



Prenatal and Neonatal Nutrition :



- Status of neonatal nutrition and policy
- Components of amniotic fluid and breast milk
- Role in gut maturation and health
- Impact of Healthy People 2030 guidelines and COVID 19
- Infant Formula Crisis 2022 and current assessment

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Surgeon General's Call to Action to Support Breastfeeding - 2011




Regina M. Benjamin, MD, MBA
<http://www.surgeongeneral.gov>

(2009-2013)

- “Breast feeding is the best source of infant nutrition and immunologic protection, and it provides remarkable benefits to mothers as well.”
- Reiterated the goals of Dr. David Sachter's 2000 goals set within a Blueprint for Action of Breast feeding.

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Healthy People Initiative– 1979

(led to Healthy People 1990 guidelines)

Healthy People provides science-based, 10-year national objectives for improving the health of all Americans. For 4 decades, Healthy People has established benchmarks and monitored progress over time in order to:

- Encourage collaborations across sectors.
- Guide individuals toward making informed health decisions.
- Measure the impact of prevention activities.

Four foundation health measures will serve as an indicator of progress towards achieving these goals:

1. General Health Status
2. Health-Related Quality of Life and Well-Being
3. Determinants of Health
4. Populations - Race or ethnicity, sex, sexual identity, age, disability, socioeconomic status, and geographic location all contribute to an individual's ability to achieve good health. It is important to recognize the impact that social determinants have on health outcomes of specific populations.

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Healthy People 2030

- Driven by data collected 2010-2020
- Did we meet the 2020 goals?
- Outcomes informed goals for 2030
- Currently collecting data for the decade 2020-2030


• <https://odphp.health.gov/healthypeople/about/timeline>

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Excess Health Risks Associated with Not Breastfeeding	
Outcome	Excess Risk* (%)
<u>Among full-term infants</u>	
Acute ear infection (otitis media)	100
Eczema (atopic dermatitis)	47
Diarrhea and vomiting (gastrointestinal infection)	178
Hospitalization for lower respiratory tract diseases in the first year	257
Asthma, with family history	67
Asthma, no family history	35
Childhood obesity	32
Type 2 diabetes mellitus	64
Acute lymphocytic leukemia	23
Acute myelogenous leukemia	18
Sudden infant death syndrome	56
<u>Among preterm infants</u>	
Necrotizing enterocolitis	138
<u>Among mothers</u>	
Breast cancer	4
Ovarian cancer	27

Agency for Healthcare Research and Quality (AHRQ), 2007, www.surgeongeneral.gov

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AHRQ Report – study limitations

- All data was from observational studies.
- Associations do not imply causality.
- Wide variety in quality of data for outcomes.
- Agency for Healthcare Research and Quality
 - Branch of HHS (.04% of HHS spending, 300 members)
 - <https://www.ahrq.gov/>
 - 80-90% reduction in budget (4/3/2025)
 - Merge with HHS Office of the Assistant Secretary for Planning and Evaluation

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AHRQ Report –potential economic impact*

- Meeting goals of Healthy People 2010
 - Economic impact of otitis media, gastroenteritis, and NEC would be \$3.6 billion dollars annually
 - Direct - Formula, physician, hospital, clinic, laboratory
 - Indirect - Lost wages, premature death

*based on the 2007 report

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Economic impact data – additional estimates

- Also included SIDS, lower respiratory tract infection, dermatitis, leukemia, obesity, asthma, type I diabetes
 - Assuming 90% compliance with exclusive breastfeeding for 6 months
 - \$13 billion annually
 - Assuming 80% compliance with exclusive breastfeeding for 6 months
 - \$10.5 billion annually

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(last updated July, 2022)

- Recommendations for term infants
 - Infants should be **exclusively** breast fed for 6 months (no formula, water, glucose, juice)
 - Infants should be breastfed from 6-12 months with gradual introduction of solid foods
 - Acknowledges benefits from breastfeeding beyond 1 year for mother
 - Protections against workplace barriers for mothers who choose to extend breastfeeding
 - Birth hospitals that implement maternity care that improves breastfeeding initiation, duration and exclusivity.

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- Recommendations for high risk/premature infants
 - infants should be breastfed directly or by using mother's expressed milk
 - Banked human milk should be used (pasteurized in Human Milk Banks using national screening guidelines)
 - Skin to skin contact

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Progress report – national and state

Entity	Initiated BF	BF at 6 months	BF at 12 months	Exclusive BF at 3 months	Exclusive BF at 6 months
2010 Targets*	75%	50%	25%	40%	17%
National**	73.9 %	43.4%	22.7%	33.1%	13.6%
South Carolina***	61.3%	30.4%	13.9%	25.5%	9.6%

* Healthy People 2010 goal

** CDC Report Card 2009 – data used to form 2020 goals

*** SC 2009 data - Few states met targets

Note : 1972 – 27% of infants were breastfed

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Conclusions prior to setting 2020 goals :

- **Success**
 - Initiation of breastfeeding target of 75% was met
 - Represents a continued, but slow, improvement
- **Disappointments**
 - Half of breastfed newborns were supplemented with formula while still in the hospital
 - More than 40% of infants are given solid foods within the first 4 months of birth
 - **Unacceptable disparities** persist populations (as defined by OMB), socioeconomic groups, and geography

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OMB

Office of Management and Budget

- Defines the Standards for data collection
- Defines Racial/Ethnic groups for data collection, surveys, census reports, programing
- Updated after a 2-year review (SPD 15) March, 28 2024
- Requires implementation by March, 2029
 - Application to 2030 census
 - [Updates to Race/Ethnicity Standards for Our Nation](#)

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Population Differences

Group	Initiated BF	BF at 6 months	BF at 12 months
National Target for 2010	75%	50%	25%
Race / Ethnicity National (SC)			
Hispanic (SC)	80.4% (76.7%)	45.1% (46.4%)	24% (21.8%)
White, non-Hispanic (SC)	74.3% (71%)	43.2% (36.3%)	21.4% (15.8%)
Black, non-Hispanic (SC)	54.4% (43.3%)	26.6% (15.9%)	11.7% (4.6%)
American Indian/Alaska Native	69.8% (na)	37.1% (na)	19.4% (na)
Asian or Pacific Islander	80.9% (na)	52.4% (na)	29.7% (na)

Source: Centers for Disease Control and Prevention National Immunization Survey, Provisional Data, 2007 births. http://www.cdc.gov/breastfeeding/data/NIS_data/index.htm

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Socio-economic factors

Group	Initiated BF	BF at 6 months	BF at 12 months
National Target for 2010	75%	50%	25%
Recipient of WIC			
Yes	66.1%	32.7%	16.5%
No, but eligible	76.5%	50.4%	30.1%
No, not eligible	82.2%	51.7%	25.5%
Mother's education			
Less than HS or GED	66.2%	35.9%	19.9%
HS or GED	65.2%	31.7%	15.7%
Some College	74.8%	40.5%	19.7%
College Graduate	85.4%	56.5%	28.6%
Mother's age			
< 20	53%	19.3%	8.1%
20 – 29	69%	33.8%	16.2%
≥ 30	77.5%	48.5%	25.4%

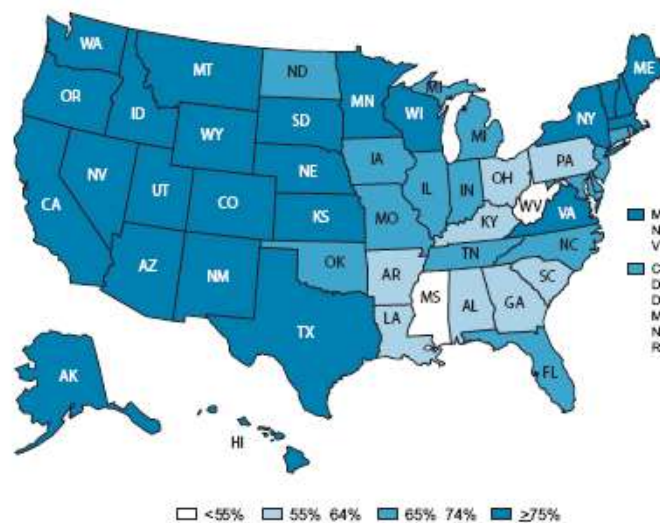
Source: Centers for Disease Control and Prevention National Immunization Survey, Provisional Data, 2007 births. http://www.cdc.gov/breastfeeding/data/NIS_data/index.htm

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Geographical differences

(initiation of breastfeeding)




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Perceived/real barriers

<ul style="list-style-type: none"> • Lack of knowledge <ul style="list-style-type: none"> – Specific benefits to health – “How to” • Perceived inconvenience to lifestyle (45%) • Social norms <ul style="list-style-type: none"> – Immigrants, generational decrease – Poor family and social support • Hospital practices <ul style="list-style-type: none"> – Separation of mother and newborn 	<ul style="list-style-type: none"> • Embarrassment <ul style="list-style-type: none"> – Conflicts over public breast feeding (43% approval) – Cultural regard for breast as a sexual object • Lactation problems <ul style="list-style-type: none"> – Pain, soreness – Lack of milk • Employment and child care <ul style="list-style-type: none"> – Milk collection, place and time – Short maternity leave
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Solutions

- EDUCATION!
 - Support groups for new mothers
 - Adherence of Formula Manufactures to federal guidelines for marketing practices
 - Inclusion and promotion of Breast feeding by WIC
 - Support for appliances and education
 - Employment and childcare
 - Among 173 countries, the US is 1 of 4 without a national policy requiring paid maternity leave (the others are Swaziland, Liberia, and Papua New Guinea), [2014 International Labor Org](#)
 - US is 1 of 7, Marshall Islands, Micronesia, Nauru, Palau, Papua New Guinea, Tonga , [2024](#)
 - Among 41 wealthy countries, the US is the only country without national policy for paid leave, [2018 Pew report](#)
 - Lactation friendly sites in the workplace for milk collection

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“The Impact of the Sequester on WIC - - Will WIC Be Able to Serve All Eligible Low-Income Women and Young Children Who Apply?”
April 11, 2013/ Center on Budget and Policy Priorities



As of March 28, 2025, the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) is operating with sufficient funding to serve all eligible participants. In fiscal year 2024 Congress allocated \$7.03 billion to WIC. \$7.75 was requested for the current budget year to ensure the program could meet the needs of eligible individuals.

However, as of now, Congress has not finalized the appropriations for WIC for FY 2025. [NWICA Media](#)

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<https://doi.org/10.1542/peds.2022-057988>

- **Contra-indications**

- Infants with classic galactosemia (galactose 1-phosphate uridylyltransferase deficiency)
- Mothers with active tuberculosis disease or positive for T-cell lymphotropic (HTLV 1 and 2) viral infection
- Mothers receiving diagnostic or therapeutic radioactive isotopes, anti-metabolites or chemotherapeutic reagents.

- **Resource for contra-indicated drugs**

- **Drugs and Lactation Database (LactMed®)** from the National Institute of Child Health and Human Development,
<https://www.ncbi.nlm.nih.gov/books/NBK501922/?report=classic>

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- **Contra-indications**

- Mothers using drugs of abuse, “street drugs”
- Mothers with active herpes simplex lesions
- Mothers infected with HIV virus
 - Conflicting evidence – African HIV positive mothers breastfeeding exclusively did not increase the rate of transmission BUT those mixed feeding (breast and formula) had an increased rate of transmission.
 - ART treated mothers with undetectable viral load reduces risk of transmission to 1%

- **Avoid**

- Alcohol, nicotine, caffeine

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Development of the fetal gut

Wagner CL, Taylor SN, Johnson D
Clinic Rev Allerg Immunol (2008) 34:191-204

- **Phase 1 Embryonic Phase of Organogenesis**



Primitive gut – conception to 5 weeks

- **Phase 2 Rapid Growth and Differentiation**

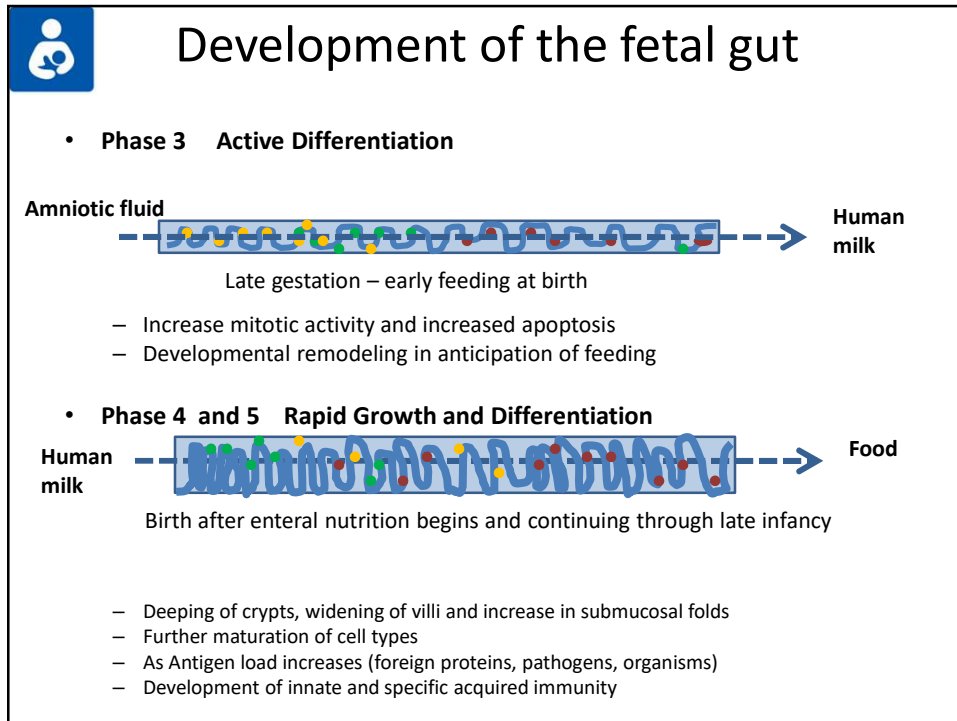


Gut tube with lumen and movement of fluid from mouth to anus at 8 weeks
5 weeks to late gestation

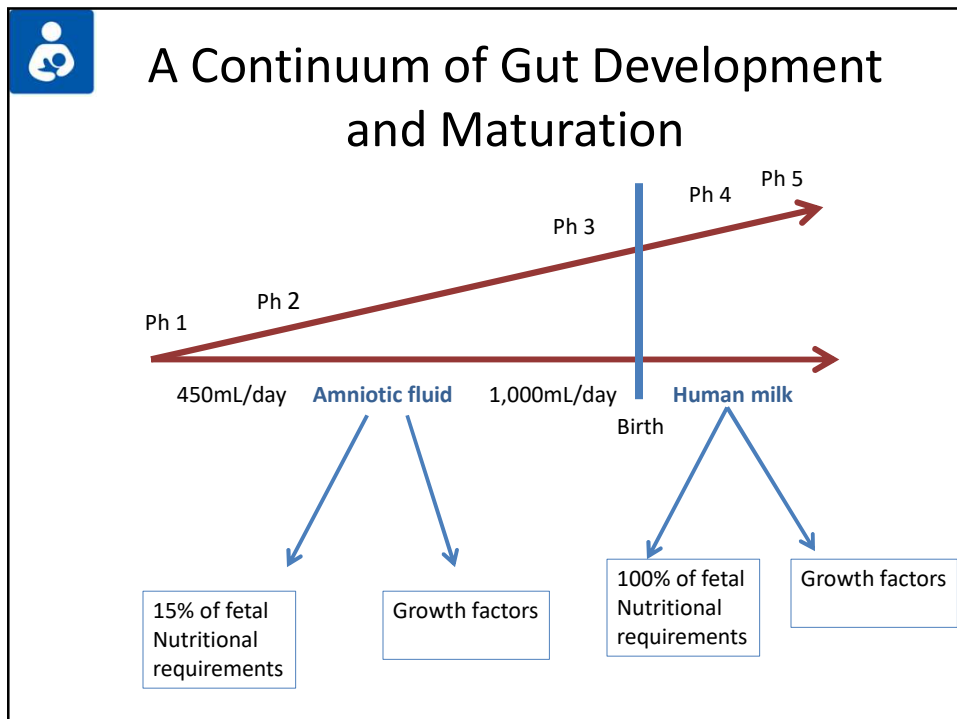
- 1000X elongation
- Development of crypts, villi, and microvilli
- Swallowing of amniotic fluid
- Blockage of amniotic fluid flow inhibits development

X

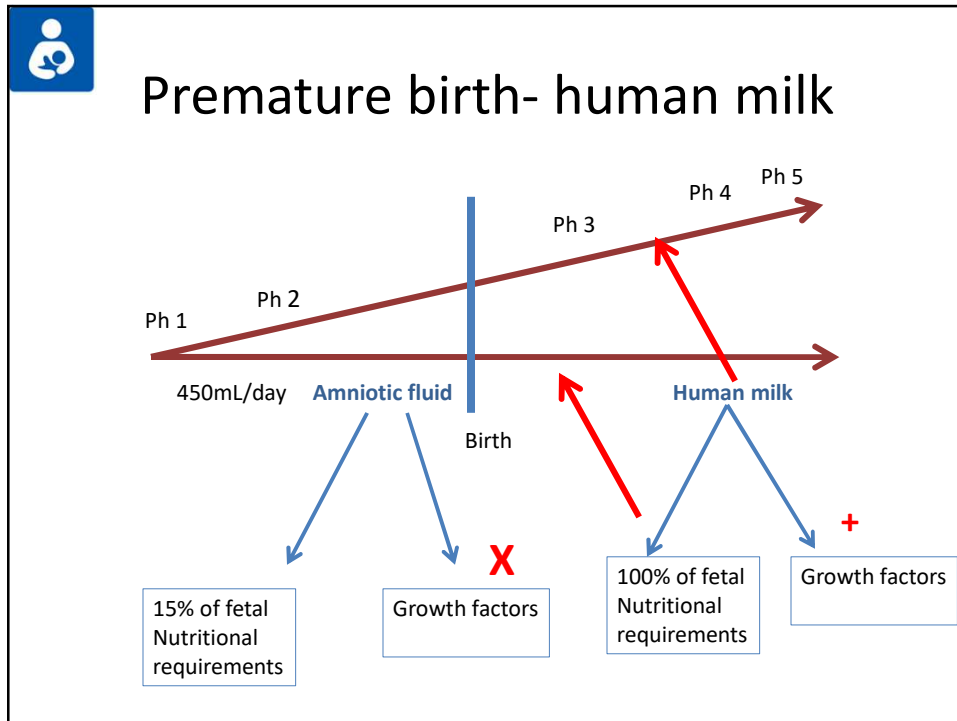
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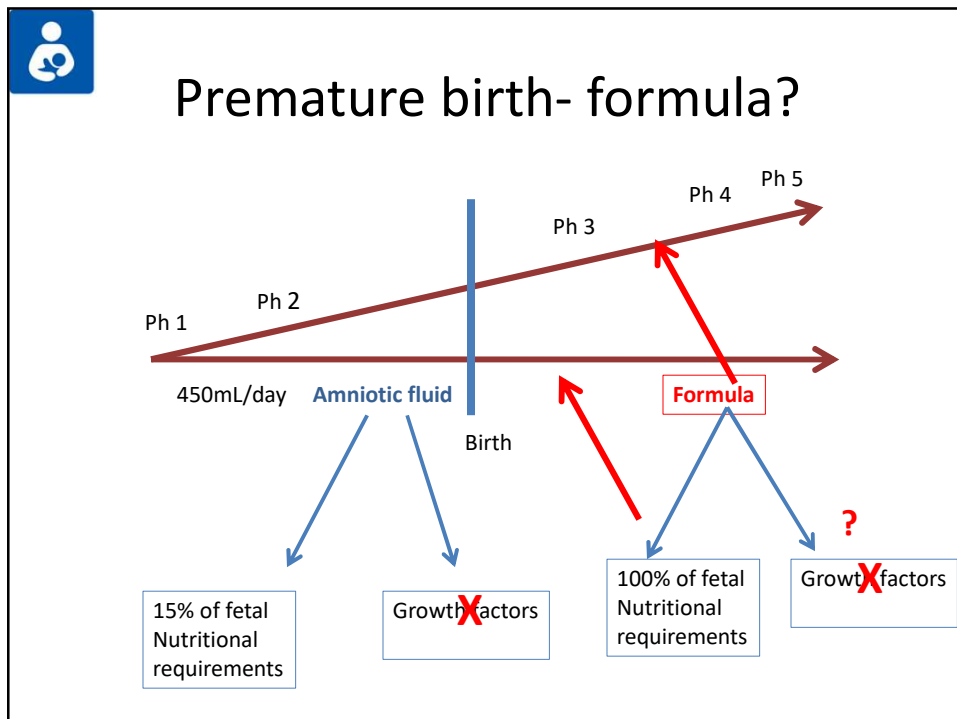
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Components of amniotic fluid

- Proteins
- Carbohydrates
- Lipids and phospholipids
- Urea and electrolytes
- Source of these substances
 - Secreted by cells lining the amniotic cavity in early pregnancy
 - Contains increasing amounts of fetal urine with advancing development of the fetal kidney
 - Fetal lung secretions

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Growth factors in amniotic fluid

- Ligands for Kinase and Kinase-associated receptors
 - Receptor tyrosine kinases
 - Epidermal Growth Factor (EGF)
 - Insulin-like Growth Factor (IGF-1)
 - Hepatocyte Growth Factor (HGF)
 - Vascular Endothelial Growth Factor (VEGF)
 - Transforming Growth Factor α (TGF- α)
 - Heparin-binding EGF-like Growth Factor (HB-EGF)
 - JAK-STAT Receptors
 - Interleukins (IL)
 - Human Growth Factor
- In vitro models (fetal gut cells)
 - While EGF was shown to increase in concentration with advancing gestational age, the other factors are thought to work in synergy with EGF for complete bioactivity of the amniotic fluid (Wagner and Forsythe, 2000)

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Transition to breast milk

- Ligands for Kinase and Kinase-associated receptors
 - Receptor tyrosine kinases
 - Epidermal Growth Factor (EGF)
 - Insulin-like Growth Factor (IGF-1)
 - Hepatocyte Growth Factor (HGF)
 - Vascular Endothelial Growth Factor (VEGF)
 - Transforming Growth Factor α (TGF- α)
 - Heparin-binding EGF-like Growth Factor (HB-EGF)
 - JAK-STAT Receptors
 - Interleukins (IL)
 - Human Growth Factor

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Observations in the infant and mother

- EGF levels in amniotic fluid increase steadily during pregnancy.
- EGF levels in breast milk are the highest in the first few days following parturition.
- EGF levels in breast milk gradually decrease during the first month of lactation.
- Infant derived salivary EGF increases with gestational and post natal age
- **EGF levels in milk of mothers with extremely pre-term infants are 50%-80% higher than those with mothers of full-term infants.**

Dvorak, B (2010, J Pediatrics 156:S31-5)

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GROWTH & DEVELOPMENTAL FACTORS IN BREAST MILK

GROWTH FACTOR or DEVELOPMENTAL FACTOR	RECEPTOR SIGNALING PATHWAY	EFFECTS OF BREASTFEEDING
Epidermal Growth Factor (EGF)	Receptor tyrosine kinase (same receptor for both ligands)	Maturation and repair of intestinal epithelium
Transforming Growth Factor α (TGF- α)		
Brain-derived Neurotrophic Factor (BDNF)	Receptor tyrosine kinase	Neuronal development in intestinal tract
Glial Cell-line Derived Neurotrophic Factor (GDNF)	Receptor tyrosine kinase	
Insulin-like Growth Factor I (IGF-1)	Receptor tyrosine kinase	Tissue growth
Vascular Endothelial Growth Factor (VEGF)	Receptor tyrosine kinase	
Erythropoietin (Epo)	JAK-STAT	Erythropoiesis; intestinal development
Somatostatin	G α i-protein coupled receptor	Growth regulation
Calcitonin	G α s-protein coupled receptor	Neuronal development in GI tract
Insulin	Receptor tyrosine kinase	Regulation of growth, metabolism and body composition
Adiponectin	Ca ²⁺ /calmodulin kinase pathway	
Leptin	JAK-STAT	
Ghrelin	G α q-protein coupled receptor	
Resistin	Receptor tyrosine kinase	
Thyroid hormone	Nuclear hormone receptor	
Transforming Growth Factor β (TGF- β)	Receptor serine-threonine kinase	Defense against infection; inflammatory responses; Anti-allergenic effects
Cytokines	JAK-STAT	

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RECEPTOR TYROSINE KINASES

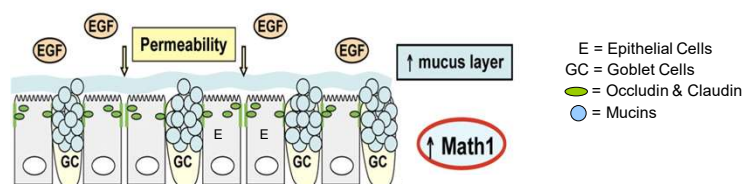
1. EGF Receptor Signaling

b) EGF Receptor-mediated Effects on Intestinal Mucosa

- Human breast milk is a major source of EGF and HB-EGF and TGF- α , all of which can bind to the EGF receptor.
- EGF is essential for development and maturation of the intestinal mucosa and for repair in response to inflammation.

The following are regulated via EGF receptor signaling:

- Expression of Math1:** Transcription factor that has a central role in the development of secretory cell lineages, particularly Goblet cells, enteroendocrine cells and Paneth cells
- Maintenance of Tight Junctions:** Expression and localization of occludin and claudin
- Activation of Anti-apoptotic Pathways:** Cell survival proteins that reduce apoptosis
- Down-regulation of Proinflammatory Cytokines**



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Necrotizing Enterocolitis (NEC)



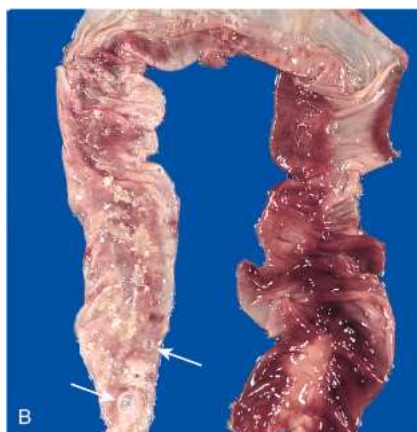
© Elsevier 2005

- Occurs 1/10 of very-low-birth-weight infants
- Cause (unknown)
 - Intestinal ischemia
 - Bacterial infection of the immature gut
 - Formula feeds
- 20-60% require surgery
- High peri-natal mortality

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Necrotizing Enterocolitis (NEC)



© Elsevier 2005

- Terminal ileum, cecum and ascending colon
- Mucosal necrosis with inflammation
- Loss of the intestinal surface barrier
- Thinning of wall with possible perforation

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Other studies:

- Numerous studies with animal models for NEC demonstrate that oral administration of EGF reduces the intestinal damage of NEC
 - Decreases intestinal permeability
 - Increases mucin production by goblet cells

Clark JA, et al Am J Physiol Gastrointest Liver Physiol, (2006) 291: G938-049

- Human studies of 327 premature and term neonates correlated the levels of salivary EGF with development of NEC.
- Salivary EGF increases with gestational age
- Lower levels of EGF in the first week of life correlated with incidence of NEC

Warner BB, et al J Pediatr (2007) 150: 358-63

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Intestinal mucosa remodeling by recombinant human epidermal growth factor₁₋₄₈ in neonates with severe necrotizing enterocolitis

Peter B. Sullivan, Peter J. Lewindon, Carmen Cheng, Peter F. Lenehan, Kuo Bo-Sheng, Jeffrey R. Haskins, Robert A. Goodlad, Nicholas A. Wright and Felix A. dela Iglesia
Journal of Pediatric Surgery (2007) 42, 462 - 469

- Approved by the Chinese University of Hong Kong, Clinical Research Ethics Committee
- Aimed to accrue 20
- 12 weeks of age or less in ICU
- Severe NEC
- 6 day EGF infusions
- Days 4,7,14 rectal biopsy

- Accrued 8 patients and study was discontinued
- 4 EGF and 4 Placebo
- Very little evidence of altered clinical outcome
- 1 patient in each group died
- Administered EGF was tolerated as well as the placebo control

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Composition of human milk- protein

- Proteins in human milk
 - **Whey – soluble** (70-80%)
 - alpha - lactalbumin
 - Lactoferrin
 - Immunoglobulins (IgA)
 - Lysozyme
 - Growth factors
 - **Casein – insoluble** (20-30%)
- Protein in Bovine milk
 - Whey - 18%
 - Beta-lactoglobulin
 - Casein – 82%
- Benefits of human milk
 - Whey is more easily digested
 - Whey is associated with more rapid gastric emptying
 - Lactalbumin is less allergenic (lactoglobulin contributes to colic and protein allergy)
 - Breastfed infant's plasma taurine (bile conjugation and brain development) and cysteine (synthesis of antioxidants) are higher
 - Breastfed infants have lower levels of amino acids (phenylalanine, tyrosine, and methionine) known to be deleterious to brain development

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Impact of protein on Renal Solute Load of Neonate

- Protein in 750 ml (daily feed)
 - Human milk – 7.5 g
 - Formula – 11.0 g
 - Cow's milk – **24.7 g**
- Renal solute load per 100 kcal
 - Human milk – 14 mOsm
 - Formula – 20 mOsm
 - Cow's milk – **46 mOsm**
- Resulting urine solute concentration (mOsm/L)
 - Human milk - < 100
 - Formula - < 600
 - Cow's milk - **> 600**
 - (isotonic urine is 280-310)
- Resulting urine volume
 - Human milk - ~ 250 ml/d
 - Formula - ~ 250 ml/d
 - **Cow's milk - > 550 ml/d**

Excess protein leads to osmotic diuresis and water loss causing dehydration.

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Composition of human milk- lipids

- Lipids in human milk
 - 50% of calories (major energy source)
 - Lipids are packaged as milk fat globule triglycerides (TG)
 - Contains unique content of very long-chain fatty acids arachidonic acid and docosahexaenoic acid (DHA)
 - Derived from linoleic and linolenic acids
 - More easily hydrolyzed to monoglycerides which enhance absorption
- Lipids in formulas
 - Medium chain fatty acids
 - Hard to duplicate total lipid content of human milk
- Most variable component among individuals
 - Increases with length of lactation
 - Increases during single breast feeding



- Benefits of human milk
 - Infant gastric and lingual lipases easily digest the packaged lipids in breast milk
 - Breast milk contains additional lipases to assist digestion and fat absorption
 - DHA is associated with improved cognition (myelination, visual acuity)
 - Mammary gland membranes package the milk fat globule to provide a stabilized and compartmentalized product that is released in a rate-controlled fashion.

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Composition of human milk- carbohydrates

- Primarily lactose
 - Metabolized to galactose and glucose
- Small oligosaccharides
 - Immune properties
 - Nutritional effects

- Benefits of human milk
 - Lactase is present from birth and produced by the neonatal gut
 - Oligosaccharides prevent antigens from attaching to gut epithelium
 - Oligosaccharides support growth of Lactobaccillus bifidus which increases acidity to compensate for low production of gastric HCl


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Composition of human milk-minerals

<ul style="list-style-type: none"> Calcium and phosphates are constant but lower in breast milk (may be very low in milk of mothers delivering preterm infants). Iron, and zinc decline during lactation 	<ul style="list-style-type: none"> Benefits of human milk <ul style="list-style-type: none"> – Absorption of calcium and phosphates are facilitated by binding to digestible proteins – Lactoferrin in human milk binds iron molecules and then binds specific receptors on intestinal cells to aid absorption – After 6 months, iron and other micronutrients should be supplemented, maybe earlier
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Composition of human milk-vitamins

<ul style="list-style-type: none"> Maternal status effects content of vitamins in human milk Breast milk has low vitamin K content The content of Vitamin D is generally low, reflects maternal levels 	<ul style="list-style-type: none"> Vegans should supplement with water-soluble vitamin B12 Vitamin K should be given after birth to prevent hemorrhagic disease Maternal supplementation of Vitamin D₃ recommended by Wagner , et al.
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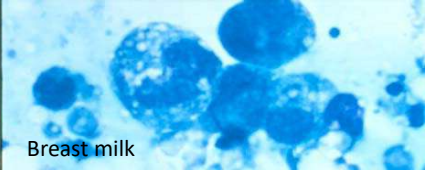
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Composition of human milk-immune competent maternal cells



formula



Breast milk

- Colostrum – 1×10^5 cells/mL
 - Predominately neutrophils
 - Some lymphocytes
 - sIgA and IgG
- Mature milk – $1 \times 10^{3-4}$ cells/mL
 - >80% macrophages
 - Activated
 - Capable of producing 12 or more growth factors and/or cytokines
- Cells survive days to a week
- Remain immunologically active and provide passive immunity until the baby builds active immunity.

- The neonatal gut is colonized by environmental bacteria within 12 hours after birth
- Neonate's immune system is naïve and incompetent
 - Neonate's B cells have not had time to build an arsenal of memory cells
- Neonate gut mucosal cells lack good tight junctions
 - Macromolecules and bacteria have easier access to the submucosa and systemic circulation

Photograph, from Dr. Carol Wagner

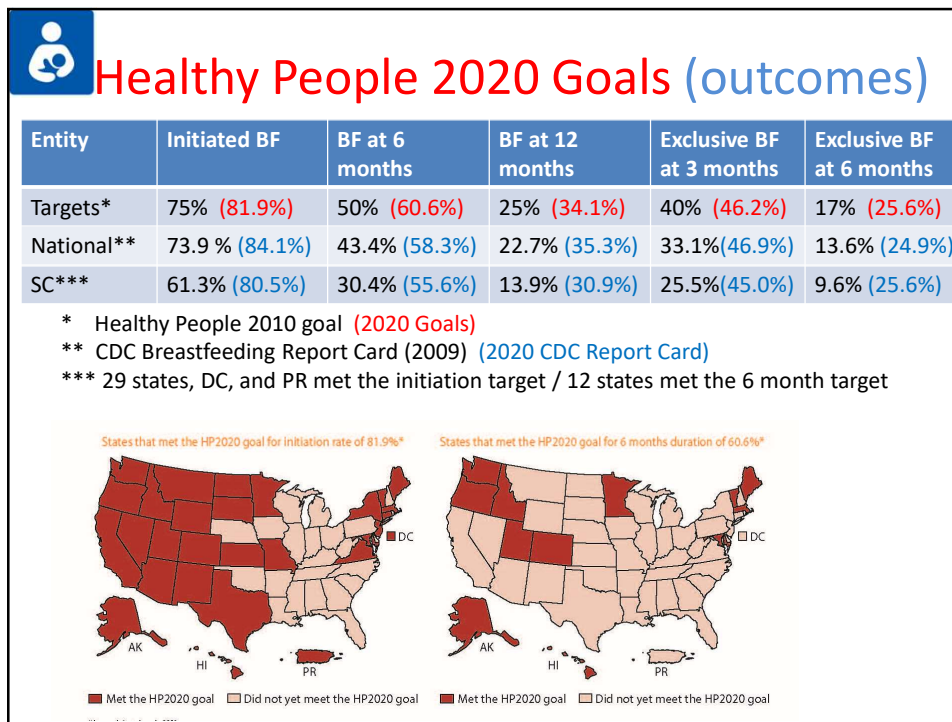
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Progress?

- 2020 Goals were set based on data collected at the close of Healthy People 2010
- More recently, data from 2019 indicators informed Healthy People 2030 Goals
- Let's see what happened!

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 **Healthy People 2020 Goals**

Objective	Best estimate**	2020 Targets	2018 Report Card	2020 Report Card
Increase the proportion of employers that have worksite lactation support programs	25%	38%	49.0%	51.0%
Reduce the proportion of breastfed newborns who receive formula supplementation in the first 2 days of life	24.2%	14.2%	17.2% SC 15.2%	19.2% SC 16.7%
Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies	2.9%	8.1%	26.1% SC 41.7%	25.99%

** 2006, 2009 estimates

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Legend:

- <10%
- 10–19.9%
- 20–29.9%
- 30–39.9%
- ≥40%

★ DC

AK HI USVI PR Guam

*Data as of June 30, 2018

Baby-friendly hospital initiative

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Baby-friendly hospital initiative

2. Implement the International Code of Marketing of Breast-milk Substitutes

- No advertising of breast milk substitutes to families
- No free samples or supplies in the health care system.
- No promotion of products through health care facilities, including no free or low-cost formula.
- No contact between marketing personnel and mothers.
- No gifts or personal samples to health workers.
- No words or pictures idealizing artificial feeding, including pictures of infants, on the labels or product.
- Information to health workers should be scientific and factual only.
- All information on artificial feeding, including labels, should explain the benefits of breastfeeding and the costs and hazards associated with artificial feeding.
- Unsuitable products should not be promoted for babies.
- All products should be of high quality and take account of the climate and storage conditions of the country where they are used.

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SC Baby-friendly update

- MUSC – September, 2013 ([redesignated 2024-2028](#))
- Tideland Waccamaw Community Hospital – May, 2013 ([redesignated 2013-2028](#))
- Tideland Georgetown Memorial Hospital – October, 2013 ([redesignated 2018-2023](#))
- AnMed Health – June, 2014
- East Cooper Medical Center -
- Greenville Memorial Hospital – July, 2014
- Prisma Health Tuomey Regional Medical Center – December, 2015 ([redesignated 2020-2025](#))
- Spartanburg Medical Center – May, 2017 ([redesignated 2023-2028](#))
- McLeod Medical Center, Dillon – May, 2018
- McLeod Regional Medical Center, Florence – June, 2019
- Bon Secours St. Francis – October, 2018
- Prisma Health Baptist, Columbia – March, 2018 ([redesignated 2024-2028](#))
- Prisma Health Baptist, Easley – December, 2022
- Prisma Health Baptist, Parkridge – October, 2019
- Prisma Health Greer Memorial – January, 2018 ([redesignated 2024-2028](#))
- Prisma Health Laurens County – December, 2015
- Prisma Health, Oconee Memorial - January, 2016 ([redesignated 2022-2027](#))
- Prisma Health, Patewood Hospital – August, 2021
- Prisma Health, Richland – June, 2015 ([redesignated 2022-2027](#))
- Conway Medical Center – August, 2022
- MUSC Health Florence Medical Center – December, 2022
- MUSC Health Lancaster Medical Center - June, 2022

18-22 in South Carolina

584 US hospitals and birthing centers in 50 states and D.C to hold Baby-Friendly designation currently

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Laws Protecting Working Moms

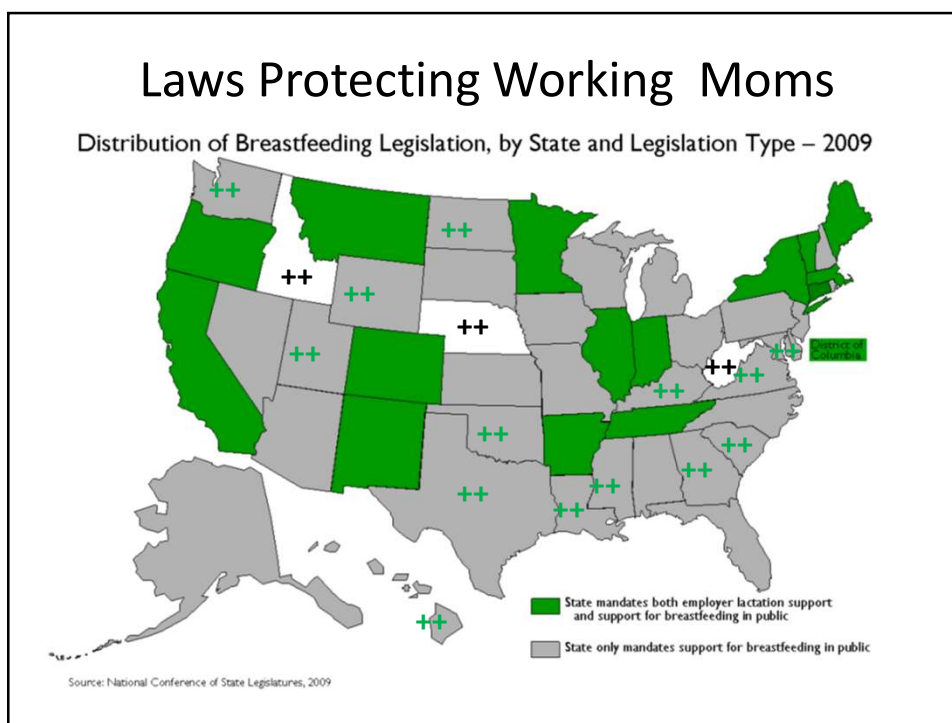
- <http://www.womenshealth.gov/breastfeeding/employer-solutions/laws.html>
- US Patient Protection and Affordable Care Act (2010) amended Section 7 of the Fair Labor Standards Act, covering hourly wage-earning employees to provide time and space for breastfeeding
 - Reasonable break time (without compensation) express milk for 1 year
 - A place other than a bathroom, that is shielded from view of coworkers
 - Health insurance benefits to defray costs of breastfeeding education and supplies
- 28 states have passed legislation to support nursing women at work

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Repeal of ACA

- <http://fortune.com/2017/01/17/obamacare-repeal-women-breastfeeding/>
- Full repeal would likely remove workplace breastfeeding protections
- Any protections would be left up to the states

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South Carolina Milk Bank

Dr. Alison Chapman, Medical Director

- Announced February 25, 2014
- Housed at MUSC
- Previously supplied by the Non-profit Mothers' Milk Bank in Austin, Texas at \$5 per ounce
- Used for the sickest, very low birth-weight babies
- Dr. Sarah Taylor estimates a need of 3,000 ounces per week for SC (~\$780,000 annually)
- Cost to initiate the facility estimated \$200,000
- Costs -\$128,000-238,000 savings with 2-week reduction in hospital stay associated with available milk for infants with NEC

<https://musckids.org/our-services/milk-bank>

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POPE FRANCIS ENCOURAGES MOTHERS TO BREASTFEED IN THE SISTINE CHAPEL



"If they are hungry, mothers, feed them, without thinking twice, because they are the most important people here."

- Pope Francis has become an unlikely advocate for public breastfeeding, by encouraging mothers to feed their babies in the Sistine Chapel.

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Opposition to Breast-Feeding Resolution by U.S. Stuns World Health Officials

<https://www.nytimes.com/2018/07/08/health/world-health-breastfeeding-ecuador-trump.html>



A Brooklyn mother unable to nurse fed her child donated breast milk. The \$70 billion infant formula industry has seen sales flatten in wealthy countries in recent years.

Credit James Estrin/The New York Times

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Healthy People 2030 – initially 1 breast feeding objective

following public comment period to January 2019

- MICH-2030-15 Increase the proportion of infants who are breastfed exclusively through 6 months.

Later added back-

- MICH-2030-16 Increase the proportion of infants who are breastfed at 1 year
- <http://www.usbreastfeeding.org/d/do/2689>

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Healthy People 2030 – removed 2 key related objectives

- MICH-23 – Reduce the proportion of breastfed newborns who receive formula supplementation within the first 2 days of life.
- MICH-24 – Increase the proportion of live births that occur in facilities that provide recommended care (i.e. Baby-Friendly Hospital Initiative-certified hospitals) for lactating mothers and their babies.

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What is the impact of reduced emphasis on policy and practice?

What is the impact of Covid 19?

- CDC Breastfeeding Report Card will continue to report data every two years
- 2022 CDC Breastfeeding Report Card will include data from the Covid-19 Pandemic timeframe
- 2024 CDC Breastfeeding Report Card will be published ~ August, 2024

As of March 28, 2025, the CDC has not released a Breastfeeding Report Card for 2024. The CDC has not provided specific reasons for this delay.
 "For the most current information on breastfeeding rates and related health indicators, consulting the CDC's official website." <https://www.cdc.gov/breastfeeding-data/about/index.html>

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Healthy People 2030 Goal

Entity	Initiated BF	BF at 6 months	BF at 12 months	Exclusive BF at 3 months	Exclusive BF at 6 months
Targets	81.9% (none)	60.6% (none)	34.1% (54.1)	46.2% (none)	25.6% (42.4)
National	84.1% 83.2%	58.3% 55.8%	35.3% 35.9%	46.9% 45.3%	24.9% 24.9%
SC	80.5% 80.6%	55.6% 46.6%	30.9% 26.0%	45.0% 43.3%	25.6% 19.3%

Healthy People Goals/Targets **2020 Goals** **2030 Goals**

CDC Breastfeeding Report Card **(2020 CDC Report Card)** **(2022 CDC Report Card)**

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Healthy People 2020 Goals

Objective	Best estimate	2020 Targets	2018 Report Card	2020 Report Card	2022 Report Card
Increase the proportion of employers that have worksite lactation support programs	25%	38%	49.0%	51.0%	
Reduce the proportion of breastfed newborns who receive formula supplementation in the first 2 days of life	24.2%	14.2%	17.2% SC 15.2%	19.2% SC 16.7%	19.2% SC 22.1%
Increase the proportion of live births that occur in facilities that provide recommended care for lactating mothers and their babies	2.9%	8.1%	26.1% SC 41.7%	25.99%	28.9% SC 47.5%

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WHO COVID 19 Breastfeeding Guidelines

<https://www.who.int/news-room/q-a-detail/q-a-on-covid-19-pregnancy-childbirth-and-breastfeeding>

- Can COVID-19 be passed from a woman to her unborn or newborn baby?
 - We still do not know if a pregnant woman with COVID-19 can pass the virus to her foetus or baby during pregnancy or delivery. To date, the virus has not been found in samples of amniotic fluid or breastmilk

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WHO COVID 19 Breastfeeding Guidelines

<https://www.who.int/news-room/q-a-detail/q-a-on-covid-19-pregnancy-childbirth-and-breastfeeding>

- Can I touch and hold my newborn baby if I have COVID-19?
 - Yes. Close contact and early, exclusive breastfeeding helps a baby to thrive. You should be supported to
 - Breastfeed safely, with good [respiratory hygiene](#);
 - Hold your newborn skin-to-skin, and
 - Share a room with your baby
 - You should wash your hands before and after touching your baby, and keep all surfaces clean.

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WHO COVID 19 Breastfeeding Guidelines

<https://www.who.int/news-room/q-a-detail/q-a-on-covid-19-pregnancy-childbirth-and-breastfeeding>

- Can women with COVID-19 breastfeed?
 - Yes. Women with COVID-19 can breastfeed if they wish to do so. They should:
 - Practice [respiratory hygiene](#) during feeding, [wearing a mask](#) where available;
 - Wash hands before and after touching the baby;
 - Routinely clean and disinfect surfaces they have touched.

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American Academy of Pediatrics- Covid/Breastfeeding statement

- The American Academy of Pediatrics (AAP) strongly supports breastfeeding as the best choice for infant feeding, even if mother and/or her infant is infected with SARS-COV-2.
- Published studies have detected SARS-CoV-2 nucleic acid in human milk. Currently, however, viable infectious virus has not been detected in breast milk.
- Pasteurization methods (such as those used to prepare donor milk) inactivate SARS-CoV-2 after it has been experimentally introduced into human milk.
- Both IgA and IgG neutralizing antibodies in human milk against multiple SARS-COV-2 antigens.

Conclusion: Therefore, physicians should advocate for and encourage breastfeeding. Post-discharge guidance and education are essential to support families, ensure the health of mothers and infants, and ensure mothers are able to reach their breastfeeding goals.

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Formula Crisis 2022

- 4 companies control the formula industry in the US (FDA regulates and sets nutritional standards)
 - Abbott Nutrition
 - Mead Johnson Nutrition
 - Nestle USA
 - Perrigo Company
- COVID-19 supply chain issues (11% out-of-stock)
- Recall and closure of Abbott products (40% loss)

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Issues

- Strict Import Restrictions- Trade Agreements
 - Protects American Producers
- FDA restricts import of European formulas
 - Some exceed FDA nutritional requirements
- WIC is a major contractor of infant formulas
 - Contracts with a major supplier creates monopoly and does not encourage/support development of new suppliers

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Impact

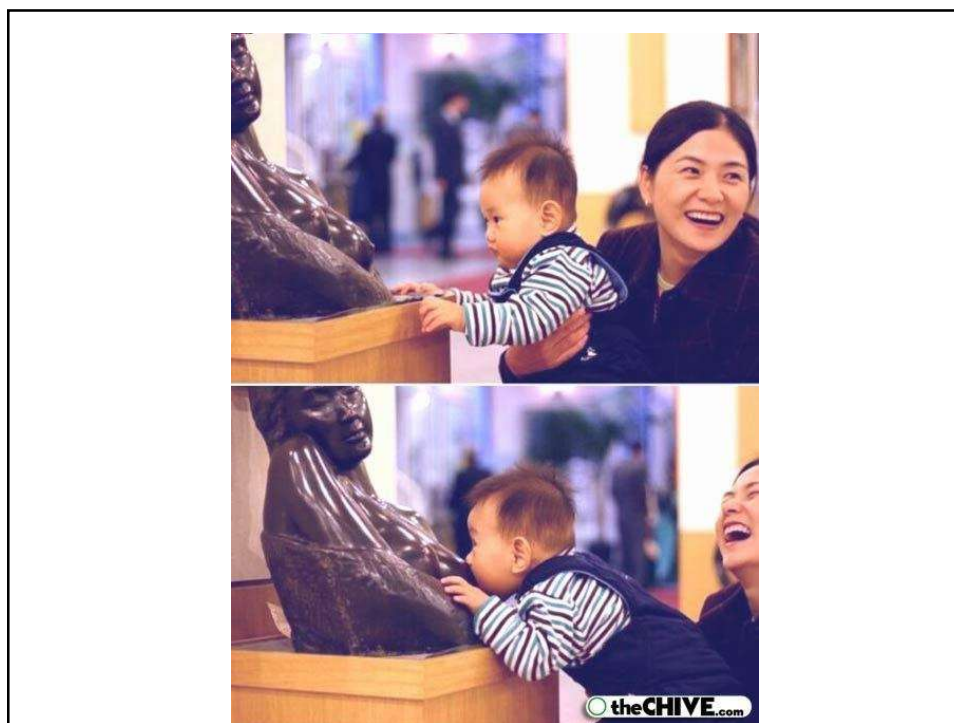
- At the start of May, with shortages nationwide, the worst-hit states were Tennessee, Texas, Iowa, North Dakota, and South Dakota, all with out-of-stock rates at or greater than 50%.
- A further twenty-five states and Washington, DC, had out-of-stock rates between 40% and 50%
- Shortages were reportedly particularly acute in rural areas.
- Impact was felt most by families of lower socioeconomic groups and populations with the lowest incidence of breastfeeding.

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What has changed since 2022? ☹️

- Currently 2 suppliers make up 84% of the retail dollars for infant formula. (80% in 2022)
- WIC still does not allow parental choice in formula
 - “first choice” formulas are paid by WIC
 - Medical documentation for others
 - SC parents pay out-of-pocket for alternate formulas
- FDA lacks the resources to investigate and/or approve new companies.
 - A request by FDA for budget increases in the infant formula division was declined by Congress.

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