



Infant Diet from 0-6 months

Breastfeeding, Formula and Introducing Solids

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DISCLOSURES

NONE

~~EAT~~

EAT

POOP

REPEAT



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Breastfeeding / Chestfeeding

Chestfeeding / Breastfeeding



- The American Academy of Pediatrics (AAP) recommends exclusive breastfeeding for approximately 6 months after birth
- AAP supports continued breastfeeding, along with appropriate complementary foods introduced at about 6 months, as long as mutually desired by mother and child for 2 years or beyond
- These recommendations are consistent with those of the World Health Organization (WHO)
- Medical contraindications for breastfeeding are rare
- AAP recommends that hospitals implement policies to promote breastfeeding

Benefits of Breastfeeding

Maternal Benefits:

- Reduced risk of excessive bleeding during menses
- Reduced risk of developing RA, HTN, DM2, Breast CA, Ovarian CA
- Reduced risk of postpartum depression

Infant Benefits: (dose response protection but in general, BF protects against)

- Otitis Media
- Recurrent Otitis Media
- Upper Respiratory Tract Infection
- Lower Respiratory Tract Infection
- Asthma + atopic dermatitis
- RSV Bronchiolitis
- DM1 / DM2
- ALL/AML
- Celiac Disease/IBD
- SIDS



Image source: <https://www.cdc.gov/nccdphp/dnpao/features/breastfeeding-benefits/index.html>

Sources:

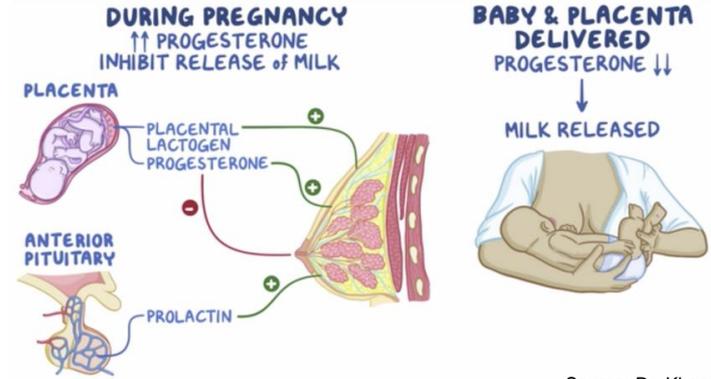
American Academy of Pediatrics
Centers for Disease Control

Lactogenesis



Lactogenesis:

- Developing the ability to secrete milk and involves maturation of alveolar cells
- **Stage I:**
 - Secretory initiation, driven by high levels of placental progesterone. Begins in second trimester.
 - May be able to express colostrum in late pregnancy.
- **Stage II:**
 - Secretory activation, driven by drop in progesterone from expulsion of the placenta and high levels of prolactin, cortisol and insulin.
 - Milk comes in at about day 2-3 post-partum.
- Lactation is maintained by regular removal of milk and nipple stimulation which trigger prolactin and oxytocin release.



Source: Dr. Khoo

Source: Pillay, J, et al.

Establishing Breastfeeding (aka Milk Supply)



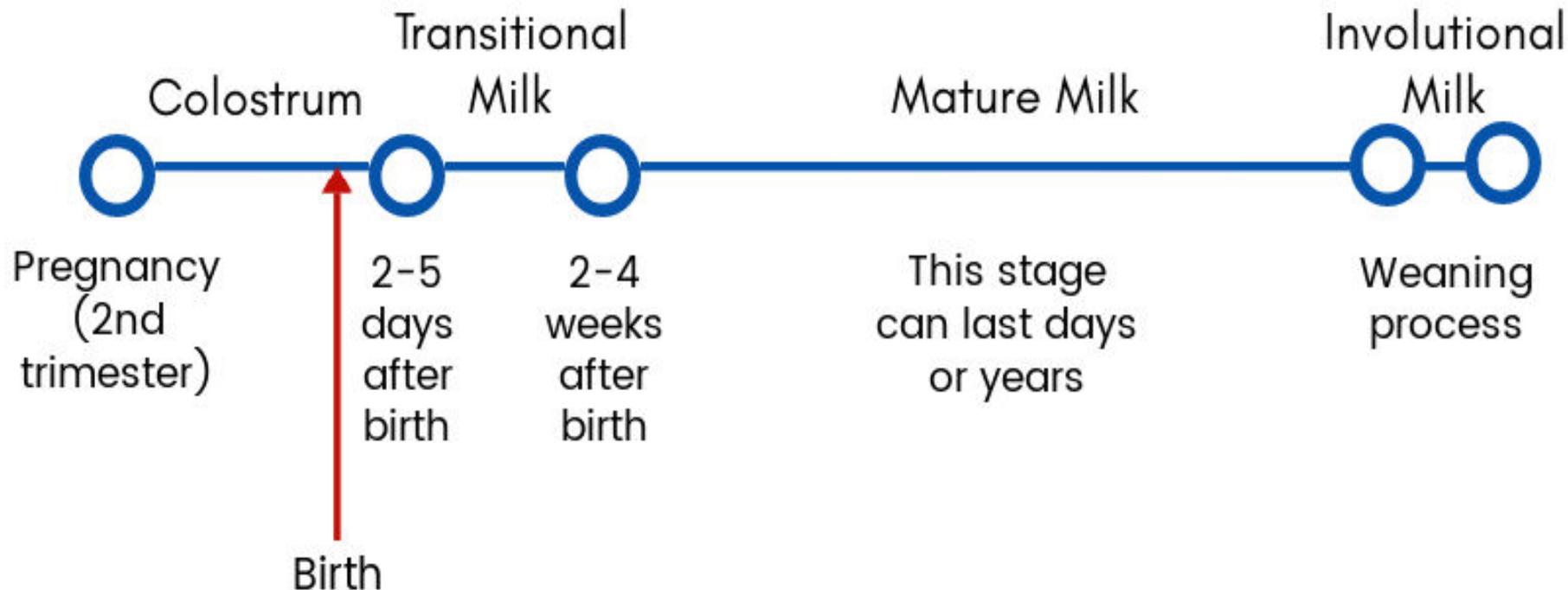
1. Breastfeed early

- a. Lay baby down to nurse, skin to skin within the first hour of birth whenever possible –aka ‘golden hour’
- b. Spend lots of time skin-to-skin during the first hour

2. Breastfeed often

- a. At least 8-12 times over 24 hours
- b. Baby first expresses colostrum
- c. The more baby eats, the more milk later comes in

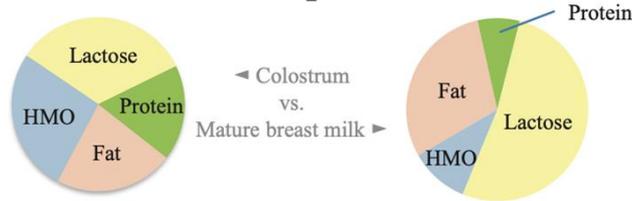
Stages of Breast Milk



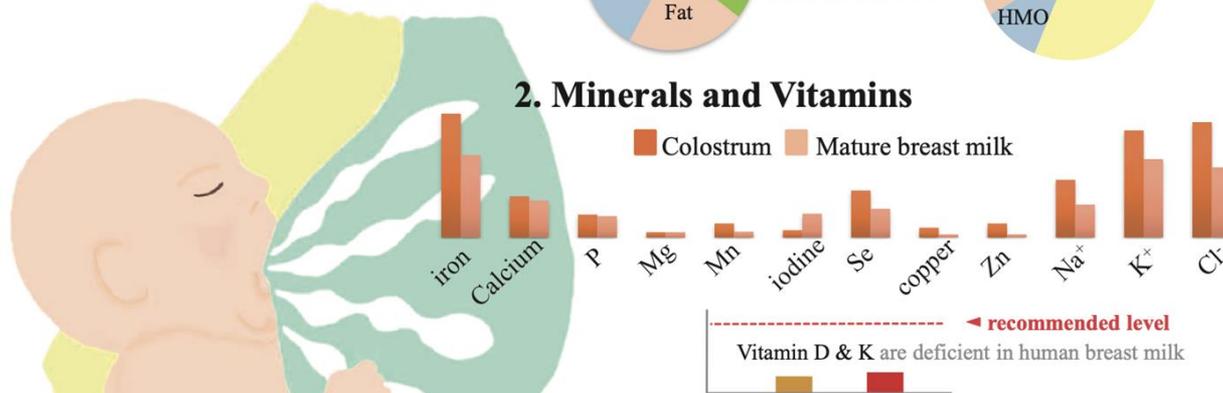
Composition of Breastmilk

Human Breast Milk

1. Nutritional components



2. Minerals and Vitamins



3. Hormones and Growth factors

EGF, IGF-1/2, VDFG, Epo, Adiponectin
BDNF, GDNF, CNTF

4. Microbial communities

Staphylococcus, Streptococcus, Lactobacillus, Propionibacterium

5. microRNAs

help constructing infants immune system through intestine

Source: Kim, S. et al.

How big are babies' tummies day by day



Guide to Newborn Stomach Capacity

Day 1



Small frequent feeds of colostrum. 5-7ml

Day 3



Milk production increases, which encourages baby to feed more frequently. 22-27ml

Week 1



Frequent feedings now have baby taking 45-60ml at a feed.

1 Month



Frequent feedings help establish the milk supply. Baby is now drinking 80-150ml a feed.

Approx Vol. Per Day:

- **Day 1:** 5-7ml (1 teaspoon) at a time
- **Day 3:** 22-25ml (4-5 teaspoon)
- **Week 1:** 1.5-2oz per feed
- **Week 2-3:** 2-3oz per feed
- **1 month:** 3-5oz per feed

Source: La Leche League

How to know if baby is getting enough milk

- Baby is breastfeeding often, 8-12 times per day (in 24 hours).
- Parent can see and hear baby swallowing while breastfeeding.
- Baby seems content after a feeding.
- Baby is steadily gaining weight.
- Baby has enough pees and poops throughout the day (see next slide)



Image source: <https://www.whattoexpect.com/first-year/breastfeeding/benefits/>

Source: American Academy of Pediatrics

How many pees and poops per day

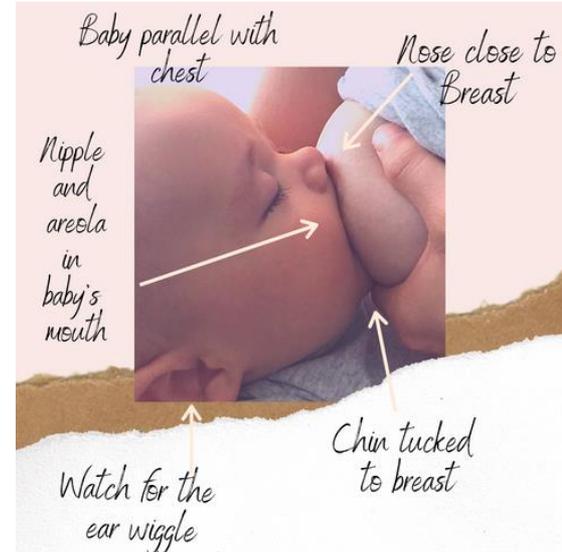
Baby's Age	Wet	Poops
DAY 1 (<i>birthday</i>)		
DAY 2		
DAY 3		
DAY 4		
DAY 5		
DAY 6		
DAY 7		

- Baby poop can vary in color. In the first week, baby poop changes from black or dark green to a yellow color.

Source: Women Infant and Children

Issues that may make BF challenging

- Latch
- Issues with milk transfer
- Baby not accepting the breast
- Quick let down
- Plugged ducts
- Engorgement
- Infections
- Nipple size and shape
- Cluster Feeding and Growth Spurts
- Nursing Strikes
- Exhaustion
- Feeling like mom cannot leave baby
- Judgement



Conditions associated with Breastfeeding

Hypoglycemia

- Infants most at risk are late preterm, SGA, LGA, or born to mothers with DM
- Reduce risk of occurrence by encouraging skin-to-skin, frequent feeding
- Per AAP, only screen if symptomatic
- Manage by feeding frequently

Breastfeeding Jaundice (Suboptimal Intake Jaundice)

- Occurs in the first week of life.
- Newborns who are not feeding well.
- Prevention is key: encourage exclusive and frequent breastfeeding at least 8 to 12 times per day, avoid water or unnecessary formula supplements, and teach mothers proper latch technique.

Breastmilk Jaundice (BMJ)

- Jaundice that occurs in healthy thriving breastfed infants usually beyond the 2nd week of life.
- This elevation in serum bilirubin is a normal response to breastfeeding, and other than the presence of jaundice, infants with BMJ seem healthy

Source: American Academy of Pediatrics

Exclusive Pumping (EP)



Image source: <https://www.thebump.com/a/exclusive-pumping>

- **What is it?**
 - When a family feeds breastmilk that is pumped and is given in a bottle and not directly from the breast
 - About 5-14% of families that feed their baby breastmilk exclusively pump (EP)
- **Reasons for EPing include:**
 - Baby having a long NICU stay, Issues with latch/milk transfer, Needing to monitor intake, etc.
 - Many parents choose to EP after attempt at direct breastfeeding is unsuccessful and it can be a heartbreaking time for the parent
 - Some parents choose to EP from the get go as well
- Benefits of breastmilk remain whether it is through direct breastfeeding or EP

Pumps Galore!



Manual



Single Electric



Double Electric



Portable



Wireless



Hospital Grade

Pumps have so many parts!



<https://www.1naturalway.com/products/elvie-stride>

Whats in the box?

2-year warranty on the Hub and 90-day warranty on all other components.
For complete warranty information, see our FAQs or Instructions for Use.



Hub

1 Hub

CAPS



2 Caps

CUPS



2 Cup Fronts , 2 Cup Seals

Breast Shields



2 Breast Shields (24mm)

Valves



2 Valves

Diaphragms



2 Diaphragms

Tubes



2 Short Tubes (for the Cups)
1 Long Tube (for the Hub)
1 Tube Splitter

Hub Cover



1 Cover
1 Clip

Charging Cable



1 Charging Cable

<https://breastpumps.byramhealthcare.com/elvie-stride-hands-free-breast-pump>

Milk Storage Guidelines

Human Milk Storage Guidelines

TYPE OF BREAST MILK	STORAGE LOCATIONS AND TEMPERATURES		
	Countertop 77°F (25°C) or colder <i>(room temperature)</i>	Refrigerator 40 °F (4°C)	Freezer 0°F (-18°C) or colder
Freshly Expressed or Pumped	Up to 4 Hours	Up to 4 Days	Within 6 months is best Up to 12 months is acceptable
Thawed, Previously Frozen	1–2 Hours	Up to 1 Day <i>(24 hours)</i>	NEVER refreeze human milk after it has been thawed
Leftover from a Feeding <i>(baby did not finish the bottle)</i>	Use within 2 hours after the baby is finished feeding		

These guidelines are for healthy full-term babies and may vary for premature or sick babies. Check with your health care provider.

Find more breastfeeding resources at: WICBreastfeeding.fns.usda.gov
www.cdc.gov/breastfeeding/



03/19/15-8

Source: Centers for Disease Control

Pumping at Work Protections

- **PUMP for Nursing Mothers Act (Signed Dec 2022)**
 - Employers (with 50+ employees) are required to provide a reasonable amount of break time and a space to express milk as frequently as needed by the nursing employee, for up to one year following the birth of the employee's child.
 - The space provided by the employer cannot be a bathroom and it must be shielded from view and free from intrusion by coworkers or the public.
 - If an employee is not completely relieved from duty, time used to pump breast milk at work must be paid.
 - If a person's right to pump at work was violated they may be entitled to employment reinstatement, promotion, payment of wages lost and an equal amount as liquidated damages, compensatory damages and make-whole relief.

Source: US Dept. of Labor

Formula

Formula



Formula is used in various scenarios, including but not limited to:

- Parent choice
- Parent unable to BF (illness, not present, adoption, surrogacy, etc)
- Issues with adequate supply (due to medical conditions, unable to meet demand such as in multiples, etc)
- Combo feeding: sometimes parents give a combination of formula and breastmilk

Formula consumption



How many ounces per day?

- Newborn 1-2oz every 2-3 hrs
- 2-4 months 4-6oz every 4-5 hours
- 4-6 months 6-8oz every 4-6 hours (no more than 32oz in a day)

How many calories per ounce?

- Term formulas have 20 kcal/ounce (mimic human breast milk)
- Pre-Term formulas have 22-24 kcal/ounce (pre-term babies have higher protein and calorie recs and also need more Mg, P, Ca)
 - Transition to term formula once babies reach 3lb15oz

How long is prepared formula from powder good for?

- 2 hours



Image source: [wirecutter](#)

Types of Formula

Comparison of Breast Milk and Available Infant Formulas

Class	Brand names	Calories (kcal per oz)	Carbohydrate source	Protein source	Indications	Cost per ounce*	
						Powdered formula†	Ready-to-feed
Breast milk	—	20	Lactose	Human milk	Preferred for all infants	—	—
Term formula	Carnation Good Start; Enfamil with Iron; Similac with Iron	20	Lactose	Cow's milk	Appropriate for most infants	\$0.14	\$0.27
Term formula with DHA and AA	Enfamil Lipil; Good Start DHA & ARA; Similac Advance	20	Lactose	Cow's milk	Marketed to promote eye and brain development	0.16	0.30
Preterm formula	Enfamil 24 Premature; Preemie SMA 24; Similac 24 Special Care	24	Lactose	Cow's milk	Less than 34 weeks' gestation Weight less than 1,800 g (3 lb, 15 oz)	—	0.80
Enriched formula	Enfacare; Similac Neosure	22	Lactose	Cow's milk	34 to 36 weeks' gestation Weight 1,800 g (3 lb, 15 oz) or greater	0.19	0.32
Soy formula	Enfamil Prosobee; Good Start Soy; Similac Isomil	20	Corn-based	Soy	Congenital lactase deficiency, galactosemia	0.16	0.30
Lactose-free formula	Enfamil Lactofree; Similac Sensitive	20	Corn-based	Cow's milk	Congenital lactase deficiency, primary lactase deficiency, galactosemia, gastroenteritis in at-risk infants	0.16	0.30
Hypoallergenic formula	Similac Alimentum; Enfamil Nutramigen; Enfamil Pregestimil	20	Corn or sucrose	Extensively hydrolyzed	Milk protein allergy	0.25	0.37
Nonallergenic formula	Elecare; Neocate; Nutramigen AA	20	Corn or sucrose	Amino acids	Milk protein allergy	0.35	—
Antireflux formula	Enfamil AR; Similac Sensitive RS	20	Lactose, thickened with rice starch	Cow's milk	Gastroesophageal reflux	0.18	0.31
Toddler formula	Enfamil Next Step; Good Start 2; Similac Go and Grow	20	Lactose	Milk	Nine to 24 months of age	0.15	0.25

AA = arachidonic acid; DHA = docosahexaenoic acid.

*— Calculated from average retail price. Most information comes from <http://www.drugstore.com>.

†— After adding water.

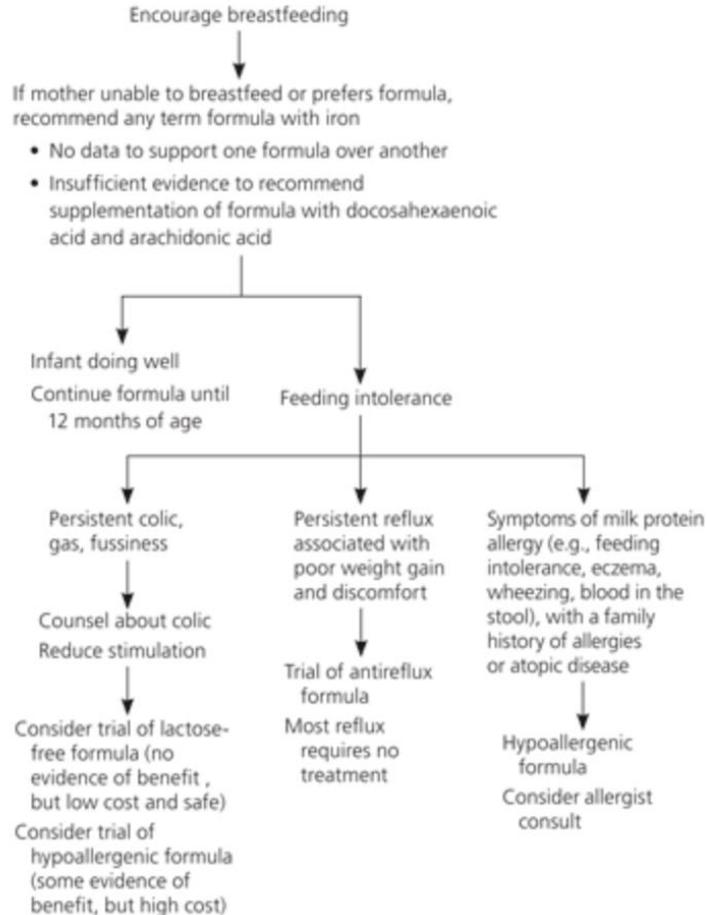
Source: O'Connor, American Family Physician.

Types of Formula

Class	Brand Name	Calories per Ounce	Carb Source	Protein Source	Indications	Cost per ounce
Term Formula	Carnation good start Enfamil with Iron Similac with Iron	20	Lactose	Cow's Milk	Appropriate for most infants	0.14
Term Formula with DHA	Enfamil Lipil Similac Advance	20	Lactose	Cow's Milk	Marketed to promote eye and brain development	0.16
Hypoallergenic Formula	Similac Alimentum Enfamil Nutramigen Enfamil Progestimil	20	Corn or Sucrose	Extensively Hydrolyzed	Milk Protein Allergy	0.25

There are so many more brands of formula that are not listed in the prior slide

Formula Selection in Term Infants



Source: O'Connor, American Family Physician.

It Adds Up!

Similac Advance (term formula)

Price per can: \$38.49

Ounces of milk per can: Approx 210

Ounces of milk consumed by baby per day:
Max 32

Can of similac lasts for: Approx 6-7 days

So a family needs a can of milk per week for a
baby!



Source: Target.com



Women, Infants and Children

- The Women, Infants and Children (WIC) nutrition program helps individuals who are pregnant or just had a baby, and children up to age 5 eat well, be active, and stay healthy.
It helps families across the state by providing nutrition education, breastfeeding support, healthy foods, formula and referrals to health care and other community services.
- WIC welcomes partners, grandparents, foster parents, or guardians who care for eligible children.
- WIC services are provided at no cost to the patient.

Introducing Solids

Introducing solids

- Introduce baby to solids at around 6 months, but no earlier than 4 months
- Confirm that baby is developmentally ready:
 - Controls head and neck
 - Sits up on their own or with support
 - Opens mouth when food is offered
 - Brings objects to mouth and tries to grasp food
 - Is able to swallow food and transfer food from front of tongue to back of tongue



Image source:
<https://www.cdc.gov/nutrition/infantandtoddlernutrition/foods-and-drinks/when-to-introduce-solid-foods.html>

Introducing Solids

- No need to give foods in any specific order
- Introduce one food at a time and wait 3-5 days before trying a new food to assess for any allergies to that specific food.
 - Potentially allergenic foods include cow's milk products, eggs, fish, shellfish, tree nuts, peanuts, wheat, soy and sesame.
- By the time baby is 7-8 months, they can eat foods from a variety of food groups (infant cereals, proteins/meats, fruits, vegetables, dairy (yogurt, cheese but no cow's milk), etc)



<https://www.yummytoddlerfood.com/homemade-baby-food/>

Traditional Weaning vs Baby Led Weaning (BLW)



Traditional Weaning:

- Introduce foods in the following order:
Purees→Mashed foods→ Regular consistency
- Sometimes it is a single food item or combination of foods at once
- Usually caregiver spoon feeds until baby develops the skills to use utensils

Same number of choking reports among both methods

Baby Led Weaning:

- Foods are introduced in small bite size pieces without altering into mash or puree
- Usually foods are given as they are normally cooked
- Baby is encouraged to eat the foods themselves rather than being spoon fed

Source: D'Auria, et al. Moon, R.--
American Academy of Pediatrics

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