

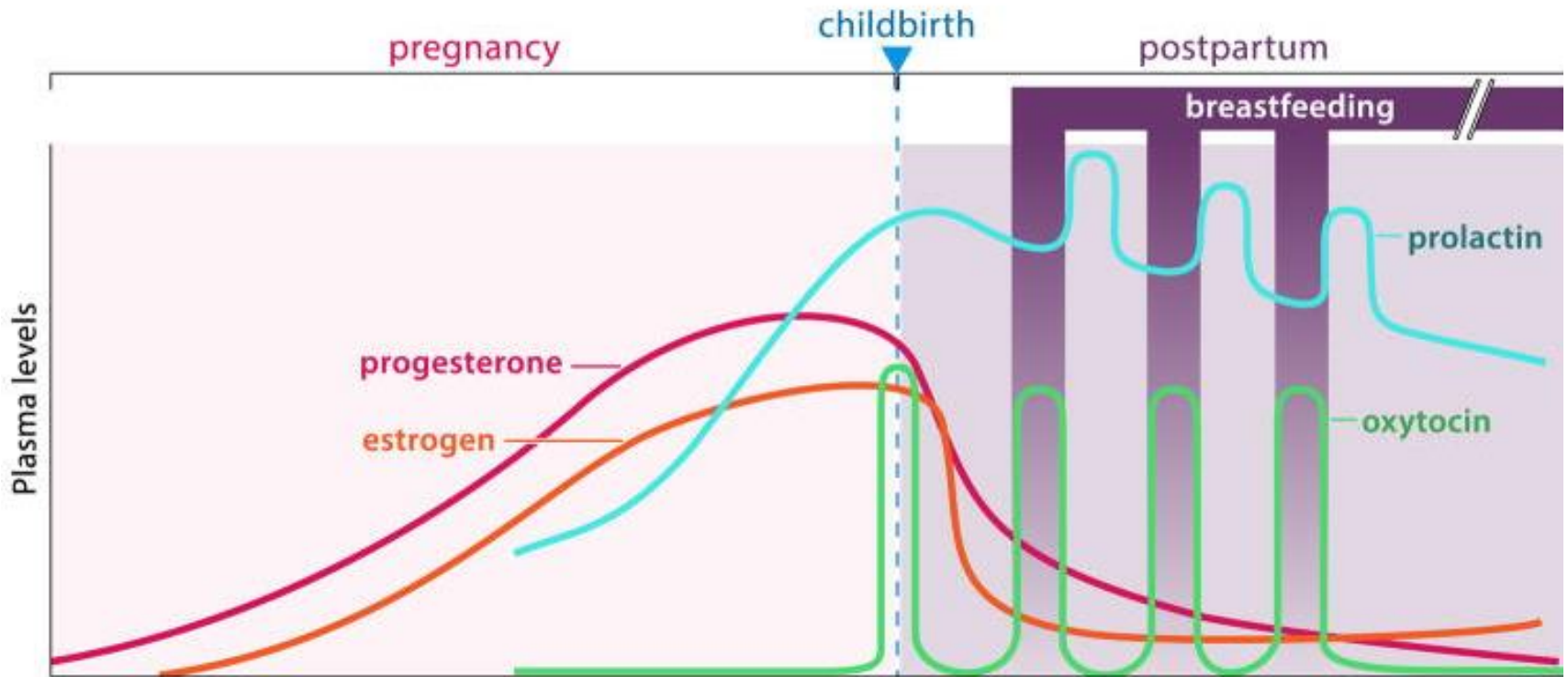
# Step 2 Establishment and maintenance of milk supply

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What we already know are...

# Hormone level during and after pregnancy



# How to establish and maintain milk supply

- Ideally, an infant should be breastfed within the first 2 hours after birth.
- Pump within 1<sup>st</sup> few hours after birth
- 8 to 12 times per 24 hours.
- The degree of breast emptying is a crucial
- More than 8 breastfeeding sessions in a 24-hour period prevents the decline of prolactin before the next feeding

# Pump early !

- Mothers who pumped within 1 hour had compared to mothers who pump within 6 hours
  - Significantly more milk during the first 7 days
  - Significantly more milk at week 3
  - Significantly earlier lactogenesis stage II

**Table 1** Milk volume (ml)

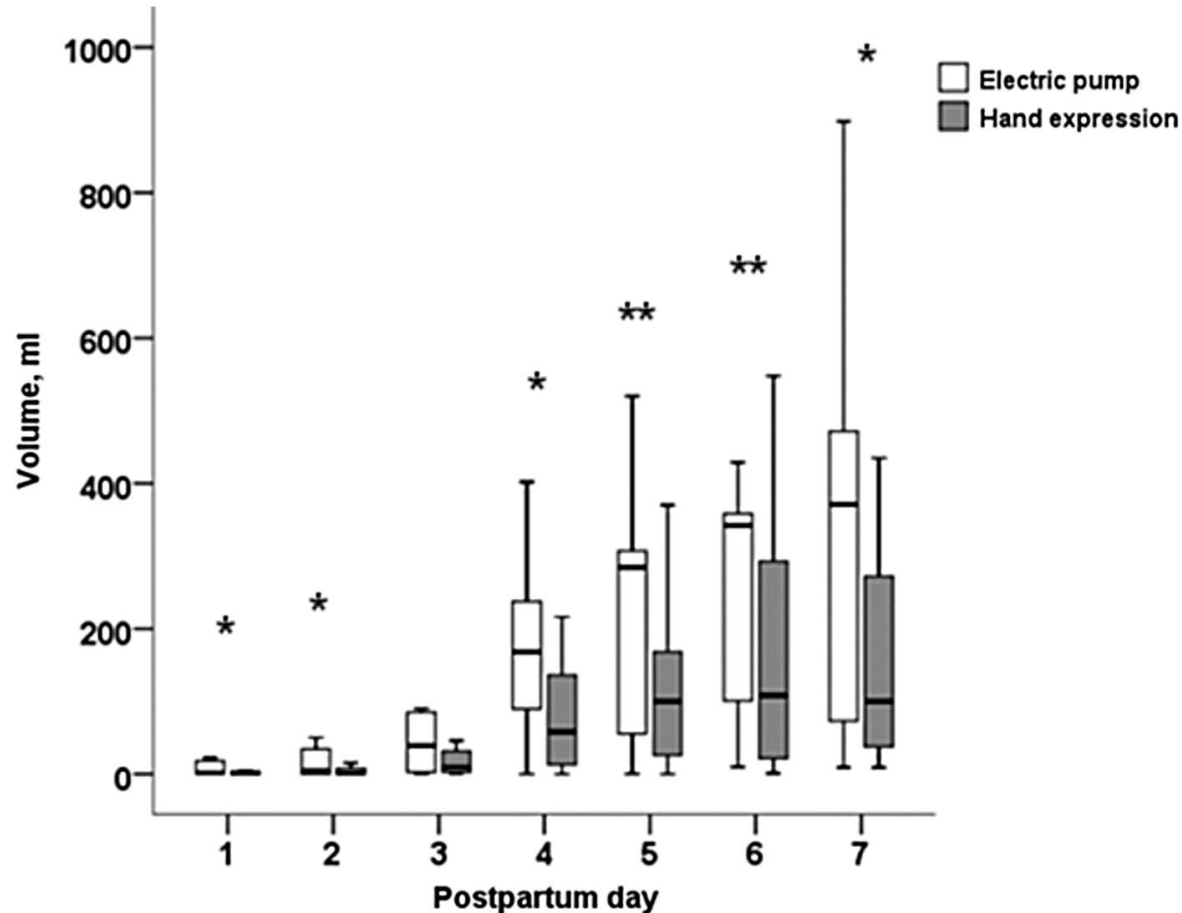
<i>Time</i>	<i>Volume of milk</i>		
	<i>Early initiation (n = 10)</i>	<i>Late initiation (n = 10)</i>	
	<i>M</i>	<i>M</i>	<i>P</i>
Initial expression session	4.19	0.1	0.14
Day 1	19.2	0.7	0.06
Day 2	76.7	2.2	0.01
Day 3	142.3	45.4	0.14
Day 4	185.7	69.9	0.09
Day 5	282.0	85.8	0.06
Day 6	322.0	191.9	0.06
Day 7	355.0	188.8	0.1
Total at 1 week <sup>a</sup>	1374.7	608.1	0.05
	<i>N = 8</i>	<i>N = 7</i>	
3 weeks <sup>b</sup>	613.0	267.2	0.01
	<i>N = 6</i>	<i>N = 4</i>	
6 weeks <sup>c</sup>	451.0	209.95	0.07

<sup>a</sup>Sum of all milk volume for days 1–7.

<sup>b</sup>24 h milk volume at 3 weeks.

<sup>c</sup>24 h milk volume at 6 weeks.

# Electric breast pump VS Hand expression



# Higher Fat Content in Breastmilk Expressed Manually: A Randomized Trial

	Manual expression	Pump expression	<i>p-value</i>
Mean fat (g/100 ml)	2.3 + 1.27	1.84 + 1.36	0.024
Mean protein (g/100 ml)	2.06 + 0.98	2.03 + 0.89	NS
Mean CHO (g/100 ml)	5.39 + 0.92	5.39 + 0.78	NS
Mean energy (kcal/100 ml)	53.47 + 13.66	48.9 + 14.8	0.04

# Predictors of expressed breast milk volume

- 62 mothers, GA <34 weeks
- Participate in RCT trials of double VS single pump
- 47 provides data on milk expression until hospital discharge

Table 5 Significant predictors of milk production during (1) the first 10 days (g/day)\* and (2) the whole NICU stay (mL/day)†

	Coefficient	95% CI	p Value
<i>(1) First 10 days, all subjects; n=62</i>			
Adjusted R <sup>2</sup> 0.34			
Total no episodes of breast feeding	17	8 to 26	0.001
Single (=1) vs double pumping (=2)	109	31 to 186	0.007
No. of days of records	17	1 to 33	0.04
<i>(2) Subjects with 7 or more days of records; n=54</i>			
Adjusted R <sup>2</sup> 0.27			
Total no episodes of breast feeding	17	7 to 26	0.001
Single (=1) vs double pumping (=2)	115	30 to 200	0.01
<i>(3) Whole stay in NICU prior to infant's discharge</i>			
Adjusted R <sup>2</sup> 0.59			
Double pumping vs single	218	80 to 356	0.003
Comfort score day 10	-103	-184 to -21	0.02
Reached target 500 mL by day 10	298	170 to 426	<0.001

\*Stepwise regression including gestational age, birth weight, number of days of records (model (1)), milk expressions per day, number of episodes of skin-to-skin contact, number of times infant put to breast, style of pumping (single=1, double=2), hospital.

†Stepwise regression including gestational age, birth weight, milk expressions per day in first 10 days, number of times infant put to breast in first 10 days, whether 500 mL/day achieved by 10 days (no=1, yes=2), style of pumping (single=1, double=2), score for comfort of pump on day 10 (1=best, 3=worst), hospital. NICU, neonatal intensive care unit.

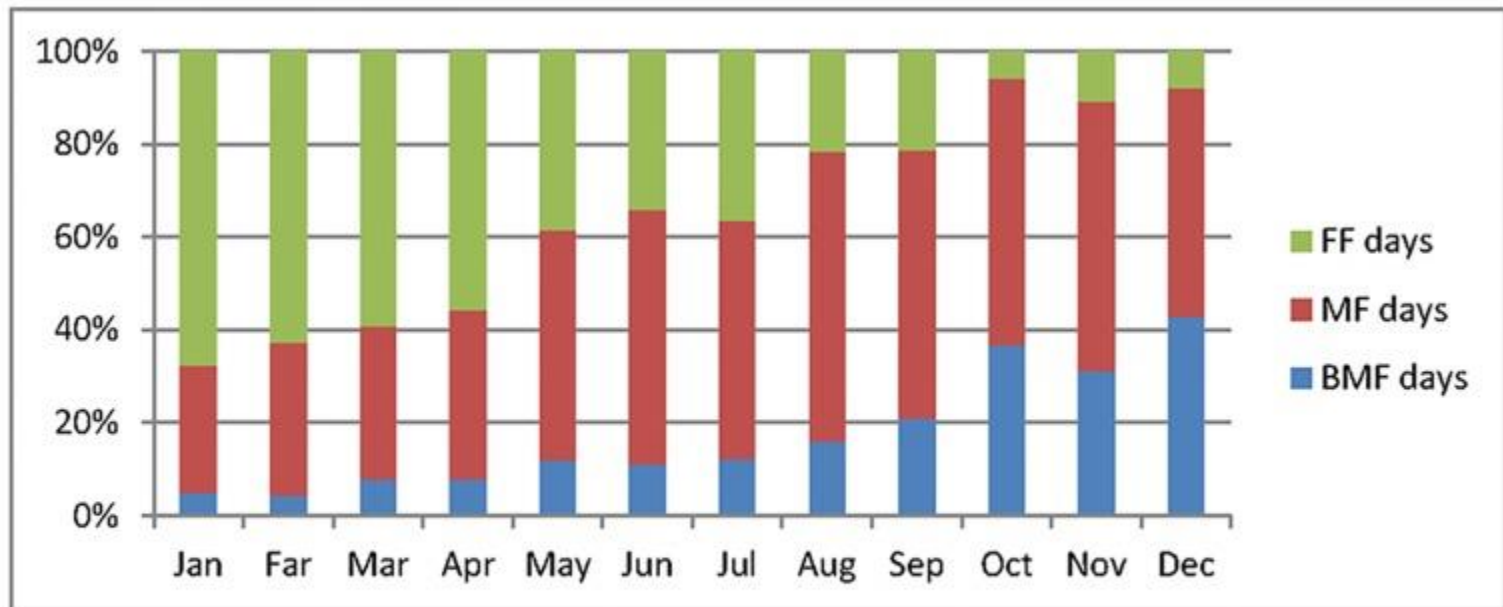


**My Pumping Diary**

Date:		Date:		Date:	
Pumping Time	Volume	Pumping Time	Volume	Pumping Time	Volume
<b>In total:</b>		<b>In total:</b>		<b>In total:</b>	
<b>Baby daily needs:</b>		<b>Baby daily needs:</b>		<b>Baby daily needs:</b>	
<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>	
Date:		Date:		Date:	
Pumping Time	Volume	Pumping Time	Volume	Pumping Time	Volume
<b>In total:</b>		<b>In total:</b>		<b>In total:</b>	
<b>Baby daily needs:</b>		<b>Baby daily needs:</b>		<b>Baby daily needs:</b>	
<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>	
Date:		Date:		Date:	
Pumping Time	Volume	Pumping Time	Volume	Pumping Time	Volume
<b>In total:</b>		<b>In total:</b>		<b>In total:</b>	
<b>Baby daily needs:</b>		<b>Baby daily needs:</b>		<b>Baby daily needs:</b>	
<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>		<b>Volume gap to the goal:</b>	

Milk pumping records can improve breast milk feeding rates

# Improvement of Expressed Breast Milk in Mothers of Preterm Infants by Recording Breast Milk Pumping Diaries in a Neonatal Center in China



The cross coordinate represents the month and the vertical coordinate represents the constituent ratio of the feeding pattern. Blue bar is BMF (breast milk feeding), red bar is MF (mixed feeding), green bar is FF (formula feeding).

# Galactogogues

- Dopamine antagonist
- Increase prolactin secretion
- Ex. Domperidone, metoclopramide, risperidone, phenothiazine, neuroleptics

# Domperidone study

Study	Population	Dose	Result
Da Silva et al 2001 (n=20)	Preterm (Mean GA 29 weeks)	10 mg three times daily total 7 days	Milk volume increase 44.5% VS 16.6% (p<0.05) PL increase 89% VS 13.8% (p=0.008) No adverse events
Campbell-Yeo et al 2010 (n=46)	Preterm GA<31 wks	10 mg three times daily total 14 days	Milk volume increase 267% VS 18.5% (p=0.005) PL increase 97% VS 17% (p=0.07) No adverse events
Knoppert et al 2013 (n=15)	Preterm GA<33 wks	10 mg or 20 mg three times daily total 4 weeks	Increase in daily milk volumes within each group (p<0.01) Dose of domperidone 20 mg, 3 times daily was associated with clinical, but not statistically significant

# EMPOWER Trial

**Table 2.** Outcomes on Days 14 and 28.

	Group A	Group B	OR (95% CI)	<i>p</i>
No. (%) of mothers who achieved a 50% increase in milk volume on Day 14	35 (77.8%)	26 (57.8%)	2.56 [1.02, 6.25] <sup>a</sup>	.04 <sup>a</sup>
Missing Day 14 volumes	0	5		
No. (%) of mothers who achieved 50% increase in milk volume on Day 28	31 (68.9%)	28 (62.2%)	1.35 [0.56, 3.22]	.51
Missing Day 28 volumes	4	7		

Note. CI = confidence interval; OR = odds ratio. Group A: 4 weeks of domperidone (*N* = 45). Group B: 2 weeks of placebo + 2 weeks of domperidone (*N* = 45).

<sup>a</sup>This favors Group A over Group B.

# EMPOWER Trial

**Table 4.** Mean Percentage Volume Change on Days 14 and 28.

	Group A	Group B	<i>p</i>
Mean (range) % volume change Day 0 to Day 14	254 (−100 to 2,129)	175 (−100 to 923)	.19 <sup>a</sup>
Mean (range) % volume change Day 15 to Day 28	<u>22 (−68 to 200)</u>	<u>49 (−100 to 254)</u>	<u>.05<sup>a</sup></u>

Note. Group A: 4 weeks of domperidone ( $N = 45$ ). Group B: 2 weeks of placebo + 2 weeks of domperidone ( $N = 45$ ).

<sup>a</sup>Wilcoxon rank sum test was used.

# Key factors for success



Time to initiate milk expression



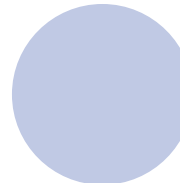
Methods of milk expression



Milk volume during first 2 weeks



Milk record chart



Feeding at the breast



NICU nursing lactation team

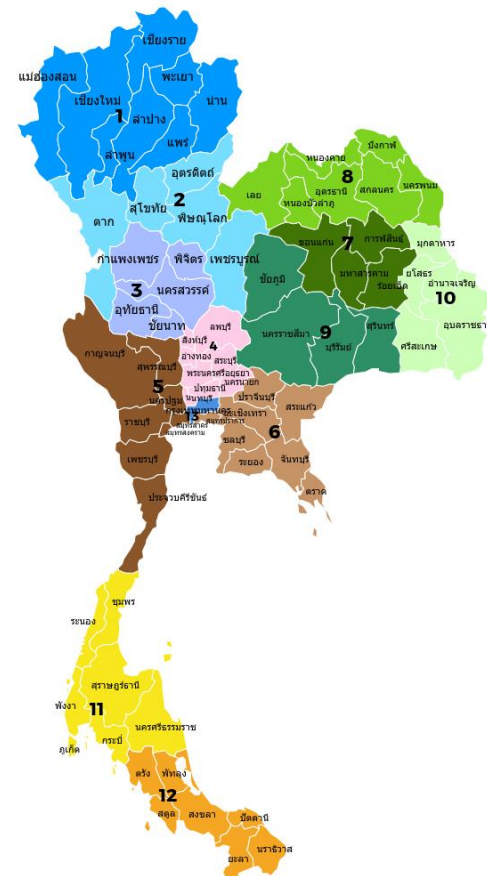
# Lessons learned: Challenges

- Unable to initiate early milk expression
  - Not fully recovered from anesthesia
  - Maternal complications eg. hypertension, postpartum hemorrhage
- Maternal mental and physical stress
- Inadequate equipment
  - Hospital
  - Household
- No on-site lactation team



# Lessons learned:

- Geographic disparity in mother vs baby treatment location
- Short maternity leave



# Clinical practice guidelines

- Establishment
  - Written hospital policy
  - Give information regarding breast milk benefits and how to succeed in breastfeeding these vulnerable infants
  - Set goals with mother
  - Encourage mother to express milk regularly
  - Give clear instructions for milk expression and collection
  - Prepare proper equipment for milk expression
  - Establish hospital connections for milk transfer

# Clinical practice guidelines

- Maintenance
  - Maternal support
  - Create relaxing atmosphere to express milk
  - Encourage mother to express and record milk volume regularly
  - Positive reinforcement from healthcare personnel
  - Set up on-site lactation team
  - Use indicator tools for early detection of milk inadequacy

# Controversial issues

# Methods of expression

## **Hand expression**

- **Strength**
  - Low cost, no equipment need
  - Gentle
  - Might get more fat content
- **Weakness**
  - Maternal exhaustion
  - Lower volume
  - Technique dependent

## **Electrical breast pump**

- **Strength**
  - Higher milk volume
  - Easy to use
- **Weakness**
  - Quality of pump matter
  - Sophisticate equipment
  - High cost

# Geographic problems

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**Thank you**