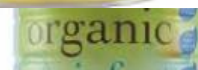




We Treat Kids Better

The 5 W's of Infant Formula

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Objectives

- List **who** are the main players in manufacturing infant formula
- Describe **why** there are a multitude of infant formula
- Explain **what** are the main categories of infant formula
- Examine **when** various formulas are appropriate for use
- Review **where** infant formula can be purchased

But first... BREASTMILK

- Ideal nutrition source for newborns and infants
- Optimal for growth and development
- Over 250 non-nutritional and bioactive components
 - Modulate GI tract and immune function
 - Enhances brain development
- Plays a role in development of chronic disease later in life
- Convenient, inexpensive
- Psycho-social benefits
- Bonding

How does formula compare to breastmilk?

Compared to mother's breastmilk, formula is missing many things babies need to be strong, healthy and smart. Did you know...

Formula-fed babies have a greater risk of:

- Ear infections
- Diarrhea/constipation
- Pneumonia
- SIDS (Sudden Infant Death Syndrome)



Children who were formula-fed have a greater risk of:

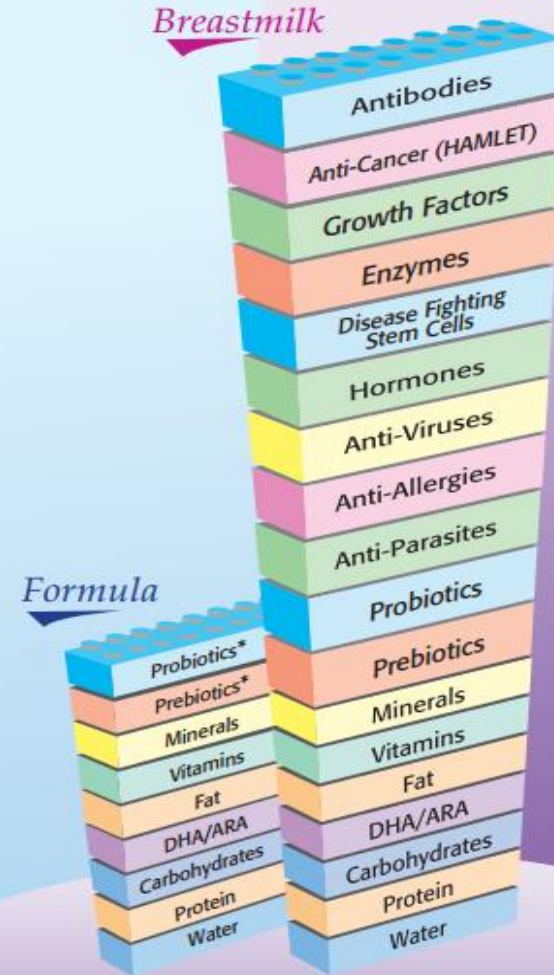
- Obesity (becoming overweight)
- Diabetes
- Asthma and allergies
- Cancer

What is the cost of formula feeding?

Formula feeding costs money. The dollars add up because you must buy extra formula as your baby grows, since WIC does not give you all the formula your baby will need. But the real cost of formula is the cost to your baby's health... and the time you spend away from work or at the doctor when your baby is sick.

Babies are born to breastfeed!

Breastmilk has **MORE** of the Good Things Babies Need
See for Yourself!



*Not all formulas have prebiotics and probiotics.

Breastmilk/Breastfeeding support

- The AAP and the World Health Organization recommend exclusive breast-feeding for the first six months.
- In cases where breast-feeding isn't working, moms should pump
- The AAP advises that, "Babies should continue to breast-feed for a year and for as long as is mutually desired by the mother and baby."
- The World Health Organization and UNICEF recommend that mothers continue to partially breast-feed for up to two years or more

Breastmilk composition

- Dynamic and variable in its nutritional and non-nutritional qualities and composition:
 - throughout the stages of lactation
 - between mothers
 - throughout the day
 - throughout a breastfeeding or pumping session
- Carbohydrate
 - 6.7 to 7.8 g/dL for lactose
 - Primary CHO Lactose
 - Prebiotic oligosaccharides
 - Probiotics bifidobacterium species, lactobacillus reuteri

Breastmilk composition

- Protein
 - Approximately 0.9 to 1.2 g/dL
 - Source: Casein and whey
 - Most abundant proteins are casein, α -lactalbumin, lactoferrin, secretory immunoglobulin IgA, lysozyme, and serum albumin
 - Lactoferrin can help prevent spread of pathogenic bacteria
 - IgA destroys bacteria, protects mucosal barrier
 - Protein levels decrease in human milk over the first 4 to 6 weeks or more of life regardless of timing of delivery

Breastmilk composition

- Fat
 - 3.2 to 3.6 g/dL
 - 50% of total calories come from fat
 - Predominantly saturated fat
 - Essential polyunsaturated fats, linoleic acid and alpha-linolenic acid → convert to arachidonic acid (ARA), docosahexanoic acid (DHA), eicosapentaenoic acid (EPA)
 - Breastmilk DHA, EPA and AA are linked to maternal diet
 - May regulate growth, inflammatory responses, immune function, vision, neurodevelopmental outcomes and brain development

Infant Formula

- Infant Formula Act in 1980 passed by Congress
 - Due to diagnosis of Chloride deficiency after on one of the major manufacturer reformulated some of its formula products and omitted salt
 - The act required formula makers to use specific nutrients.
- **Regulations and Information on the Manufacture and Distribution of Infant Formula**
 - <https://www.fda.gov/Food/GuidanceRegulation/GuidanceDocumentsRegulatoryInformation/InfantFormula/ucm136118.htm>

Infant Formula

- Feb 7, 2014, new rules introduced
 - To ensure formula manufacturers test their products for salmonella and other pathogens before distribution.
 - Require formula companies to prove to the FDA that they are including specific nutrients
 - Rules also are aimed at new companies that come into the market.
- Reasoning: growing number of unregulated infant formula and emphasis on 'natural' or 'organic'

Who makes infant formulas?

US companies - registered with FDA and follow the Infant Formula Act to regulates macro/micronutrients

- Abbott Laboratories
- Mead Johnson
- Nestle, USA
- Nutricia North America
- PBM Nutritionals (Perrigo Company)
- Prolacta Bioscience

Who makes infant formulas?

European companies -Strictly Adhere to EU Organic Regulations and the Stringent International Demeter Regulations (Demeter= goddess of the harvest and presides over grains and fertility of the earth)

- Holle
- Hipp
- Danalac

Various websites sell/distribute infant formula not manufactured in the us.

Why are there so many formulas?

- Differing nutritional requirements
 - Premature vs term infants
- Allergies or intolerances to bovine or soy protein
- Medical issues
 - Liver disease or malabsorption
 - Chylothorax
 - Renal dysfunction
- Inborn errors of metabolism
- Ketogenic diet
- **Marketing in response to parental request/preference and consumer trends**

What are the main categories of infant formula and the indications for Use?

- Bovine-based (milk-based) protein
- Soy-based protein
- Extensively hydrolyzed protein
- Elemental protein

Milk-protein

- Preterm formula and post-discharge formula for growing preemies
- Term formula
 - Modified pro composition
 - Varied whey and casein ratios
 - Low or reduced lactose
- Added functional carbohydrates: oligosaccharides
- Probiotics and prebiotics
- Additional fatty acids (DHA, ARA)

Term Milk-based formula options

- Enfamil Premium (60:40)
 - Enfamil AR (for spit-up)
 - Thickened w/rice starch; prebiotics; 10x more viscous
 - Enfamil Gentlease (for fussiness, gas, crying)
 - Partially broken down protein; 20% lactose
 - Enfamil Reguline (support digestive health, promote soft stools)
 - Partially broken down; Prebiotics
- Gerber Good Start (100:0) Soothe or Gentle

Newborns



Enspire™ - Milk-based powder with iron with two new ingredients: MFGM to foster cognitive development and lactoferrin to support immune health.



Enfamil® based Infants 0-12 months



Enfamil® Soy-based Infants 9-18 months
Enfagrow® Toddler Transitions® Soy - Designed for toddlers experiencing fussiness and gas when soy is preferred.



Enfamil® ProSobee® soy for Sensitive Infants. Soy-based infant formula for the first 12 months.

a previous blend and partially broken down proteins for the first 12 months.



Enfamil® Reguline® - to help digestive health. Gentle soy-based formula that has

Enspire™

Features	Benefits
Bovine lactoferrin	Supports gut health and brings Enfamil composition closer to human milk than ever before ¹
Milk Fat Globule Membrane (MFGM)	Supports brain development, and brings Enfamil composition closer to human milk than ever before ²
Non-GMO formulation	Some consumers prefer a non-GMO infant formula. By providing a non-GMO formulation, consumer appeal is maximized. There is no evidence that formulas without genetically modified ingredients are safer or more nutritive
Has LCPUFA (DHA and ARA at 0.32% and 0.64% of total fatty acids, respectively)	Clinically shown in Enfamil Infant to promote learning ability from infancy through age 5 ³ .
Dual Prebiotics Blend (PDX and GOS)	Supports an infant's natural defenses by fostering the growth of beneficial bacteria throughout the large intestine; provides stool consistency similar to that of breast fed infants ⁵⁻⁷

Term Milk-based formula options

- Similac Advance (48:52)
 - Similac Advance Organic
 - 20cal/oz; USDA organic
 - Similac Sensitive (for fussiness and gas)
 - 19cal/oz; Reduced lactose; Prebiotics
 - Similac for Spit-up
 - 20cal/oz; Reduced lactose; Added rice starch; Prebiotics
 - Similac Total Comfort (for discomfort)
 - 19cal/oz; Partially hydrolyzed protein; Prebiotics; Reduced lactose

Unlike other formulas, we have 2'-FL Human Milk Oligosaccharide* (HMO), an immune-nourishing prebiotic that circulates throughout the body. Similac with 2'-FL HMO helps strengthen baby's immune system to be more like the breastfed infant's than ever before.

2'-FL HMO facts:

- Naturally abundant in most breast milk
- Backed by more than 15 years of extensive research
- Adds another layer to Similac's already proven immune support

Similac Pro-Advance is non-GMO[†] and has [OptiGRO™](#), our unique blend of DHA, Lutein, and Vitamin E, to help support your baby's overall growth, and brain and eye development. Trust Similac Pro-Advance to provide a strong start for your baby's developing immune system.

* Not from human milk.

† Ingredients not genetically engineered.



Similac Pro-Advance™



Similac® Advance® NON-GMO®



Similac® Advance®



Similac® For Supplementation NON-GMO



Similac® Organic



Pure Bliss™ Infant Formula



Similac® For Spit-Up NON-GMO



Similac Pro-Sensitive™



Similac Sensitive® NON-GMO



Similac Sensitive®



Similac Total Comfort™ NON-GMO



Similac® Soy Isomil®

Premature infant formula

- Similac Special Care Advance (20, 24, 30, HP)
- Premature Enfamil Lipil (20, 24, 30, HP).
- Gerber Good Start Premature (24, 24 High Protein)
- Meets specific micronutrient needs of preemies: higher in protein, vitamins, minerals
- Protein and fat easier to digest; higher MCT content
- Available in the hospital
- Generally used until the infant is 2500-3000g



Premature versus term formula

- Compared to standard infant formula, preterm formula has:
 - More protein; predominantly whey protein
 - More fat; MCT fat blend
 - More CHO; less lactose
 - Higher caloric density
 - More vitamins and minerals
 - Osmolality 24cal/oz Preterm Formula similar to 20cal/oz
- Advantages for Preterm Infants:
 - Improved weight gain, linear growth, HC growth
 - Bone mineralization equal to intrauterine rate
 - Normal biochemical indices of nutritional status

Transitional preterm formula

- **Enfamil Enfacare**
- **Similac Expert Care Neosure**
- Comes standard at 22cal/oz
- Meets specific nutrient needs higher in protein, calcium, phosphorus and other nutrients compared to term formula; contains MCT



Human milk fortifier

- **Enfamil Human Milk Fortifier Acidified Liquid**
- **Similac Human Milk Fortifier Extensively Hydrolyzed Protein Concentrated liquid**
- Designed to improve nutritional quality of BM for premature infants only
- Provides increased protein
- Provides 2 ½ times more Ca and P for bone mineralization
- Provides increased micronutrients - Vit A, Vit D, iron



Soy-based

- **Enfamil Prosobee**
- **Gerber Good Start Soy**
- **Similac Soy Isomil**
- Not hypoallergenic
- Vegetarian diet preferred (not lacto-vegetarian)
- AAP discourages the use of soy formulas for infants born <1850g
 - Contains phytates which can bind with Ca and Zn >> decreasing their bioavailability
 - Lower protein quality

Soy-based

- Cochrane Review: feeding with soy formula not be recommended for the prevention of allergy or food intolerance
- No benefit in:
 - Preventing atopic disease in healthy or high-risk infants
 - Preventing or managing infantile colic or fussiness
 - Cow's milk protein allergy (need hydrolyzed or hypoallergenic formula)
 - Lactose intolerance (true lactose intolerance rare in children <2-3yrs)
- May be appropriate for patients w/Galactosemia

Extensively hydrolyzed

- Extensively hydrolyzed protein (casein) broken down to peptides (considered semi-elemental)
- Hypoallergenic (10% of RAST/SPT positive will have reaction)
- Used in malabsorption and/or protein intolerance
- Available in Powder, Concentrate, RTF
- Difference is the amount of MCT oil
- Not ideal bone mineralization ratio for preemie needs
- Expensive



Extensively hydrolyzed

- Similac Expert Care Alimentum
 - 33% MCT; Colic symptoms d/t protein sensitivity; Reduced lactose, Corn free
- Enfamil Pregestimil
 - 55% MCT; Lactose-free; Fat malabsorption
- Enfamil Nutramigen
 - 10% MCT; Lactose-free; Cows milk/soy allergy
- Enfamil Nutramigen w/Enflora LGG
 - 10% MCT; Lactose-free; Cows milk allergy; Probiotic LGG

Elemental

- Elemental = Amino Acid Based
- 20cal/oz standard
- ‘Hypoallergenic’
- Indicated for nutrient malabsorption and/or severe allergy not effectively managed by extensively hydrolyzed formula (Short bowel syndrome)
- Used for multiple food protein allergies; EOE
- Comes as powder only
- Contain MCT oil in varying amounts



Elemental

- Elecare Infant
 - 33% MCT; contains DHA and ARA; Clinically documented to be hypoallergenic
- Neocate Infant DHA/ARA
 - 33% MCT; contains DHA/ARA and nucleotides similar to BM; hypoallergenic; contains nucleotides
- Enfamil Puramino (previously Nutramigen AA)
 - 33% MCT; contains DHA and ARA; hypoallergenic

Elemental

- Nestle Health Science Alfamino Infant
 - 43% MCT; meet AAP criteria for hypoallergenicity
- Gerber Extensive HA
 - 49% MCT; 100% whey; Clinically documented to be hypoallergenic; contains Probiotic *B. lactis*; contains DHA; 220mOsm/kg

Formulas for medical issues

- Disease Specific Infant Formulas:
 - Chylothorax → not for long term use (for less than 2 months as does not meet EFA needs)
 - Enfaport (chylothorax or LCHAD deficiency)
 - Sterile RTU/Concentrate, 30cal/oz standard
 - 84% MCT
 - Vivonex Pediatric + MCT
 - Elemental, 100% free amino acid
 - 70% MCT

Formulas for medical issues

- Disease Specific Infant Formulas:
 - Renal
 - Similac PM 60/40 (impaired renal fxn, lower mineral intake needs)
 - 20cal/oz
 - Low Iron—Additional iron supplementation needed
 - Ca:Phos=2:1 (LBW infants may need additional Ca, Phos, Na)

Where can infant formula be purchased?

- Standard bovine- and soy-based options available online at multiple retail stores (Target, Toys R Us, BuyBuy Baby, supermarkets and drug stores, Costco, WIC)
- Extensively hydrolyzed and Elemental available through manufacturers and specific vendors online; WIC
- Outpatient dietitians deal with formula ordering and have extensive understanding about the ins and outs of insurance companies
- WIC and CCS will cover some oral formulas
- Tube feedings more often covered than oral

Summary

- Infant formula is tightly regulated and closely monitored
- Breastmilk remains the gold standard
- Formula companies continue to adjust formula to better mimic BM
- The 4 main categories of infant formula are bovine-based, soy-based, hydrolyzed and elemental
- Numerous formula options exist making it challenging for parents and consumers
- Consumer demand plays a large role in development of new products
- Infant formulas will continue to develop based on what we learn about BM