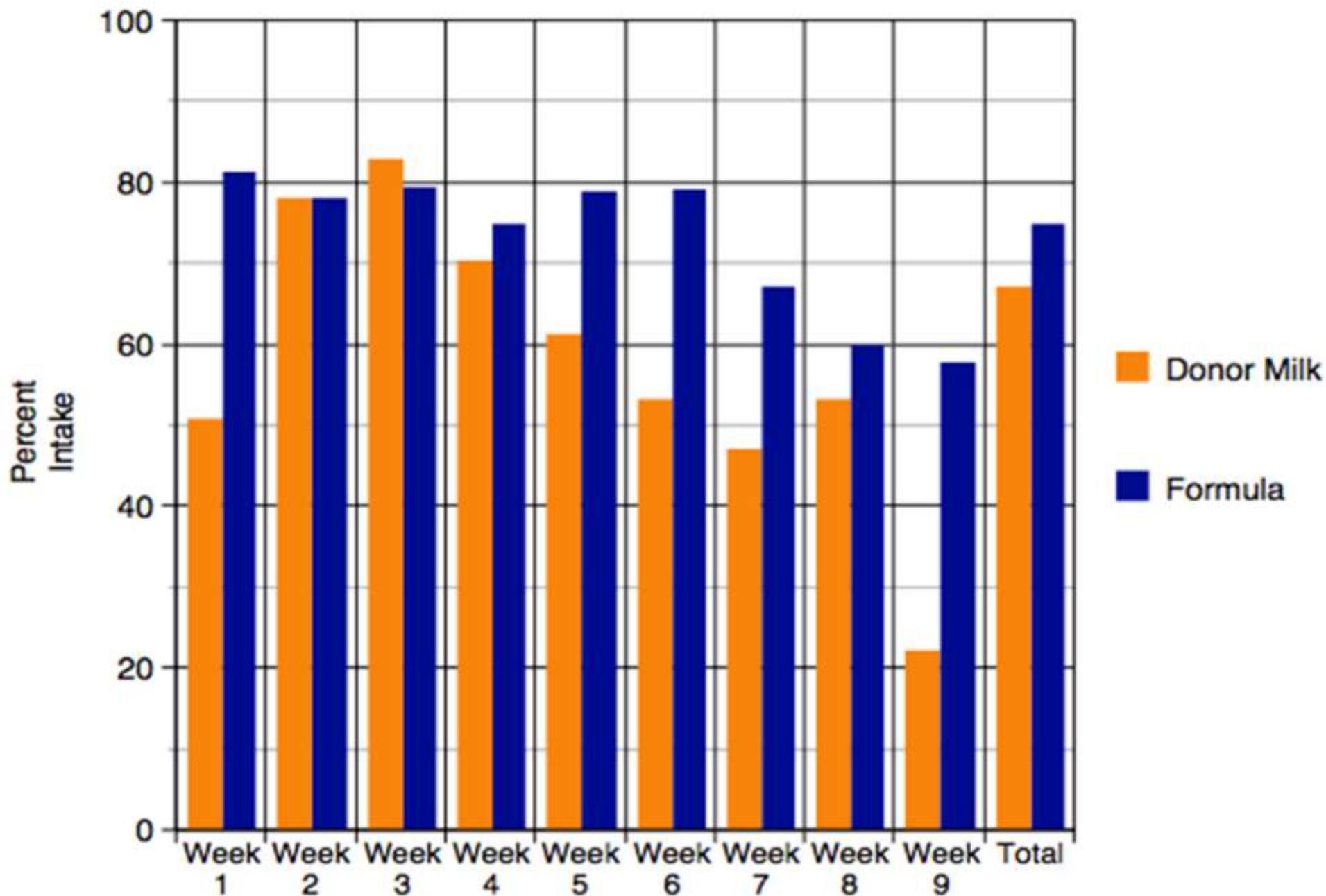
# Does Donor Milk Decrease Consumption of MOM

- ▶ Potential for decreased MOM production
  - Less motivated mothers
  - Less motivated staff
- ▶ The literature doesn't support this assumption
  - Decreases formula administration
  - Increases expression and breastfeeding

Utrera et al., 2010; Arslanoglu et al., 2012



Percent Intake of Mother's Own Milk



**Nothing Beats Mom's Own Milk!**

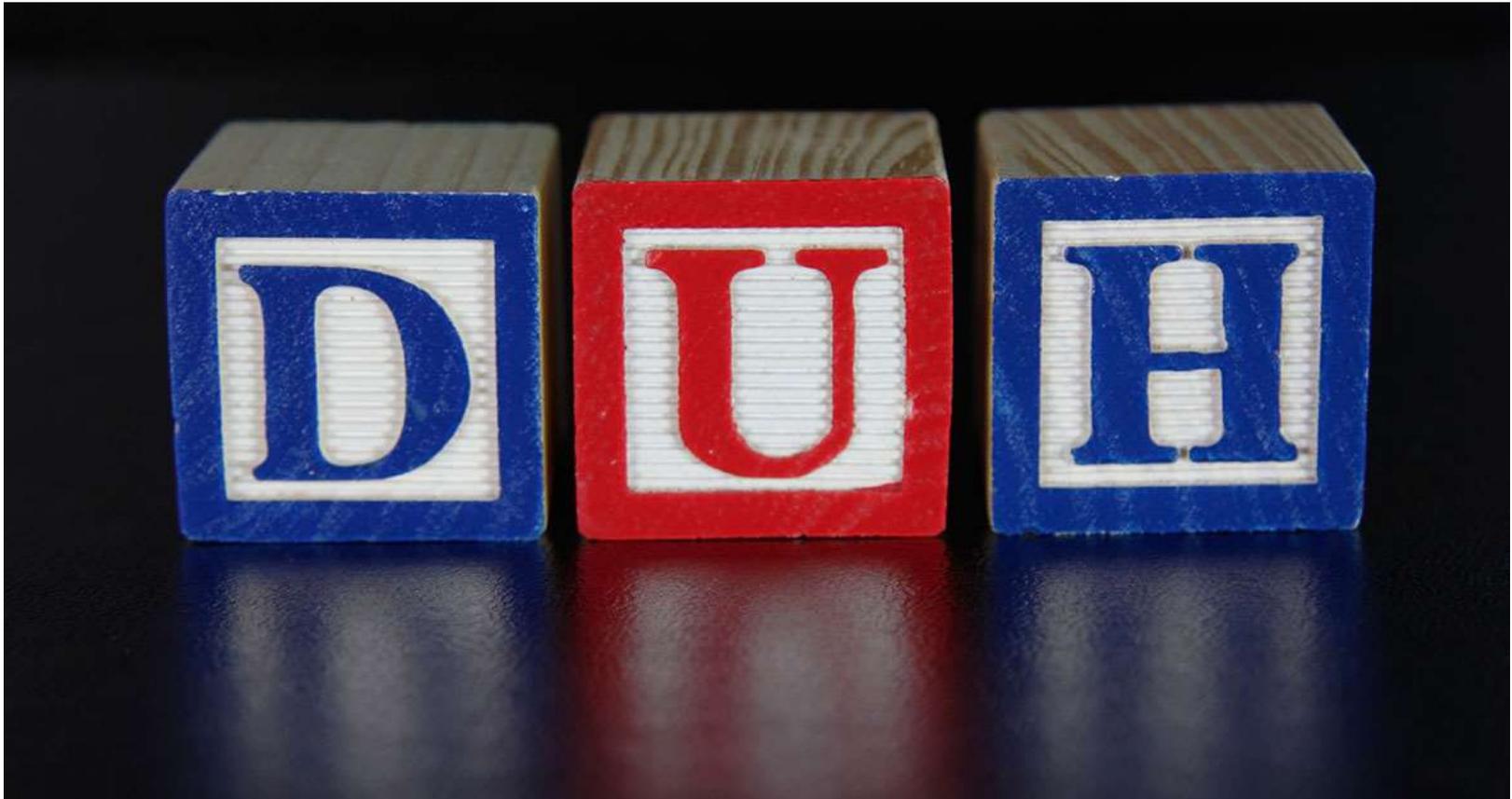


# Early Initiation To Improve Lactation Success



# When Should We Initiate Milk Expression

Within 6-Hours After Delivery!



# Research Supporting Within 6 Hours

- ▶ Prospective observational study
  - 87 mothers of VLBW
- ▶ Purpose: Identify correlates with lactation beyond 40 weeks PCA
- ▶ Initiation within 6 hours correlated with lactation at 40 weeks PCA

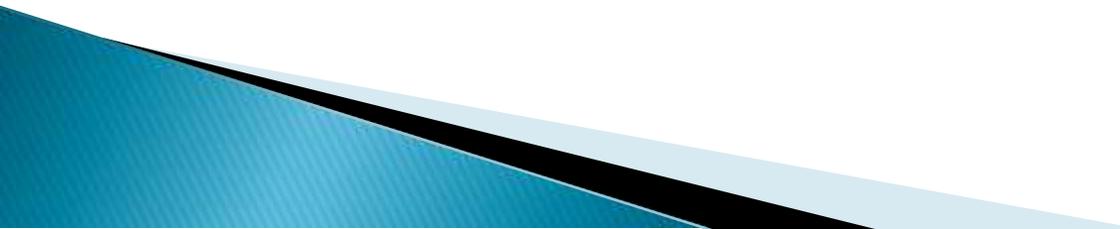
	<b>Lactation at 40 Weeks' CA*</b>		<b><i>P</i> Valu</b>
	<b>Continued (<i>n</i> = 30)</b>	<b>Discontinued (<i>n</i> = 57)</b>	
Began <6h after delivery	9 (30%)	5 (9%)	.02
Expressed $\geq 5$ x/d at 35wk PCA	24 (80%)	15 (79%)	1.0
Mean volume $\pm$ SD (mL)/pumping at 35 wks	132 $\pm$ 75	54 $\pm$ 40	<.001
Owned or rented an electric pump	28 (93%)	17 (89%)	.64

# What About Starting Earlier?

- ▶ It's what we tell our term moms
- ▶ Initiation within 30 minutes recommended
- ▶ Timing associated with duration of breastfeeding



# Initiation of Expression Within One Hour After Delivery

- ▶ 20 mothers of VLBW infants
    - Consented prior to delivery
  - ▶ Randomized to 1 of 2 groups
    - Group 1 initiated expression within 1 hour
    - Group 2 initiated expression within 1–6 hours
  - ▶ Outcomes
    - Milk volume at Day 1–7, 21 and 42
    - Timing of Lactogenesis stage II
    - Pain and stress
- 

# Demographics

<u>Characteristic</u>	<u>Early initiation (n=10)</u>	<u>Late initiation (n=10)</u>	<u>p</u>
	<u>M (SD)</u>	<u>M (SD)</u>	
Gestational age	27.4 (1)	27.4 (2.8)	1
Birth weight	998.2 (244.6)	990.1 (380.4)	0.96
Maternal age (years)	26.3 (4.8)	27.5 (1.9)	0.69
Parity	3.4 (4.9)	1.6 (0.97)	0.27
Maternal weight (lbs)	194 (32.1)	199.7 (90.0)	0.86
Maternal weight gain	16.7 (11.9)	17.3 (8.4)	0.90
Expression frequency	5.7 (1.0)	6.2 (1.3)	0.27
KC	3.9 (5.2)	3.4 (3.8)	0.81

# Demographics

<u>Characteristic</u>	<u>Early initiation</u>	<u>Late initiation</u>	<u>P</u>
	<u>N (%)</u>	<u>N (%)</u>	
Mode of delivery			0.64
SVD	4 (40)	3 (30)	
C/S	6 (60)	7 (70)	
Antenatal steroids			0.30
Yes	10 (100)	9 (90)	
Maternal race			0.18
White	5 (50)	6 (60)	
Black	4 (40)	4 (40)	
Hispanic	1 (10)	0 (0)	
Maternal smoking			0.30
Yes	1 (10)	0 (0)	
Maternal diabetes			0.14
Yes	0 (0)	2 (20)	

# Demographics

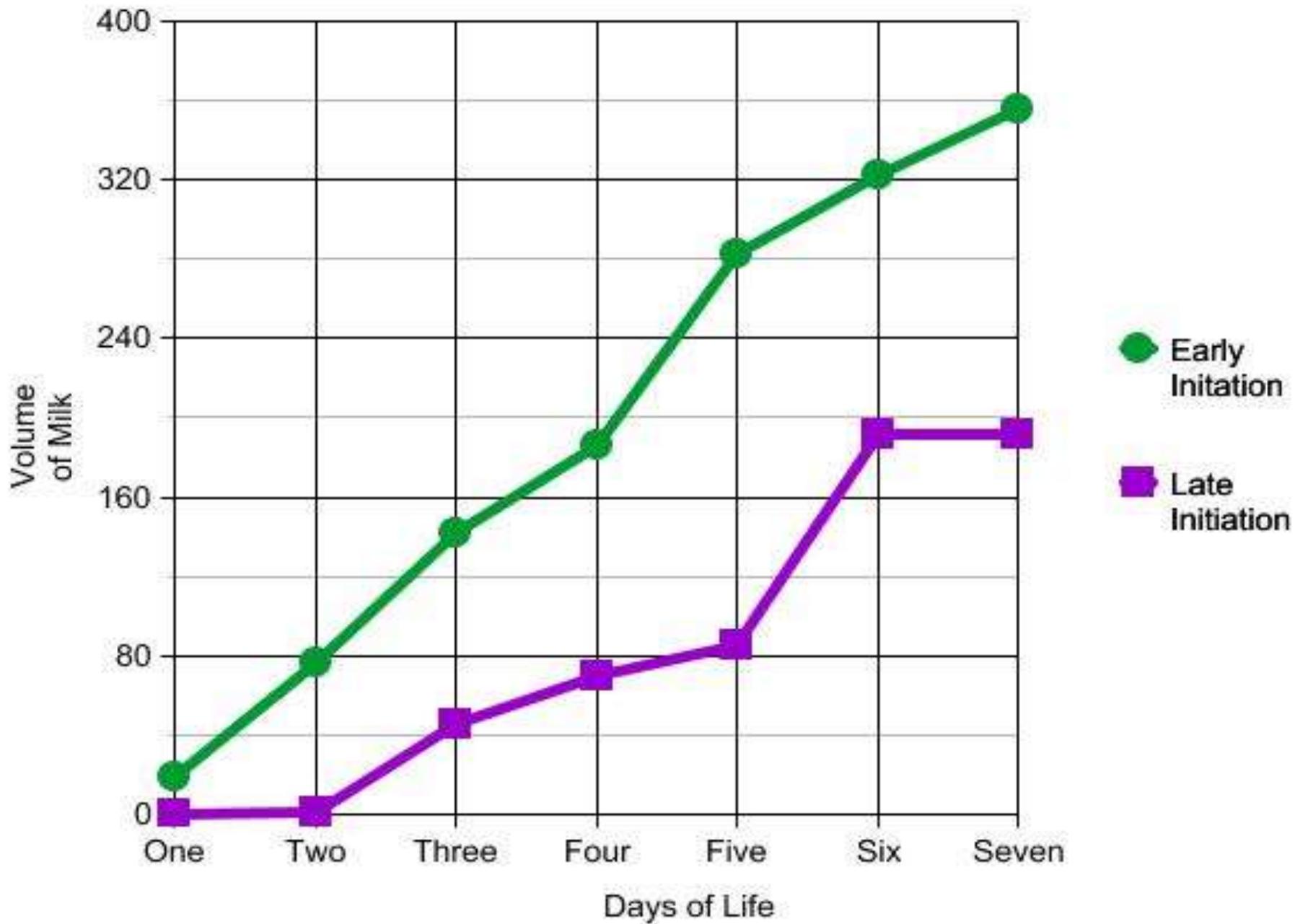
<u>Characteristic</u>	<u>Early initiation</u>	<u>Late initiation</u>	<u>P</u>
	<u>N (%)</u>	<u>N (%)</u>	
Decision to breastfeed			0.36
At conception	7 (70)	6 (60)	
During pregnancy	2 (20)	2 (20)	
In hospital	1 (10)	2 (20)	
Expected length of breastfeeding			0.08
Only pump	0 (0)	1 (10)	
6 months	2 (20)	1 (10)	
12 months	4 (40)	0 (0)	
As long as possible	4 (40)	8 (80)	
Breastfeeding experience			0.76
Yes	1 (10)	1 (10)	

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# Milk Volume (mL)

Time	Early Initiation (n=10)	Late Initiation (n=10)	P
Initial expression	4.19	0.1	0.14
Day 1	19.2	0.7	0.06
Day 2	76.7	2.2	0.01
Day 3	142.3	45.4	0.14
Day 4	185.7	69.9	0.09
Day 5	282.0	85.8	0.06
Day 6	322.0	191.9	0.06
Day 7	355.0	188.8	0.1
Total at 1 week	1374	608.1	0.05

Volume of Milk During First Week

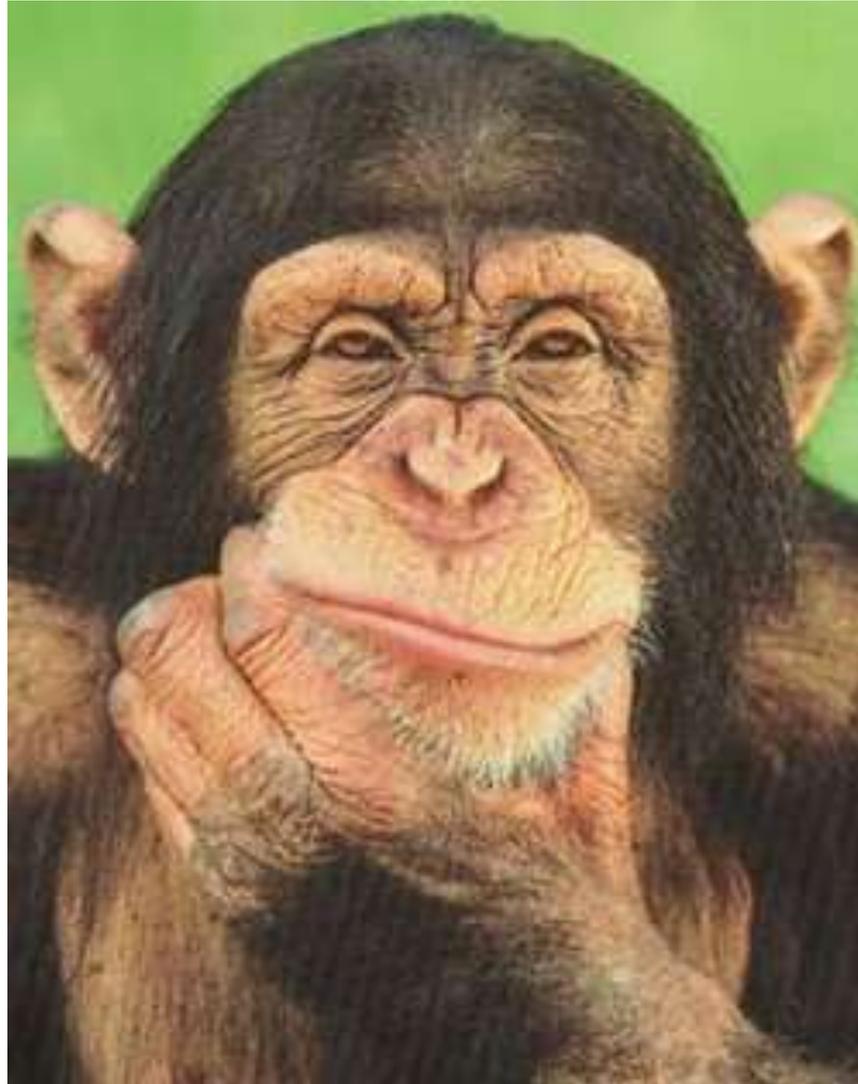


# Milk Volume and Timing of Lactogenesis Stage II

<u>Variable</u>	<u>Early Group</u>	<u>Late Group</u>
Lactogenesis stage II	80.4 hours	136.8 hours
3 weeks	613 mL (n=8)	267 mL (n=7)
6 weeks	451 mL (n=6)	209 mL (n=4)

\*30% of late expression group expressed 0 ml for three of the first seven days

Is the < 6 Hour Recommendation Valid?



# Should We Initiate Expression Within 6 hours?

- ▶ Prospective observational study
- ▶ 40 mothers of VLBW infants
  - Group 1 initiated milk expression within 6 hours
  - Group 2 initiated milk expression after 6 hours
- ▶ Outcomes
  - Milk volume at day 1–7, 21, 42
  - Timing of lactogenesis stage II

# Demographics

	<i>Early initiation</i>	<i>Late initiation</i>	<i>p value</i>
Birth weight (g)	974.9±321.5	943.5±234.6	0.731
Gestational age (wks)	27.4±2.4	28.0±2.1	0.424
Cesarean section	65% (13/20)	80% (16/20)	0.288
Expression frequency	6.0±1.2	6.5±1.6	0.288
Episodes of KC	3.7±4.4	3.5±4.7	0.890
Maternal age (years)	26.9±6.4	27.7±6.3	0.710
Education (years)	13.1±1.5	13.0±1.4	0.740
Married	45% (9/20)	45% (9/20)	1.0
Employed	60% (12/20)	30% (6/20)	0.057
Primip	0	20.0% *4/20	0.048 <sup>a</sup>
Weight gain	17.0±10.1	19.2±12.0	0.533
Maternal diabetes	10% (2/20)	5% (1/20)	1.0
Antenatal steroids	95% (19/20)	95% (19/20)	1.0

# Demographics

	<i>Early initiation</i>	<i>Late initiation</i>	<i>p value</i>
Decision to breastfeed			0.150
At conception	65% (13/20)	35% (7/20)	
During pregnancy	20% (4/20)	30% (6/20)	
During hospitalization	15% (3/20)	35% (7/20)	
Anticipated length of breastfeeding			0.121
Only pumping	5% (1/20)	30% (6/20)	
6 months	20% (4/20)	20% (4/20)	
As long as possible	75% (15/20)	50% (10/20)	
Breastfeeding experience	10% (2/20)	20% (4/20)	0.661

## Breastmilk Volume over Time and Lactogenesis Stage II (n=40)

Breastmilk (mL)	<i>Early initiation</i>	<i>Late initiation</i>	p value
Initial amount	0.1 (0.0–0.15)	0.0 (0.0–0.0)	0.001 <sup>a</sup>
Day 1	0.27 (0.0–7.4)	0.0 (0.0–3.5)	0.392
Day 2	3.1 (0.14–16)	4.3 (1.5–17.1)	0.550
Day 3	25.7 (6.0–138.2)	11.5 (1.5–45.4)	0.148
Day 4	51.5 (19.4–205.3)	49.4 (13.9–183.4)	0.764
Day 5	117.3 (38–245)	112.1 (50–162)	0.738
Day 6	259.6 (108–302)	87.1 (50.4–140.2)	0.002 <sup>a</sup>
Day 7	252.7 (133–381)	125.7 (65–192)	0.006 <sup>a</sup>
Week 1	803.8 (377–1,166)	394.3 (249–669)	0.076

	<i>Early initiation</i>	<i>Late initiation</i>	<i>p value</i>
Week 3 (n=23)	454 (238-591)	224.2 (100-334)	0.056
Week 6 (n=14)	355 (328-457)	258.7 (124-284)	0.050
Lactogenesis stage II (hours)	114 (66-137)	78 (60-108)	0.207
Lactating at			
3 weeks	70% (14/20)	45% (9/20)	0.110
6 weeks	50% (10/20)	20% (4/20)	0.047 <sup>a</sup>

	Within 1 hour (n=10)	>1 and ≤6 hours (n=10)	After 6 hours (n=20)	p value
<b>Initial</b>	0.1 (0-0.3)	0 (0-0.1)	0 (0-0)	0.002
<b>Day 1</b>	7 (0-28)	0.01 (0-0.4)	0 (0-3.5)	0.122
<b>Day 2</b>	16 (4.1-106)	0.5 (0-2)	4.3 (1.5-17)	0.009
<b>Day 3</b>	88 (14-208)	19 (0-45)	11 (1.5-45)	0.099
<b>Day 4</b>	88 (62-399)	28 (15-40)	49 (13-183)	0.213
<b>Day 5</b>	232 (95-405)	71 (34-117)	112 (50-162)	0.099
<b>Day 6</b>	294 (182-370)	217 (79-267)	87 (50-140)	0.003
<b>Day 7</b>	306 (244-384)	180 (80-253)	125 (65-192)	0.005
<b>Week 3 (23)</b>	543 (466-818)	238 (87-442)	224 (100-334)	0.007
<b>Week 6 (14)</b>	440 (352-526)	209 (64-355)	258 (124-284)	0.024
<b>LGS2(hours)</b>	90 (24-120)	126 (108-204)	72 (60-108)	0.047
<b>Lactating at</b>				
<b>3 weeks</b>	70% (7/10)	70% (7/10)	45% (9/20)	0.343
<b>6 weeks</b>	60% (6/10)	40% (4/10)	20% (4/20)	0.080

	>1–≤6 hrs (n=10)	>6 hrs (n=20)	p value
<b>Breastmilk (mL)</b>			
Initial	0 (0–0.1)	0 (0–0)	0.036
Day 1	0.01 (0–0.4)	0 (0–4)	0.791
Day 2	0.5 (0–2)	4 (2–17)	0.025
Day 3	20 (0–45)	12 (2–45)	0.827
Day 4	28 (15–41)	49 (13–183)	0.487
Day 5	71 (35–118)	112 (51–162)	0.310
Day 6	218 (79–267)	87 (50–140)	0.110
Day 7	181 (81–253)	126 (65–193)	0.290
Week 3 (n=17)	239 (88–442)	224 (101–335)	0.810
Week 6 (n=8)	209 (64–356)	259 (124–285)	0.678
<b>LGS2 (hours)</b>	126 (108–204)	78 (60–108)	0.029
<b>Lactating at</b>			
3 weeks	70% (7/10)	45% (9/20)	0.260
6 weeks	40% (4/10)	20% (4/20)	0.384

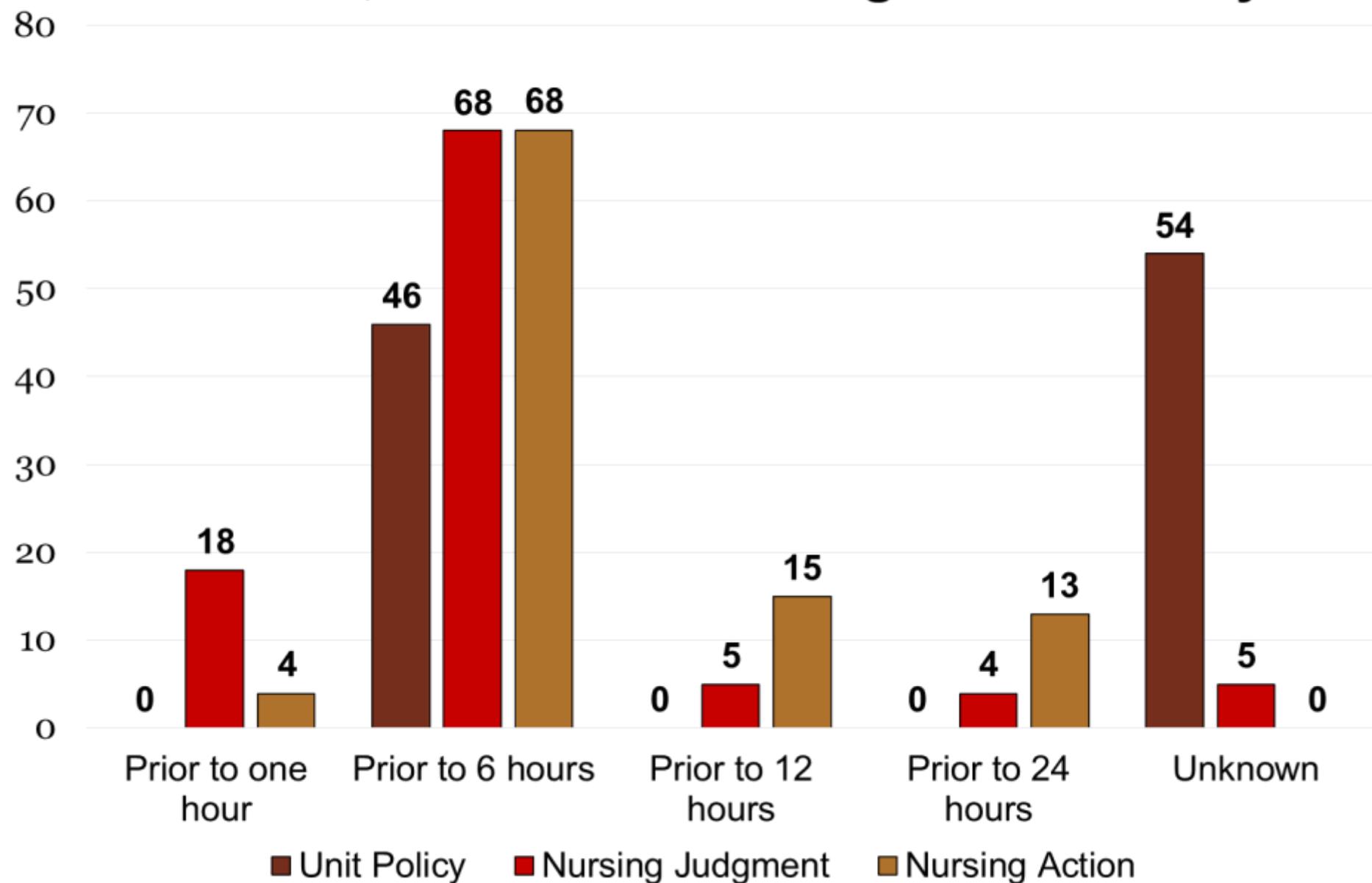
# Optimal Time to Initiate Milk Expression

- ▶ 180 mothers of premature VLBW infants
- ▶ Three groups
  - Within 1 hour
  - 1–3 hours
  - 3–6 hours
- ▶ Milk volume
  - Days 1–7
  - Day 14, 21, 28, 35, 42
- ▶ Timing of Lactogenesis
- ▶ Infant breast milk consumption

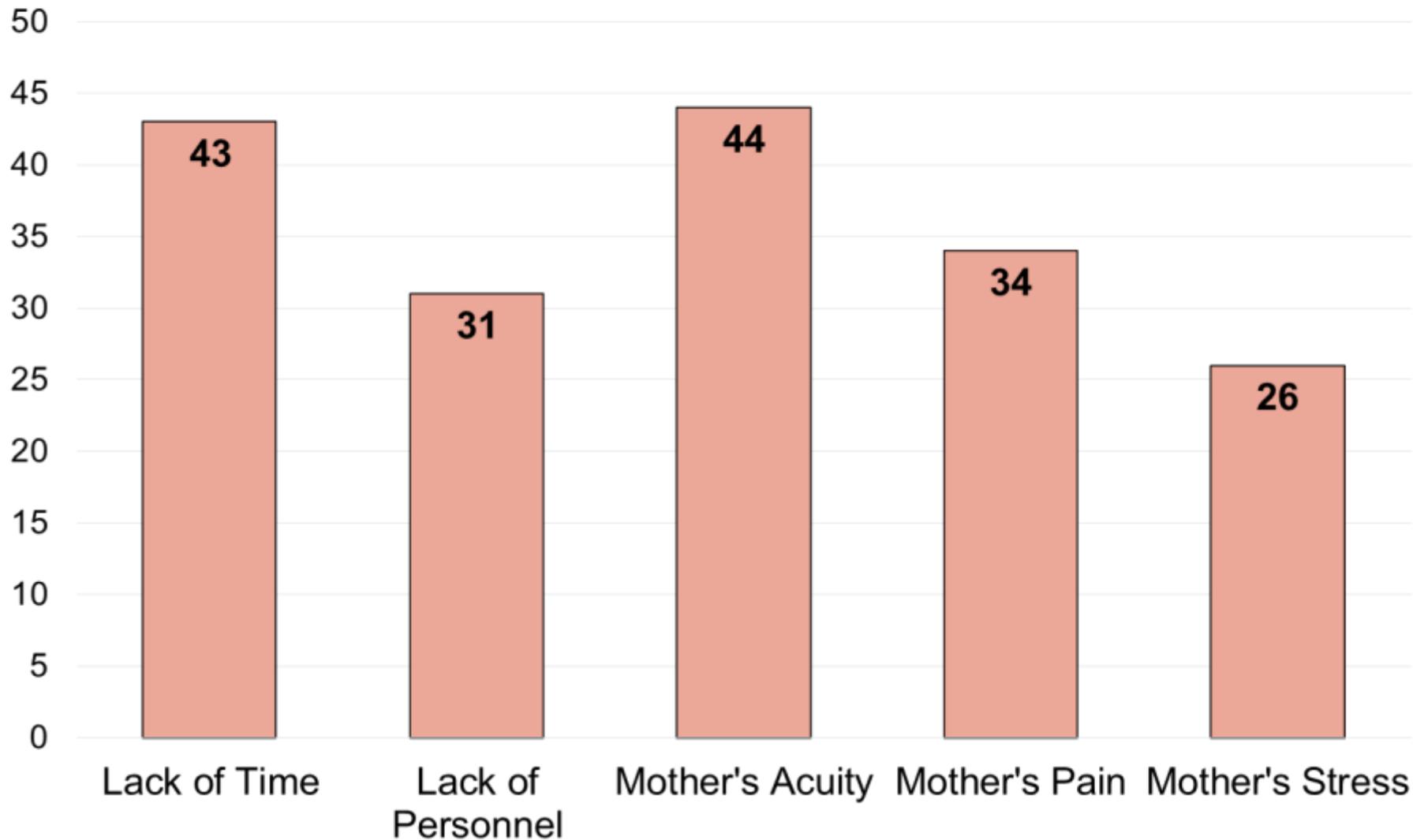
# Barriers to Initiation of Breast Milk Expression Following Delivery of Very Premature Infants: A Survey



# Comparison of Nurses' Judgment, Actions, and Understanding of Unit Policy



# Barriers to Early Initiation



# Removal of Barriers

- ▶ Nursing education
- ▶ Innovative staffing assignments
- ▶ Can someone besides a nurse assist with expression?
  - Family members
  - Others



# What's Next on the Horizon?



# Hand Expression



Where's the Evidence?

# Is Hand Expression the Best Technique for Early Expression?

- ▶ Determine the optimal technique for milk expression before lactogenesis stage II
  - Hand expression
  - Mechanical pump
  - Hand expression + Mechanical pump



# The End



Any Questions?



Partnering to Improve Health Care Quality  
for Mothers and Babies

Questions about MOM?

Technical Assistance:

[FPQC@HEALTH.USF.EDU](mailto:FPQC@HEALTH.USF.EDU)