

**Prologue**

- Born and raised in Chicago
- Not breastfed as a baby
- Catholic school K-12
- Summer job at a prenatal/abortion clinic on the West side
- Knox College
- University of Michigan Medical School
- Obstetrician?
- Pediatrician!

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**Preface**

- University of Minnesota for Residency in Pediatrics x 3 years
- Chief Resident x 1 year
- Combined Fellowships: Neonatology and Pediatric Cardiology x 5 years
- Division of Pediatric Cardiology x 3 years
- Saint Cloud Hospital/CentraCare Heart and Vascular Center
- May 2023: 24 years in Saint Cloud

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**Preface**

- I had spent practically my ENTIRE medical career focused on the care of women, infants and children...
- BUT I learned NOTHING about breastfeeding...
- ...until...

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**Preface**

- November 2018
- San Francisco
- 23<sup>rd</sup> Annual International Meeting of the Academy of Breastfeeding Medicine
- For 2 ½ days I sat with my mouth agape and realized that I was...

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**“Clueless! The 8 Things I Wish I Had Learned About Breastfeeding As a Pediatrician”**  
Edward “Chip” Martin-Chaffee, MD, FAAP

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**Disclosures**

- CentraCare Health

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**“Clueless...”**

Here are the top 8 things I wished I had learned during my medical education as a student, intern, resident, fellow, attending

These are some of the things I (we) need to teach medical personnel about breastfeeding

There is a medical school coming to Saint Cloud

Goal is to matriculate and educate medical students who will choose to practice in rural Minnesota

We need to create a curriculum to educate these potential rural practitioners regarding the benefits of breastfeeding

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**#1:Breastmilk has Bacteria in it... on Purpose!**

- Infant gut is sterile (mostly)
- Ingestion of breastmilk begins to populate the gut with healthy bacteria
- Bacteria that your mother has in her gut
- Microbiota-Gut-Brain axis:
- In animal models gut bacteria cooperate with their animal hosts to regulate the development and function of the immune, metabolic, and nervous systems
  - >200 strains of bacteria in breast milk
  - Lactobacilli, Bacteroides, Bifidobacteria, Propionibacteria

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**#1:Breastmilk has Bacteria in it... on Purpose!**

- These bacteria are extremely helpful in the fetal/newborn gut:
  - Break down toxins
  - Process electrolyte/salt absorption
- Populate the gut and “take up room” so more harmful bacteria cannot get a “foothold” and cause problems
- But what can occur if these “good”bacteria are absent or removed?

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**#1: Breastmilk has Bacteria in it... on Purpose!**

- When I was a resident:
  - "Rule out sepsis"
  - Ampicillin and Gentamicin
  - 3 day rule out
  - Changes the gut microbiome
- Antibiotics in babies
- Antibiotics in Moms with preterm infants
  - Proteobacterium phylum
    - Pseudomonas
    - Necrotizing enterocolitis

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**#2: Breastmilk has Oligosaccharides (HMO's)**

- More than just lactose (disaccharide)
- HMO's = Prebiotics
  - Complex sugar molecules
  - 2'fucosylactose (2'FL)
  - Lacto-N-neotetraose (LNnT)
  - Anti-bacterial, anti-viral, anti-inflammatory
- Preferentially feed beneficial gut bacterium
- Interact with the surface of pathogenic bacteria
- Inhibit their binding to host cell receptors
- We lack alpha-galactosidase (a good thing)
- HMO's can cause bloating, flatulence, diarrhea (bad thing)

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**#3: Breastmilk has a Host of Positive Benefits for Babies**

- Colostrum:
  - low viroload but HIGH anti-viral load
  - Highest CMV Ab activity (even higher if Mom is CMV+)
- <32 weeks and <1500 grams: after 2-3 weeks only give frozen BM
- <33 weeks: increased brain connectivity if breast milk for >90% of hospital days
- Breast feed for >12 months: less obesity at 24-36 months
- Exclusive breast feeding ≥4 months: protects against asthma symptoms and respiratory allergies in early childhood

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**#3: Breastmilk has a Host of Positive Benefits for Babies**

- Holding and breastfeeding during heel stick
  - Maximal analgesic effect
- Less type I diabetes, SIDS, ear infections, GI illnesses
- Longer breastfeeding duration:
  - increased verbal IQ score when school age
  - increased performance on IQ tests 3.4 points

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**#4: Breastfeeding has a Host of Positive Benefits for Moms**

- Breast Cancer
- Ovarian Cancer
- Type II diabetes
- Coronary artery disease
- Stroke
- Hypertension
- Obesity
- Osteoporosis
- Hypercholesterolemia

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**#4: Breastfeeding has a Host of Positive Benefits for Moms**

- Breastfeeding for ANY duration:
  - 12% decreased risk for stroke
  - 14% decreased risk for CAD
  - 17% decreased risk of dying from CAD
- “It is empowering for a mother to know that by breastfeeding she is providing optimal nutrition for her baby while simultaneously [decreasing] her personal risk for heart disease.”
  - Shelly Miyamoto, MD

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**#4: Breastfeeding has a Host of Positive Benefits for Moms**

- Breastfeeding is a Population Health issue
- If Moms are Healthier...
  - Families are Healthier and...
  - Communities are Healthier and...
  - Cities are Healthier and...
  - Countries are Healthier and...
  - The World is Healthier

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**#5: Formula Industrial Complex**

- “Wet” nursing => “Dry nursing”
  - Brunettes preferred to Blondes and Redheads
- 1838: Simon-first chemical analysis of breast milk
- 1860: first commercial formula (wheat flour, sugar, malt, cow’s milk)
  - Civil War and sweetened condensed milk
- 1870: Nestle’s Infant Food
- 1890-1915: physicians should be in charge of infant nutrition
  - % method of infant formula feeding
- 1883: Myenberg and unsweetened evaporated milk

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**#5: Formula Industrial Complex**

- 1915: milk pasteurization universally practiced in the US
- 1930’s: evaporated milk+sugar+water
- 1940-1960: infants not breastfed were given em+s+w
- Back on the Southside of Chicago as an infant
- Evaporated milk + Karo syrup +water
  - What’s the osmolality?
- Breastfeeding was practiced by “poor people”

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**#5:Formula Industrial Complex**

- “Humanized” Formula
- Early 20<sup>th</sup> century: E. Mead Johnson-cow’s milk additive
- Focus shifting from protein content of milk to the fat and CHO content
- 1912 AMA meeting: Dextrin-Maltose
- 1919: SMA (“simulated milk adapted”) first to add cod liver oil
- 1920’s: Nestle makes Lactogen to compete with SMA
  - Vegetable oil derived fat blend

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**#5:Formula Industrial Complex**

- 1926: Bosworth (chemist) and Bowditch (pediatrician) in Boston release Similac (“similar to lactation”) made by the Moores and Ross Milk Company
- Name proposed by M. Fishbein, editor of the JAMA
- 1920’s: Mead Johnson releases Sobeey (soy formula)
- 1950’s: commercial formulas start to gain traction
- 1959: Mead Johnson releases Enfamil (“infant milk”)
- 1970’s: commercial formulas replaced em+s+w and breastfeeding reached an all-time low of 25%
- Ease of use, low cost, belief that formulas were “medically approved”

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**#5:Formula Industrial Complex**

- 1960’s and 1970’s: hospitals use formulas
  - Inexpensive or free
  - Ready to feed bottles
  - Pediatricians were not encouraging breastfeeding
- 1967: AAP Committee on Nutrition
- Recommend vitamins and nutrients be added
- 1969: recommend iron fortification of formula

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**#5: Formula Industrial Complex**

- 1980's: Pediatric Internship and Residency at U of M
- Formula and Formula Reps:
  - Noon Conference
  - Grand Rounds
  - Meetings
  - Morning report
  - Every pregnant resident or expectant resident father
- Chief Resident:
  - Phone #'s on Speed dial

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**#5: Formula Industrial Complex**

- In 2022 the formula industry made >\$68,000,000,000
- Hospitals and OB/GYN and Pediatric residencies (un)wittingly contribute to the "unpromotion" of breastfeeding
- We have started to rethink this...

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**#6: The Golden Hour**

- Successful breastfeeding begins in the first hour of life
- Skin-to skin if both Mom and baby are healthy
- Put baby to breast right away
- Baby's olfactory sense assists with latching
- Lactogenesis III is an autocrine control
  - Supply-demand issue
  - As milk is removed more milk is made
- Delaying the first bath 12-24 hours

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**#6: The Golden Hour**

- Better temperature maintenance and VS stabilization for baby when skin to skin
  - More stable/normalized temperature after delayed first bath
  - Subsequently no too tired to nurse after the bath
- Maternal stress hormones decrease for Mom
  - Recover more quickly following a C/S
- Mom and baby rooming in
- No Nursery!
- An actual quote: "No just leave the baby in the NBN and you get a good night's sleep. We can bottle feed him overnight and you can try and breastfeed again in the morning."
- Infant Driven Feeding vs scheduled feedings

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**#7: Hypoglycemia**

- As an intern/resident => HUGE motivator
- Brain starved of glucose if <45 mg/dL (that was our cutoff then)
- Even asymptomatic babies were either bottlefed formula or had an IV started with D10W
- NEVER saw breastfeeding as a solution
- In fact breastfeeding was often BLAMED for the baby's low glucose
  - Inadequate lactose levels
  - Inadequate production/amounts being ingested at the breast

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**#7: Hypoglycemia**

- The definition of hypoglycemia in a newborn has ALWAYS been controversial
- Transient hypoglycemia in the first hours after birth is quite common in healthy term infants and is self-limited
- Spontaneous elevation of glucose levels by 24 hours of age
- Gluconeogenesis, glycogenolysis, \*ketogenesis
  - Neonatal brain effectively utilizes ketones for energy and "...provides glucose sparing fuel to the brain"

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**#7: Hypoglycemia**

- “No studies have shown that treating transiently low blood glucose levels results in better short or long term outcomes compared with no treatment”
- “NO evidence that hypoglycemic babies with no clinical signs benefit from treatment”
- “Transient, single, brief periods of hypoglycemia are very unlikely to cause permanent neurologic damage”

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**#7: Hypoglycemia**

- “Therefore the monitoring of blood glucose concentrations in healthy, term, appropriately grown neonates is unnecessary and potentially harmful to parental well-being and the successful establishment of breastfeeding”

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**#7: Hypoglycemia**

<u>Hours after birth</u>	<u>&lt;5<sup>th</sup> % plasma glucose</u>
• 1-2 hours (nadir)	28 mg/dL
• 3-47 hours	40 mg/dL
• 48-72 hours	48 mg/dL
<ul style="list-style-type: none"> <li>• Babies were mixed fed or formula fed</li> <li>• Plasma glucose levels are known to be lower in healthy, term, breastfed babies</li> </ul>	

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#8: Antenatal Milk Expression

- Hand expression of milk prior to delivery
- 37 weeks
- 5 minutes/side 3x daily
- Contraindicated
  - History of threatened/actual preterm labour
  - Current threatened premature labor and mother receiving tocolytics
  - Cervical incompetence

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#8: Antenatal Milk Expression

- Ideal for mothers with type I or gestational DM
- Address hypoglycemia without needing to use formula
- Helps stimulate more colostrum
- Encourages breastfeeding success
- “But why not just ONE bottle?”
  - “once formula supplementation begins in the hospital, even for mothers who are intending to breastfeed exclusively, there is a 2x greater risk of not fully breastfeeding by 30-60 days and a 3x greater risk of stopping breastfeeding by 60 days”

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...so I was clueless..

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“Success is not final; failure is not fatal. It is the courage to continue that counts.”  
-Winston Churchill

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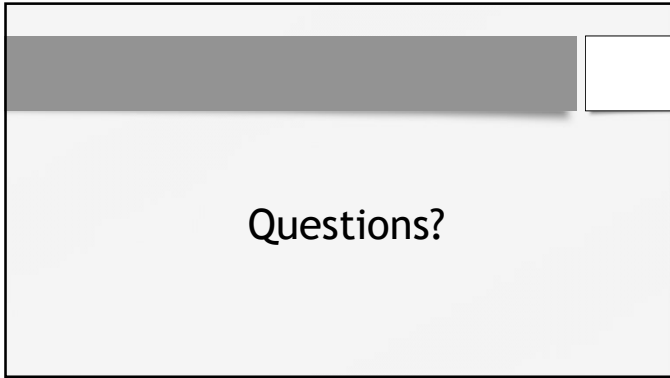
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