Infant & Specialty Formulas: what's in them and why?

The basics of infant nutrition and breast milk substitutes

Presented by Dr. Janet Green, RN, PhD

Images on zoom background
Breastfeeding mother:
KidStock/Getty Images/Blend Images

Bottle feeding mother
www.facebook.com
Support-for-Bottle-Feeding-Mothers

Important statement

Breastfeeding is best for babies. It has benefits for the infant, such as reducing infection risk, and for the mother. It is important to have a healthy balanced diet in preparation for, and during breastfeeding. Infant formula is designed to replace breast milk when an infant is not breastfed. Breastfeeding can be negatively affected by introducing partial bottle-feeding and reversing a decision not to breastfeed is difficult. Infant formula must be prepared and used as directed. Unnecessary or improper use of infant formula, such as not properly boiling water or sterilising feeding equipment, may make your baby ill. Social and financial implications, including preparation time and the cost of formula, should be considered when selecting a method of infant feeding.

Before we begin…

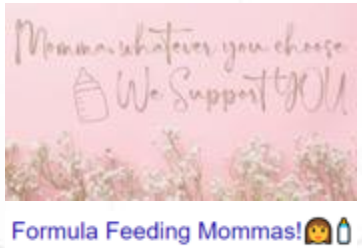
I have no relevant financial or non-financial relationships with Sanulac Nutritionals to disclose.

Choosing an infant formula can be overwhelming for a new mum..

Google

tellmebaby

KidsHealth



How do I know which formula is best for my baby?

Advice from a healthcare professional is important

Term Infant Formulas... Questions and Myth Busters

How do I know which formula is best for my baby?

Is casein protein safe for babies?

Which formula is closest to breast milk?

Is infant formula basically the same as breast milk?

What is whey and casein in infant formula?...

Can babies drink regular cow's milk?

Is there a difference between Stage 1 and Stage 2 infant formula?

What's the difference between a gold or standard infant formula?

Do infants need high protein?

Does iron in formula cause constipation?

Outline

The basics of breast milk

Overview of term infant formula

Overview of specialty infant formulas

Infant growth and development

The role of infant nutrition from 0 to 12 months

“Adequate nutrition during infancy and early childhood is essential to ensure the growth, health, and development of children to their full potential.” [1]

– World Health Organization (WHO)

Reference: 1. Infant and Young Child Feeding: Geneva: World Health Organization; 2009. SESSION 1, The importance of infant and young child feeding and recommended practices. Available from: https://www.ncbi.nlm.nih.gov/books/NBK148967/

Nutritional requirements from 0 to 12 months

Infants from 0-12 months need an adequate intake of macronutrients and micronutrients to ensure normal growth and development:[1,2]

Macronutrients

- Proteins
- Carbohydrates
- Fats

Large nutrient molecules that provide the primary nutritional source of energy, playing a vital role in building tissues and growth

Micronutrients

- Vitamins
- Minerals

Consumed in small amounts, crucial for health and vital processes like immune system functioning, nervous system health and bone tissue synthesis

1. Patel JK, Rouster AS. Infant Nutrition Requirements and Options. [Updated 2023 Aug 8]. Available from: https://www.ncbi.nlm.nih.gov/books/NBK560758/ 2. Savarino G et al. Italian J Pediatr 2021;47:109.

Measuring normal growth and development

- Key growth metrics used in Australia to monitor normal growth and development are:[1-4]

Weight

Length

Head circumference

Children's physical growth can be a sign of their overall health and development[5]

References: 1. Savarino G *et al. Italian J Pediatr* 2021;47:109. 2. The Royal Children's Hospital Melbourne. https://www.rch.org.au/clinicalguide/guideline_index/Slow_weight_gain/ Accessed March 2024. 3. Australian Breastfeeding Association. Understanding growth charts. Available at: https://www.breastfeeding.asn.au/resources/growth-charts Accessed March 2024. 4. World Health Organization Geneva. 2009. 5. RaisingChildren.net.au. Child growth charts. Available at: https://raisingchildren.net.au/newborns/development/understanding-development/growth-charts Accessed March 2024.

The basics of breast milk

The ‘gold standard’ of infant nutrition

Q1. What makes up breast milk?[1,2]

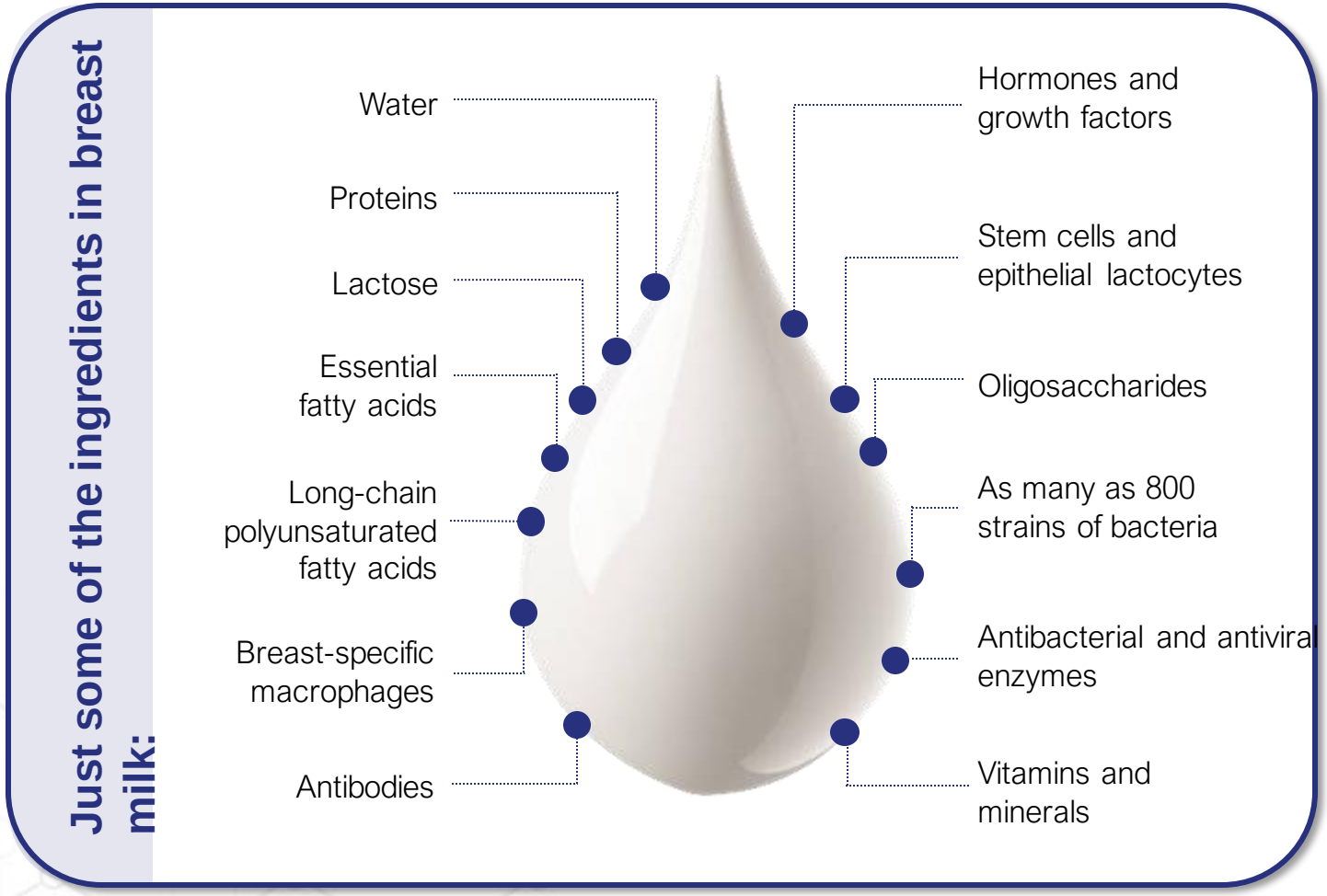


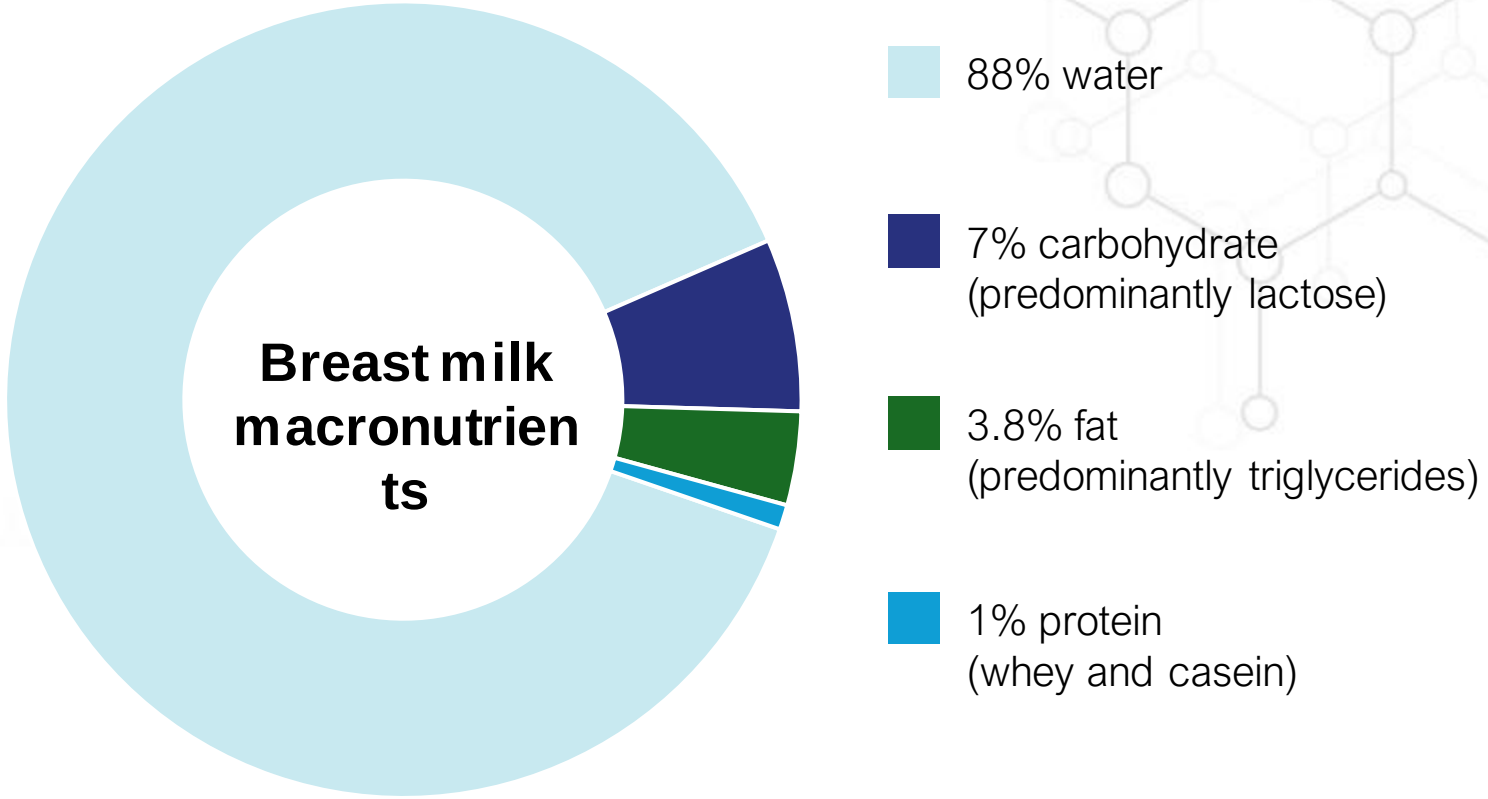
Figure adapted from the Royal Society of Biology.[2]

> *Macronutrients, such as carbohydrates, proteins (including immunologic components), fats, various micronutrients, and vitamins, trophic factors, as well as microbiome and miRNA… these are the components of HBM available only in humans and only through lactating mothers, thus making them diverse and irreplaceable.*
>
> *Kim S.Y., et al., 2020*

1. Kim SY & Yi DY. *Clin Exp Pediatr* 2020;63(8):301–309. 2. Royal Society of Biology. The mysteries of breast milk. *The Biologist* 64(3):10–13.

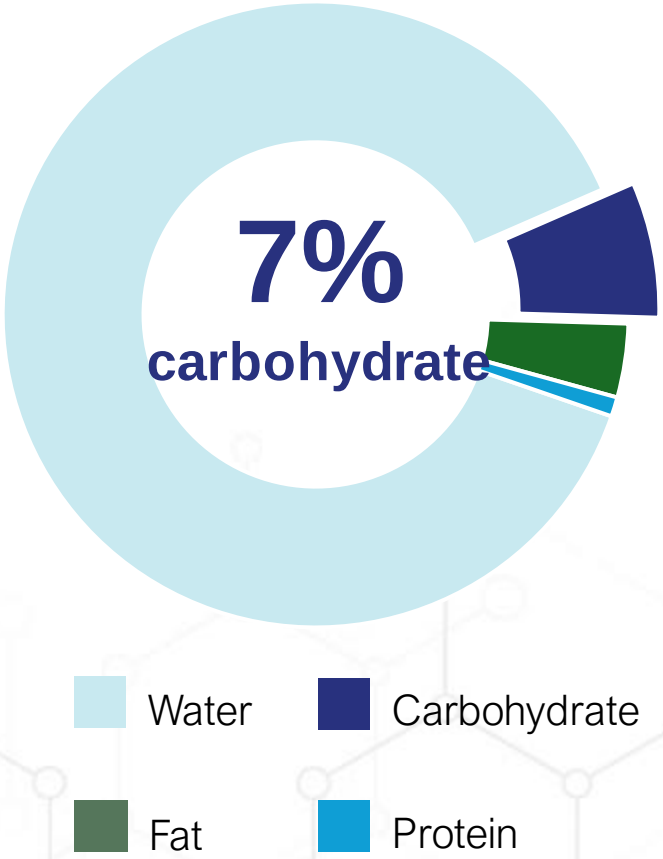
The nutritional composition of breast milk[1-3]

- The general nutritional composition of breast milk is 87-88% water, 7% carbohydrate, 3.8% fat and 1.0% protein
- Fat and carbohydrate contribute 50% and 40% of the total energy in breast milk
- The nutritional composition of breast milk is dynamic and changes over time



1. Martin CR *et al. Nutrients* 2016;8(5):279. 2. Bakshi S *et al. Front Nutr* 2023;10:1194679. 3. Kim SY & Yi DY. *Clin Exp Pediatr* 2020;63(8):301–309.

A closer look at the carbohydrate in breast milk[1-3]

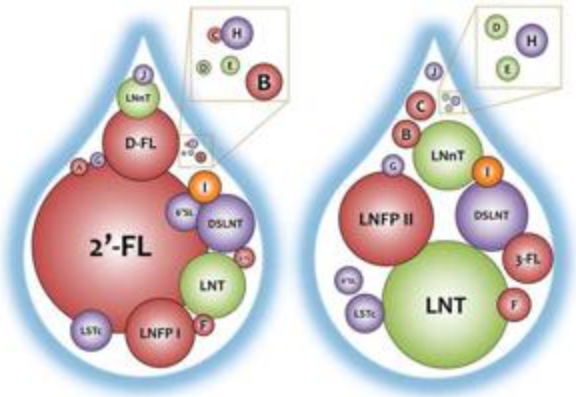


- Carbohydrates are the most prominent macronutrient in human breast milk, of which there are two main types: lactose (~80%) and human milk oligosaccharides (HMOs; ~20%)
- **Lactose** contributes 40% of the total energy in breast milk and aids in the absorption of calcium and minerals
- **HMOs** are complex carbohydrates that play an important prebiotic role in the development of the gut microbiota

1. Martin CR *et al. Nutrients* 2016;8(5):279. 2. Bakshi S *et al. Front Nutr* 2023;10:1194679. 3. Kim SY & Yi DY. *Clin Exp Pediatr* 2020;63(8):301–309.

A closer look at the carbohydrate in breast milk

Human milk oligosaccharides (HMOs)



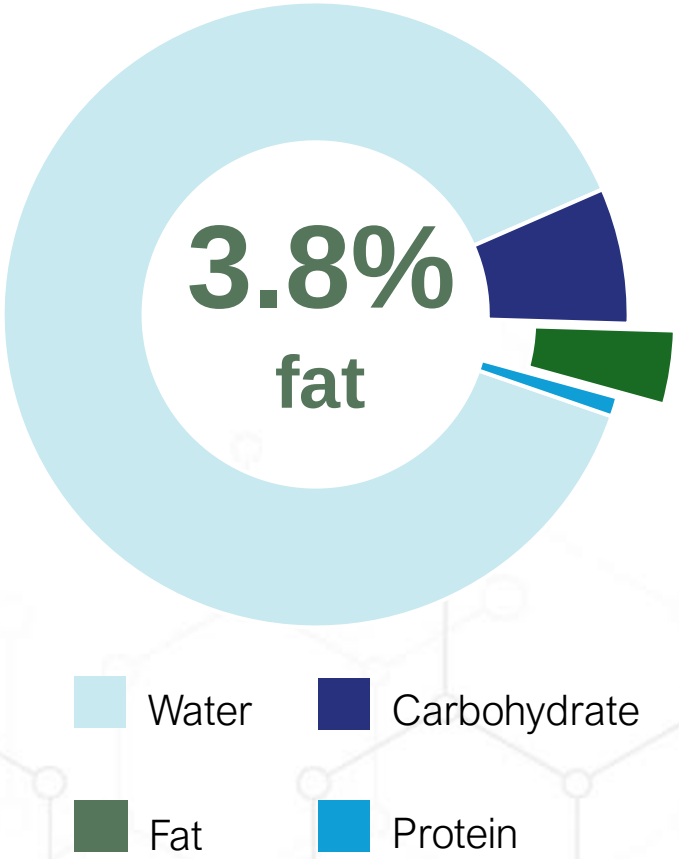
- HMOs are the third most abundant ingredient in breast milk after lactose and fat[2]
- The composition of HMOs varies from person-to-person, influenced by genetic and environmental factors[1,2]
  - *See left*, the HMO profiles of lactating mothers with different 'secretor' genetic profiles

The role of HMOs[1-10]

- They remain undigested and serve as prebiotics
- Help protect the infant gut from the adhesion of harmful bacteria
- Promote growth of beneficial bifdobacteria
- Help support an infants developing immune system

Figure adapted from Walsh C et al. 2020.[1] 1. Walsh C *et al. J Funct Foods* 2020;72:104052. 2. Walsh C *et al. J Funct Foods* 2020;104074. 3. Bode L. *Glycobiology* 2012;22(9):1147–62. 4. Goehring KC *et al. J Nutri* 2016;146:2559–66. 5. Wicinski M *et al Nutrients* 2020;12:266 6. Donovan S *et al. Am Nutr Metab* 2016;69(2):42-51. 7. Puccio G et al. *JPGN* 2017;6:624-631. 8. Steenhout P *et al. FASEB J* 2016;30(Suppl 1):275:7. 9. Berger B *et al. Am Soc Micro* 2020;11(2):e03196–19. 10. Vanderplas Y *et al. Nutrients* 2018;10:1161.

A closer look at fats in breast milk[1-3]



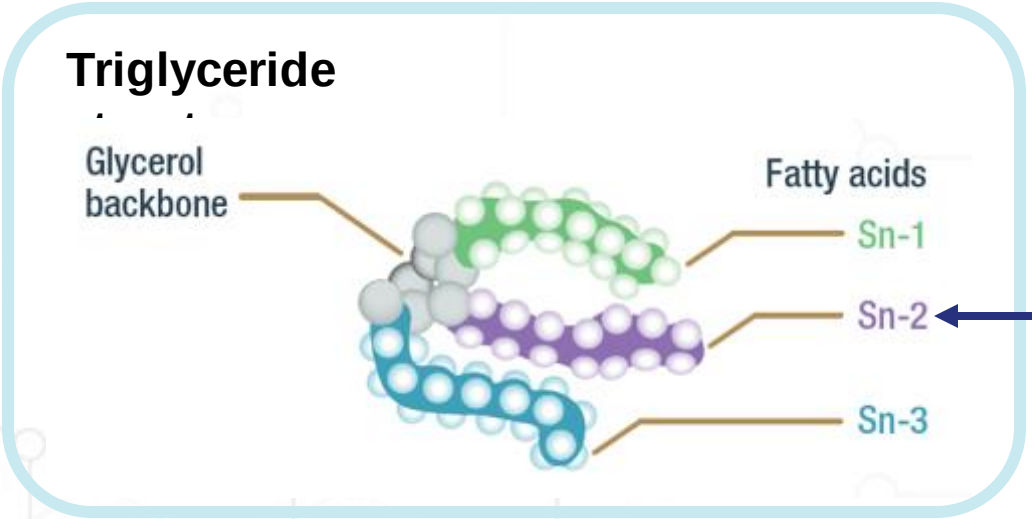
- While fats (lipids) only make up 3.8% of breast milk, they contribute 50% of the total energy
  - Lipids also influence nervous system development and immune function
- **Triglycerides** make up 95% of total lipids in breast milk
- Fatty acids are the building blocks of lipids; the most common fatty acids in breast milk are **oleic acid** (36%) and **palmitic acid** (23%)
- **Linoleic acid** (15%) and **alpha-linolenic acid** (0.35%) are essential fatty acids that are precursors for AA, EPA and DHA

AA, arachidonic acid; DHA, docosahexaenoic acid; EPA, eicosapentaenoic acid. 1. Martin CR *et al. Nutrients* 2016;8(5):279. 2. Bakshi S *et al. Front Nutr* 2023;10:1194679. 3. Sun J et al. Adv Diet Lipid Hum Health 2022;353 – 360.

A closer look at fats in breast milk

Sn-2 Palmitate and gut health

Triglycerides are the most common lipids found in breast milk, comprised of a glycerol backbone with three fatty acid chains at positions Sn-1, Sn-2 and Sn-3[1,2]



- Palmitic acid is the second most common fatty acid in breast milk, of which 70% is located in the Sn-2 position of the triglyceride (referred to as **Sn-2 Palmitate**)[1]
- Sn-2 Palmitate is associated with:[2-9]

Increase in Bifidobacteria

Increased fat & Calcium absorption

Increased bone mineralisation*

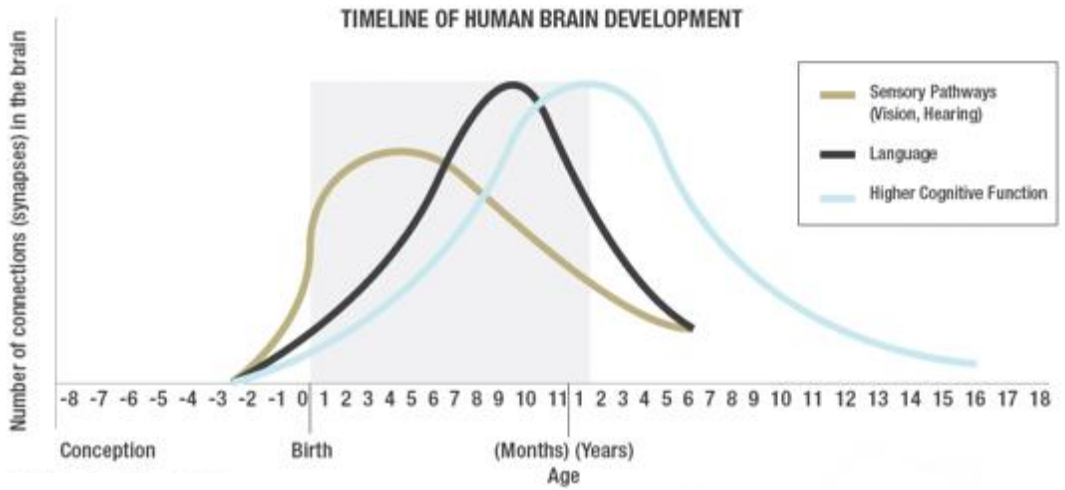
*at 4 months of age

1. Delplanque B *et al. J Pediatr Gastroenterol Nutr* 2015;61(1):8-17. 2. Innis SM. *Adv Nutr* 2011;2(3):275-283. 3. Bar-Yoseph F *et al. PLEFA* 2013;89(4):139–43. 4. Kennedy K *et al. Am J Clin Nutr* 1999;70:920-27. 5. Beghin L *et al. Clin Nutr* 2019;38:1023-30. 6. Yaron S *et al. J Pediatr Gynecol Nutr* 2013;56:376-81. 7. Yao M *et al. J Pediatr Gynecol Nutr* 2014;59:440-48. 8. Guo D *et al. Food Funct* 2022;13:2003-18 (Suppl Appendix). 9. Saturio S *et al. Microorganisims* 2021;9:2415.

A closer look at fats in breast milk

Docosahexaenoic acid (DHA) and brain development[1-6]

- An infants brain grows rapidly in the first 18 months of life, reaching 75% of adult size by the second year[7,8]
- Breast milk is an important source of DHA, present at a concentration of ~**0.32%***

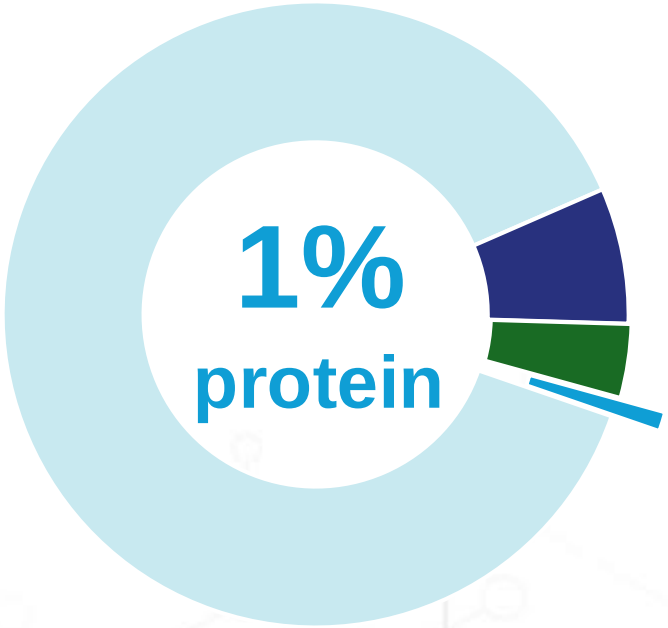


Adapted from Bhattacharjee 2015.[7] Graphic from Lawson Parker sources: Charles Nelson, Harvard Medical School; Pat Levitt, Children's Hospital Los Angeles.

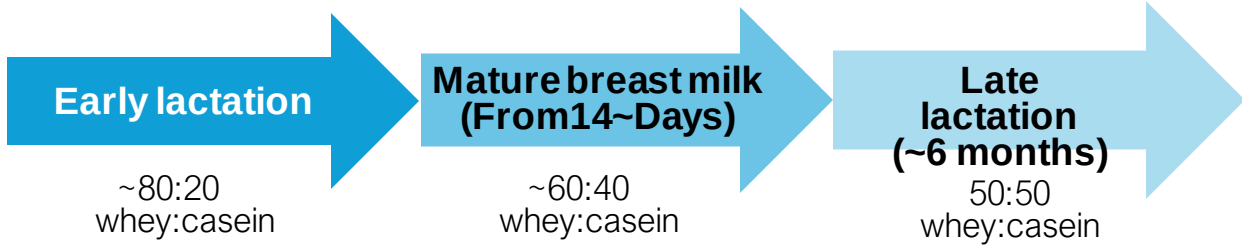
* DHA = docohexaenoic acid. ARA = arachidonic acid. # mean concentration (± standard deviation) 0.32% ± 0.22%. *By weight of total fatty acids. 1. Brenna JT *et al. Am J Clin Nutr* 2007;85:1457–64. 2. Welty FK. *Curr Opin Lipidol* 2023;34:12-21. 3. Jensen CL *et al. Am J Clin Nutr* 2005;82:125–32. 4. Jensen CL *et al. J Pediatr* 2010;157(6):900–905. 5. Hahn-Holbrook J *et al. Nutr* 2019;11(12):2964. 6. Hanson MA *et al. Int J Gynecol Obstet* 2015:131(S4):S213–53. 7. Bhattacharjee Y, *National Geographic* 2015:59–77.

A closer look at protein in breast mi

Which formula is closest to breast milk?



- There are two types of protein in breast milk: whey and casein[1-3]
  - **Casein** becomes clots or curds in the stomach
  - **Whey** remains as a liquid and is easier to digest
- Breast milk contains **1.0–1.1 g protein per 100 mL** on average[4]
- The whey:casein ratio in breast milk changes over time:[1-3]



1. Ballard.o,et al.; *Pediatr Clin North Am*. 2013 February. 2.Lonnerdal.B.,2003, *Am J Clin Nutr*;77, (suppl):1537S–43S

Overview of infant formula

What's in infant formula and why?

Q2.Can babies drink regular cow's milk?

↑

Cows' milk contains **higher levels of fat, minerals and protein** compared to human breast milk and is not suitable for infants

Breast milk contains an average protein level of 1.0–1.1 g/100 mL, versus ~3.3 g/100 mL for cows' milk[2]

↓

Cows' milk must be **altered** to more closely resemble human breast milk composition; a lower protein level is preferred

+

To ensure complete nutrition, cows' milk is fortified with ingredients like vegetable oils, vitamins, minerals and iron

Q3. Do infants need high protein?

1. Martin CR *et al. Nutrients* 2016;8(5):279. 2. National Health and Medical Research Council (2012) *Infant Feeding Guidelines*. Canberra: National Health and Medical Research Council.

Infant formula standards in Australia[1,2]

The quality, composition and labelling of all infant formula in Australia is tightly regulated through Standard 2.9.1 of the Australia New Zealand Food Standards Code. The standard:

- Defines an infant as a person up to 12 months of age
- Specifies the compositional requirements of infant formula, including the minimum and maximum required levels of energy, protein and fat
- Requires infant formula is nutritionally complete until 4 to 6 months of age
- Provides strict guidance for product labelling and health claims

Standard 2.9.1 Infant formula definition[2]	**Infant formula** means an infant formula product that: (a) is represented as a breast-milk substitute for infants; and (b) satisfies by itself the nutritional requirements of infants under the age of 4 to 6 months.

1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines.* Canberra: *NHMRC*. 2. Australian Government Federal Register of Legislation. *FANZS*– Standard 2.9.1 – Infant formula products. Available at: https://www.legislation.gov.au/F2015L00409/latest/text Accessed March 2024.

The mandatory building blocks of infant formula[1-4]

"*The constituents of breast milk are used as a reference in developing infant formula*."[1]

Macronutrients + Micronutrients

Nutrient	FSANZ infant formula mandatory requirements
Protein	• Must contain 0.45–0.70 g/100 kJ protein NHMRC recommendation: 'It is preferable to use a formula with a lower protein level'
Fat	• Must contain 1.05–1.50 g/100 kJ fat • Must contain essential fatty acids linoleic acid (LA) and ∝-linolenic acid (ALA)
Carbohydrate	Must contain glycaemic carbohydrates for energy (e.g. lactose)
Vitamins	Must contain **13 vitamins**: Vitamins A, D, C, thiamin, riboflavin, preformed niacin, vitamin B6, folate, pantothenic acid, vitamin B12, biotin, vitamin E, K
Minerals	Must contain **9 minerals**: Calcium, phosphorus, magnesium, iron, iodine, copper, zinc, manganese, selenium
Electrolytes	Must include chloride, sodium, potassium

Q4.Does iron in formula cause constipation?

1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines*. Canberra: *NHMRC*. 2. Australian Government Federal Register of Legislation. *FSANZ* Standard 2.9.1 – Infant formula products. Available at: https://www.legislation.gov.au/F2015L00409/latest/text Accessed March 2024. 3. Martin CR *et al. Nutrients* 2016;8(5):279. 4. Bakshi S *et al. Front Nutr* 2023;10:1194679.

Q5. What's the difference between a gold or standard infant formula?

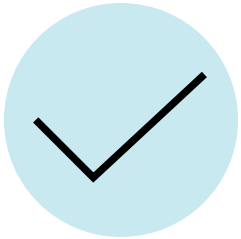
The following are optional nutritional ingredients that can be added to infant formula:

Prebiotics & probiotics[1,2]	Gut health and immunity (e.g. FOS, GOS)	
HMO's	Gut health and immunity (Human Milk Oligosaccharides) 2'-FL, LNnT	
Lipids[2,3]	Gut health and immunity, stool softness (e.g. Sn-2 palmitate)	
LCPUFAS[1,4]	Brain development in early life (e.g. Omega 3 DHA)	**Mandatory in EU**
Nucleotides[1,5-9]	Immunity	
L-carnitine[1,2]	Fatty acid metabolism	**Mandatory in EU**
Choline[1,2,10]	A precursor for acetylcholine and phospholipids critical for cell membranes	**Mandatory in EU**
Lactoferrin[1,2]	Immune responses, iron absorption, antiviral, antimicrobial, antioxidant, anti-inflammatory activities	
Lutein[1,2]	Plays a physiological and biological role in an infant's visual development and function	
Inositol[1,2]	Phospholipid production, cell osmolarity regulation and signaling	**Mandatory in EU**
Taurine[1,2]	Intestinal fat absorption, hepatic function and nervous system development	

References: 1. Australian Government Federal Register of Legislation. FSANZ– Schedule 29 – Special purpose foods. Available at: https://www.legislation.gov.au/F2015L00463/latest/text Accessed March 2024. 2. Bakshi S *et al. Front Nutr* 2023;10:1194679. 3. Australian Government Federal Register of Legislation. FSANZ– Standard 2.9.1 – Infant formula products. Available at: https://www.legislation.gov.au/F2015L00409/latest/text Accessed March 2024. 4. Lauritzen L *et al. Nutrients* 2016;8(1):6. 5. Yu V. *J Paediatr Child Health* 2002;38:543–49. 6. Singhal A *et al. Am J Clin Nutr* 2008;87:1785-92. 7. Carver J. *Acta Paediatr Suppl* 1999;430:83-8. 8. Hess J & Greenberg N. *Am Soc Parenter Ent Nutr* 2012;27(2):281–94. 9. Gutiérrez-Castrellón P *et al. Br J Nutr* 2007;98(Suppl 1):S64-7. 10. Wiedeman AM *et al. Nutrients* 2018;10(3):381.

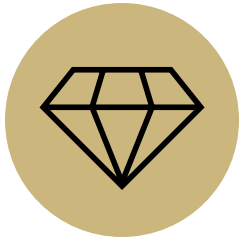
Q6. What are the different types of infant formula?

Q7. Which formula is closest to breast milk?



Standard formula

- Cow's milk-based formula
- Contains all nutrients needed for healthy growth and development
- Suitable for most babies



Premium formula

- Contains optional additional ingredients to more closely match breast milk
- Added ingredients include Omega 3 and Omega 6, HMOs, Sn-2 palmitate, prebiotics and probiotics

Specialty formula

- Modified for the dietary management of feeding problems
- Suitable for 0-12 months, nutritionally complete from 0–6 months

1. RaisingChildren.net.au. Infant formula and bottle-feeding. Available at: https://raisingchildren.net.au/newborns/breastfeeding-bottle-feeding/bottle-feeding/infant-formula#which-baby-formula-is-best-nav-title Accessed 19 March 2024. 2. The Sydney Children's Hospitals Network. Infant formula. Available at: https://www.schn.health.nsw.gov.au/infant-formula-factsheet Accessed March 2024.

Q8. Is there a difference between Stage 1 and Stage 2 infant formulas?

Q9. What is whey and casein in infant formula?

Q9. Is casein safe for babies?

Stages of infant formula[1,2]

Stage 1

- 'Newborn' formula, from birth to 6 months
- Nutritionally complete
- Whey to casein ratio more closely resembles mature breast milk eg. 65:35

Stage 2

- 'Follow-on' formula, from 6 months to 1 year
- Nutritionally balanced, to complement a solid diet
- Whey to casein ratio more closely resembles late lactation eg. 50:50

Stage 3 & 4

- 'Toddler' and 'Junior' formula, for 1 year and up
- Nutritious milk drink; a nutritional supplement only used when diet is not adequate to meet nutritional needs

References: 1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines*. Canberra: National Health and Medical Research Council. 2. The Sydney Children's Hospitals Network. Infant formula. Available at: https://www.schn.health.nsw.gov.au/infant-formula-factsheet Accessed March 2024.

NHMRC recommendations for choice of formula[1]

- ✓ Cow's milk-based infant formulas are suitable for use until 12 months of age
- ✓ The use of 'follow-on' formulas for infants aged 6-12months is not considered necessary
- ✓ Interchange between formulas within the same group is optional, however frequent changes may generate confusion and increased risk of inaccurate preparation/dosing
- ✓ It is preferable to use a formula with a lower protein level
- ✓ Use of a particular formula by a hospital does not mean that formula is the best one
- ✓ Feeding with infant formula should only be demonstrated by healthcare workers, or other community workers if necessary, and only to the mothers or family members who need it.

1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines.* Canberra: National Health and Medical Research Council.

Specialty formulas[1,2]

Sometimes formula-fed babies have special dietary needs or conditions diagnosed by a healthcare professional where general formulas may not be suitable.

Conditions include:

- Reflux and regurgitation
- Lactose intolerance
- Colic and constipation
- Cows' milk protein allergy (CMPA)

Specialty formulas should be used under medical supervision.

1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines*. Canberra: National Health and Medical Research Council. 2. The Sydney Children's Hospitals Network. Infant formula. Available at: https://www.schn.health.nsw.gov.au/infant-formula-factsheet Accessed March 2024.

What formula is good for reflux?

Does anti-reflux formula contain lactose?

Which baby formula is suitable for vegetarians?

What formula can I give my baby with CMPA?

What's the difference between lactose intolerance and dairy free formula?

What formula is good for constipation and gas?

Specialty Formula Questions

Gastro-oesophageal reflux (GOR)

GOR affects more than 40% of infants, peaking at 4 months and usually resolving by 12 months

What formula is good for reflux?

Does anti-reflux formula contain lactose?

Specialty formula for reflux and regurgitation[1-3]

- Use of **thickened infant formula** may reduce the frequency and severity of regurgitation
- Anti-regurgitation infant formulas may be thickened by adding different carbohydrates such as pre-gelatinised corn starch, rice cereals and carob bean gum
- Most reflux infant formulas are cow's milk and contain lactose
- Nutritionally complete from 0-6 months; suitable until 12 months

Specialty formulas should be used under medical supervision.

1. Benninga MA *et al. Gastroenterol* 2016;150:1443–55. 2. The Royal Children's Hospital Melbourne. Gastr. reflux disease in infants. Available at;https://www.rch.org.au/clinicalguide/guideline_index/Gastrooesophageal_reflux_disease_in_infants/ Accessed March 2024. 3. Salvatore S *et al. Nutrition* 2018;49:51–56.

Lactose intolerance

What's the difference between lactose intolerance and dairy free infant formula?

Specialty formula for lactose intolerance[2]

- Lactose intolerance formulas can be cows' milk-based or soy/plant-based
- **Cows' milk-based lactose intolerance formula** has negligible levels of lactose, and is nutritionally complete
- **Soy- or plant-based formula** is lactose-free
- Suitable for infant from birth 0-12 mths

Specialty formulas should be used under medical supervision.

1. Darma A *et al. Nutrients* 2024;16:414. 2. The Royal Children's Hospital Melbourne. Kids Health Information: Lactose intolerance. Available at: https://www.rch.org.au/kidsinfo/fact_sheets/Lactose_intolerance/ Accessed March 2024.

Colic and constipation

What formula is good for colic and constipation?

Specialty formula for colic and constipation[3,4]

Dairy based infant formula may be specially designed to help reduce the symptoms of colic and/or constipation. This can include:

- Reduced lactose
- 100% whey protein
- Lipids to soften stools (e.g. Sn-2 palmitate)
- Suitable for infant from birth 0-12 mths

Specialty formulas should be used under medical supervision.

1. Benninga MA *et al. Gastroenterol* 2016;150:1443–55. 2. Ho JMD & How CH. *Singapore Med J* 2020;61(2):63–68. 3. The Royal Children's Hospital Melbourne. Clinical Practice Guidelines: Unsettled or crying babies. Available at: https://www.rch.org.au/clinicalguide/guideline_index/Crying_Baby_Infant_Distress/ Accessed March 2024. 4. Yao M *et al. J Pediatr Gastroenterol Nutr* 2014;59:440-448.

Cows' milk protein allergy (CMPA)

CMPA affects more than 2% of infants in Australia and New Zealand[1]

What formula can I give my baby with Cows milk allergy?

Specialty formulas for CMPA[2,3]

- There are multiple types of formula available for infants with CMPA, including:
  - **Rice protein**-based (OTC)
  - **Soy protein**-based (OTC)
  - **Dairy-based extensively hydrolysed** (PBS/PSA-listed, prescription or OTC)
  - **Amino acid**-based (PBS/PSA-listed, prescription)
- The choice of formula will depend on the type of allergic reaction, infant age, and whether multiple food protein allergies are present
- Suitable from birth 0-12 months

Specialty formulas should be used under medical supervision.

ASCIA, Australasian Society of Clinical Immunology and Allergy; PBS, Pharmaceutical Benefits Scheme (AU); PSA, Pharmac Special Authority (NZ); OTC, available over the counter. 1. ASCIA. Cow's Milk (Dairy) Allergy – Fast Facts. Available at: https://www.allergy.org.au/patients/fast-facts/cows-milk-dairy-allergy Accessed March 2024. 2. ASCIA. Guide for Milk Substitutes in Cow's Milk Allergy. Available at: https://www.allergy.org.au/hp/papers/guide-for-milk-substitutes-cows-milk-allergy Accessed March 2024. 3. The Royal Children's Hospital of Melbourne. Clinical Practice Guidelines: Non-IgE mediated food allergy. Available at: https://www.rch.org.au/clinicalguide/guideline_index/Non-IgE_mediated_food_allergy/ Accessed March 2024.

Cows' milk protein allergy (CMPA)

ASICA Guide for Milk Substitutes in CMPA: Specialty formula

Type of allergy	First choice		Second choice*	Third choice*
Immediate (IgE-mediated) CMPA†	**<6 months**	• eHF; or • Rice protein-based formula‡	AAF	
	>6 months	• Soy formula^; or • Rice protein-based formula‡	eHF	AAF
Anaphylaxis	• AAF; or • Soy formula^ (>6 months); or • Rice protein-based formula‡			
Food Protein Induced Enterocolitis Syndrome (FPIES)	**<6 months**	• eHF; or • Rice protein-based formula‡	AAF	
	>6 months	• Soy formula^#; or • Rice protein-based formula‡	eHF	AAF
Delayed (non-IgE-mediated) CMPA	**<6 months**	eHF	• AAF • Rice protein-based formula‡	
	>6 months	Soy formula^ (if growing well)	• eHF • Rice protein-based formula‡	AAF
Eosinophilic oesophagitis (EoE)	AAF			

*If the previous choice was not tolerated. †Not anaphylaxis. ‡Unless allergic to rice. eHF or AAF is recommended if poor growth and/or multiple non-IgE food allergies. ^Unless allergic to soy. #If already soy-tolerant/after medically supervised soy introduction. AAF, amino acid-based formula; ASCIA, Australasian Society of Clinical Immunology and Allergy; CMPA, cows' milk protein allergy; eHF, extensively hydrolysed formula. Reference:slide 34. .

Dairy Free Plant-based Infant formula

Which baby formula is suitable for vegetarians?

Dairy-free/Plant-based infant formulas

Rice protein and Soy protein based Infant formulas are:

- Diary free/plant based
- Suitable for infants requiring vegetarian or dairy free diet
- Suitable for infant from birth 0-12 mths
- Suitable for lactose intolerance

NHMRC recommendations for choice of formula[1]

- ✓ Special formula designed for infants with nutritional problems should be used only in the case of medically diagnosed conditions
- ✓ Special formulas may be used under medical supervision for infants who cannot take cow's milk-based products for specific medical, cultural or religious reasons
- ✓ The use of special formulas such as hydrolysed or soy milk-based formulas may be used under medical supervision for infants who cannot take cow's milk-based products

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- ✗ There is no evidence that the use of soy or goat's milk-based formulas will prevent the development of allergies to cow's milk-based formulas
- ✗ Goat's milk-based formulas are not suitable alternatives for infants with allergies to cow's milk-based formulas

1. National Health and Medical Research Council (2012) *Infant Feeding Guidelines.* Canberra: National Health and Medical Research Council

In closing.....
How do I know which formula is best for my baby?

All Infant formula by itself provides the nutritional requirements of infants under the age of 4 to 6 months, however, more importantly....
forming a healthy attachment and a maternal bond with a child is one of the most significant psychological processes for a mother in the postpartum period and the first year of a child's life. It is essential for a child's survival and
healthy future development

Lutkiewicz,K et.al, 2020; Int. J. Environ. Res. Public Health 2020, 17, 5427

Sanulac Nutritionals Australia Pty Ltd. ABN 31 160 607 509. SAN-06112_06107-20/04/2024

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Slide 15. Figure adapted from Walsh C et al. 2020.1 Schematic representation of human milk oligosaccharide (HMO) profile in the milk of secretor mothers (left) and non-secretor mothers (right). Diameters of each circle depict the concentration of quantified HMO. References: 1. Walsh C et al. J Funct Foods 2020;72:104052. 2. Walsh C et al. J Funct Foods 2020;104074. 3. Bode L. Glycobiology 2012;22(9):1147–62. 4. Goehring KC et al. J Nutri 2016;146:2559–66. 5. Wicinski M et al Nutrients 2020;12:266 6. Donovan S et al. Am Nutr Metab 2016;69(2):42-51. 7. Puccio G et al. JPGN 2017;6:624-631. 8. Steenhout P et al. FASEB J 2016;30(Suppl 1):275:7. 9. Berger B et al. Am Soc Micro 2020;11(2):e03196–19. 10. Vanderplas Y et al. Nutrients 2018;10:1161.

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The evolving evidence on HMOs & Butyrate in the infant gut

Emeritus Professor Geoff Cleghorn
The University of Queensland

CEO: Cleghorn Consulting

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No matter where the milk comes from there are no HMOs



Other milks contain lesser amounts of oligosaccharides and their structures differ greatly

McGuire MK et al, AJCN. 2017. 105. 1086-1100
Images by wirestock on Freepik and Freepik

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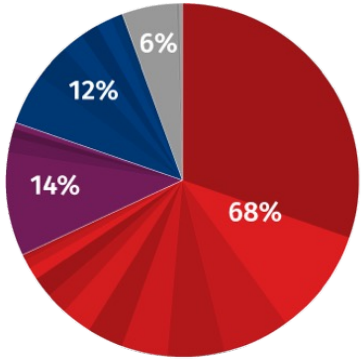
HMOs can be classified into 3 major classes by the nature of their structure



HMO distribution in Mature Milk

Term milk: 11.3g/L

Mean of Means g/L

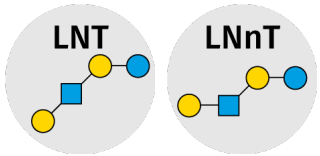
Complex HMO mixtures provide multi-range effects and target a wider range of pathogens and beneficial microbes

Neutral Core HMOs

- Neutral
- Addition of N-acetylglucosamine at the terminal position

POTENTIAL BENEFITS:

- Bifidogenic
- Antimicrobial
- Anti-inflammatory

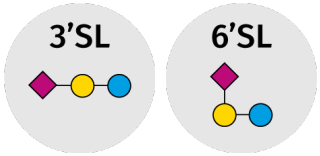


Sialylated HMOs

- Acidic
- Addition of a sialic acid at the terminal position

POTENTIAL BENEFITS:

- Anti-viral
- Brain and cognitive development

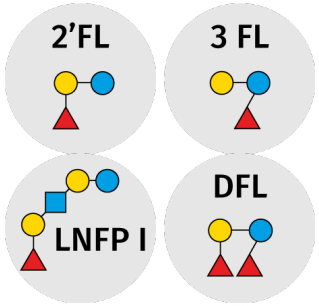


Fucosylated HMOs

- Neutral
- Addition of fucose at the terminal position

POTENTIAL BENEFITS:

- Bifidogenic
- Antimicrobial
- Anti-inflammatory
- Brain and cognitive development



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Structural specificity of HMOs can trigger different functions

- Structural difference in HMOs result in binding specificity with biological receptors that can trigger different pathways and immune response

- Certain HMO structures may increase the production of specific intestinal metabolites such as different short chain fatty acids (SCFAs). SCFAs contribute to maintaining the gut barrier, controlling immune and inflammatory reactions, and regulating central nervous system functions.

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Wang et al., 2022, J. Agric. Food Chem., 70, 6328-6353

Genetics has major effect on the actual composition of HMOs in breast milk

Fucose may or may not be present in HMOs

There are 2 fucosyltransferases

FUT 2 encoded by Secretory gene at 19q13.3
FUT 3 encoded by Lewis gene at 19p13.3

Both genes expressed in glandular epithelium

Mothers may have active or inactive genes

Winicski et al, Nutrients 12. 266. 2020

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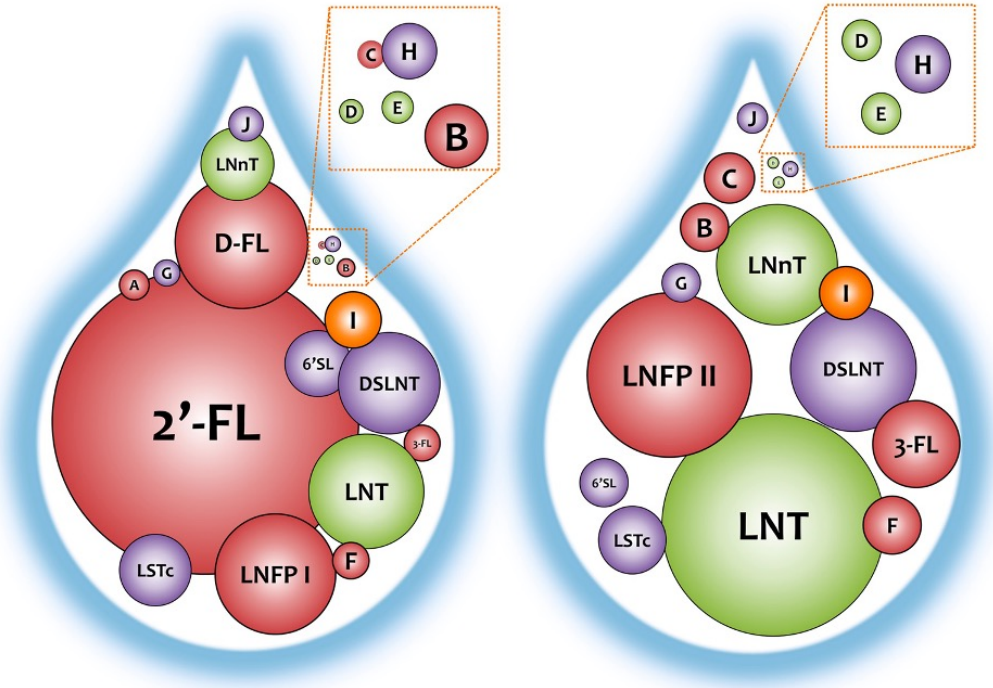
Secretor v non-secretor



Taken from, Walsh C et al, Journal of Functional Foods. doi.org/10.1016/j.jff2020. 104052

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Maternal Diet??

2021 A Scoping Review.

Potential association between dairy intake and HMOs but “evidence is lacking”

2023. A cohort study.

N=101. No significant correlation between individual nutrients and HMOs (except for folate)

Biddulph et al, Nutrients 2021 13 965
Biddulph et al, Nutrients 2023 15 2093
Image from Freepik

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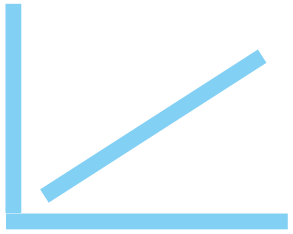
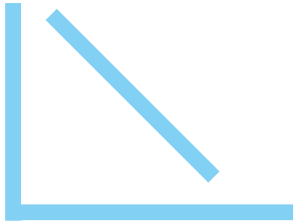
Parity and HMO concentrations

LNnt
LNT



Parity

3 ‘FL



Parity

Azad et al, Journal of Nutrition. 2018. 148.1733-1742

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HMOs in infant nutrition

Clinical evidence support roles in gut/intestinal health and immunity

Support immunity

- Decreased levels of pathogen bacteria
- Reduced illnesses (URTI*, Bronchitis, Fever)

Support intestinal health

- Promotes gut maturation
- Reduced fecal pH

Stimulate growth of beneficial bacteria

- Bifidogenic
- Microbiota like breastfed infants

Goehring 2016, Alliet 2022, Bauer 2021 (abstract), Vanderplas 2022, Puccio 2016, Newburg 2004. Berger 2020b. Bosheva 2022.

*Upper Respiratory Tract Infections

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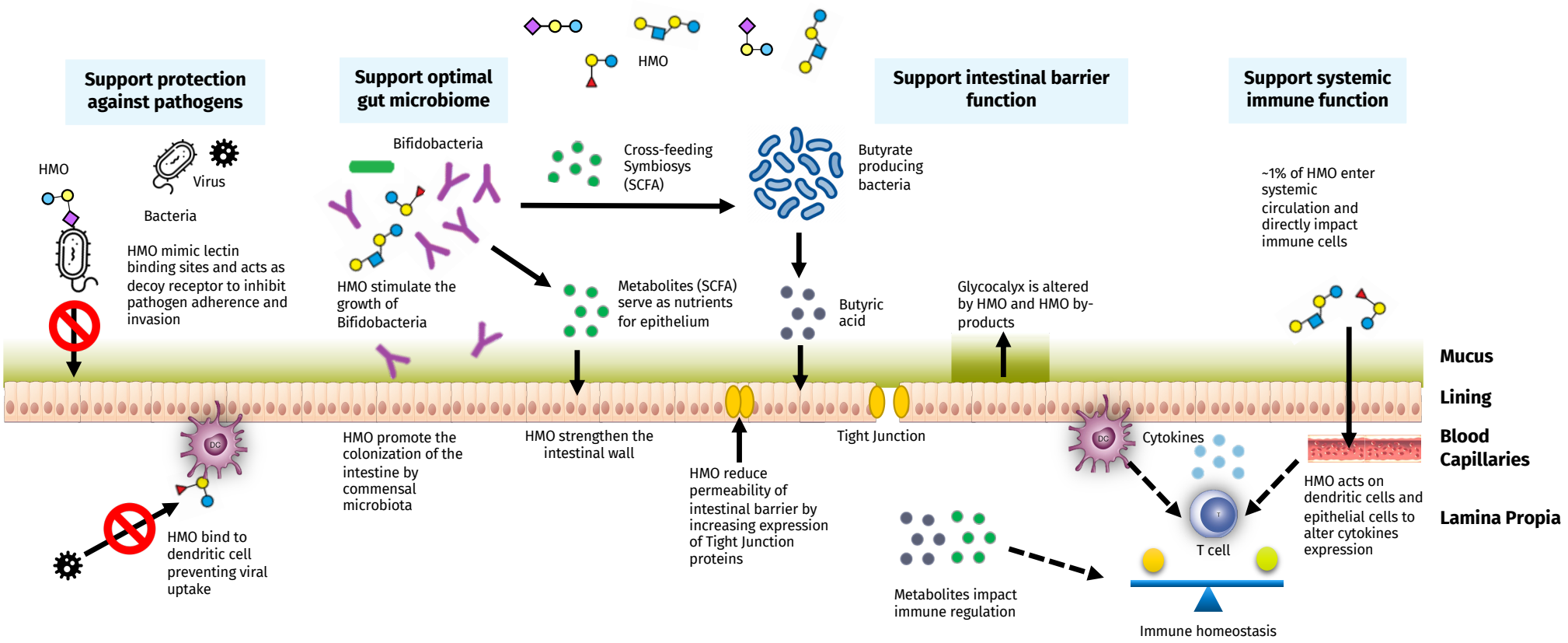
Proposed HMO mechanisms of action to support infant health



Adapted from Walsh et al., 2020, J. Funct. Foods, 72: 104074

HMO supports immunity

2'-FL inhibits in high doses as a percentage of milk oligosaccharide was associated with reduced incidence of bacteria mediated diarrhea in infants

- *Campylobacter* diarrhea occurred less often ($P = .004$)
- Calicivirus diarrhea occurred less often ($P = .012$).

Morrow et al., (2004) J. Pediatr. 145: 297-303.

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HMO supports intestinal health & immunity

Infants consuming HMO-supplemented infant formula had fewer parent-reported illness symptoms:

- Significantly reduced incidence of bronchitis at 0 – 4, 0 – 6, and 0 – 12 months
- Significantly reduced incidence of lower respiratory tract infections from 0 – 12 months
- Significantly reduced incidence of antibiotic usage from 0 – 6 and 0 – 12 months
- Significantly reduced incidence of antipyretics from 0 – 4 months

JPGN 2017; 64: 624 - 631

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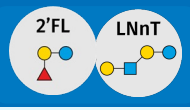
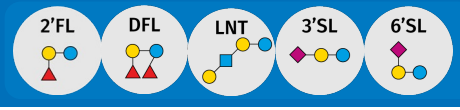
Levels of HMOs used in studies that reported clinical benefit among infants

- While the benefit of HMOs in infants has been clinically shown, evidence to conclude optimum combination or dose is limited

	Level in clinical study (g/L)			Level in mature human milk (g/L)
				
2'-FL	0.2-1	1	2.99	2.28
LNnT		0.5	-	0.37
DFL			0.75	0.29
LNT			1.5	0.74
3'-SL			0.23	0.72
6'-SL			0.28	0.4

Puccio et al 2017, J Pediatr Gastroenterol Nutr. Korpela et al 2018, Scientific Reports. Berger et al 2020. mBio. Goehring 2016. J Nutr. Marriage et al 2015, Kajzer et al 2016, Faseb Journal. Ramirez-Farias et al 2021, Nutrients. Vandenplas et al 2020, Nutrients. Parschat et al 2021, Nutrients. Soyyilmaz et al 2021, Nutrients.

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Summary

- Compositionally, HMOs represent the largest gap between breast milk and formulas for infants
- HMOs:
  - Are structurally diverse, which is the backbone of diverse functions
  - Have 3 main classes based on their structures
- Many clinical studies have shown the benefit of HMO supplementation in IF to support growth of beneficial bacteria, intestinal health and immunity in infants
- Evidence on the benefits of HMOs beyond its prebiotic function is emerging, e.g. brain, allergy, weight/stature, lungs

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No matter where the milk comes from there are no HMOs



Other milks contain lesser amounts of oligosaccharides and their structures differ greatly

McGuire MK et al, AJCN. 2017. 105. 1086-1100
Images by wirestock on Freepik and Freepik

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Short Chain Fatty Acids

Short-chain fatty acids (SCFA) are produced by bacteria dwelling in the large intestine. They are a product of the metabolism of polysaccharides that are not digested by the digestive system enzymes. At the same time, they are the main energy substrate for the epithelial cells of the intestinal mucosa. More and more scientific reports focus on the significance of SCFA and in particular that of butyric acid

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Front Microbiol. 2022; 13: 1103836.
Published online 2023 Jan 12. doi: 10.3389/fmicb.2022.1103836
PMCID: PMC9877435
PMID: 36713166

Butyrate producers, "The Sentinel of Gut": Their intestinal significance with and beyond butyrate, and prospective use as microbial therapeutics

Vineet Singh, [1,†] GyuDae Lee, [1] HyunWoo Son, [1] Hong Koh, [2] Eun Soo Kim, [3] Tatsuya Unno,[4,*,†] and Jae-Ho Shin[1,5,*,†]

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Abstract

Go to:

"…….. Most butyrate producers belong to the Clostridium cluster of the phylum Firmicutes, such as *Faecalibacterium*, *Roseburia*, *Eubacterium*, *Anaerostipes*, *Coprococcus*, *Subdoligranulum*, and *Anaerobutyricum*……."

Butyrate

- “Butyric acid present in the lumen of the gastrointestinal tract is indispensable for maintenance of normal homoeostasis of the mucosa cells. It conditions their normal metabolism and proliferation, and it is responsible for regeneration and repair processes. It stimulates local cellular response, maintains intestinal barrier integrity, and inhibits tumour cell differentiation.
- It also has an inhibitory effect on the development of other pathogens, such as *Escherichia coli*, *Campylobacter*, or *Salmonella*”

FROM: Banasiewicz T et al: Prz Gastroenterol. 2020; 15(2): 119–125.

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Butyrate

- “Butyric acid is increasingly used in the treatment / prevention of various diseases such as:
  - diarrhoea (specific and non-specific),
  - inflammatory conditions (non-specific bowel inflammation, diverticulitis, diversion colitis, radiation-induced bowel inflammation),
  - functional disturbances (IBS), dysbiosis, and post-surgery (resections, short bowel syndrome)
  - post-chemotherapy conditions.
- Recently, it has been stressed that SCFA affect not only processes occurring in the lumen of the gastrointestinal tract but also other systems and organs, such as circulatory or nervous systems, through mechanisms associated with the intestinal barrier, carbohydrate metabolism, immunomodulation, and appetite control, and with an effect on obesity”

FROM: Banasiewicz T et al: Prz Gastroenterol. 2020; 15(2): 119–125.

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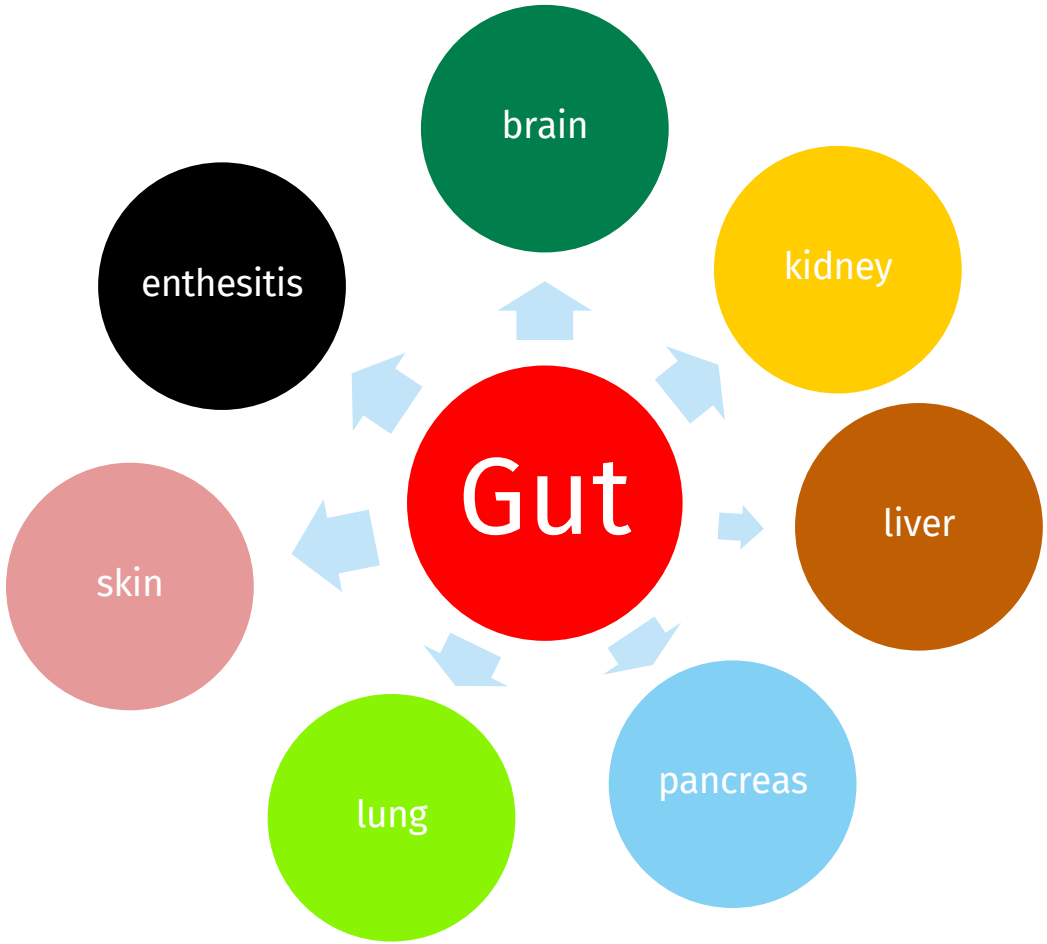

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Butyrate regulates neonatal GI Tract motility & immunity

- Formula fed neonates
  - birth weight 3010±250 g
  - gestational age 39.3±1.2 w
  - vaginal delivery 78%

- Randomly allocated to received in the first 28 d of life
  FBA supplementation (20 mg/kg/d) or placebo added to the formula.

- Diary to collect daily data on stool pattern, regurgitation, infantile colic, innate and acquired immunity stimulation.

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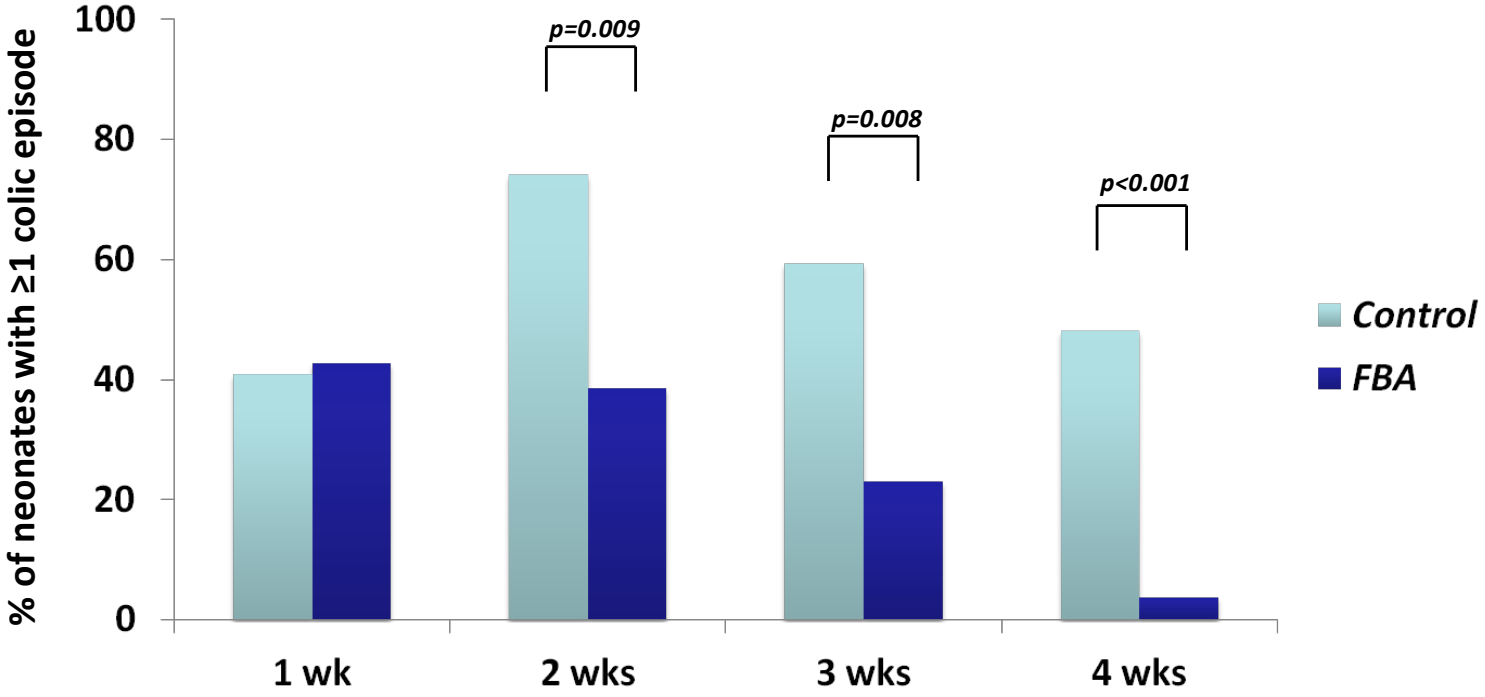
Passariello A et al. ESPGHAN Meeting 2010

colic episodes during the study period



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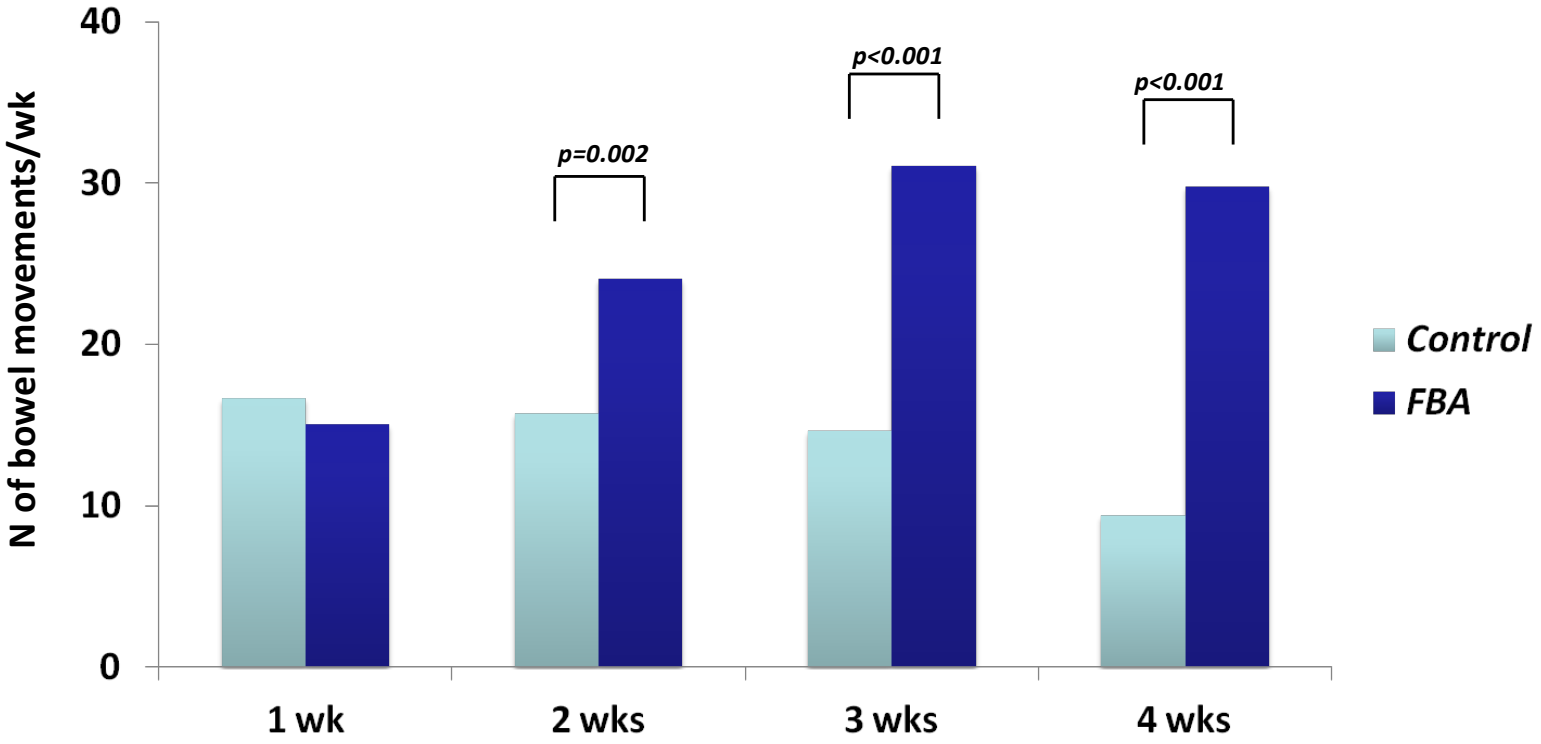
Number of bowel movements



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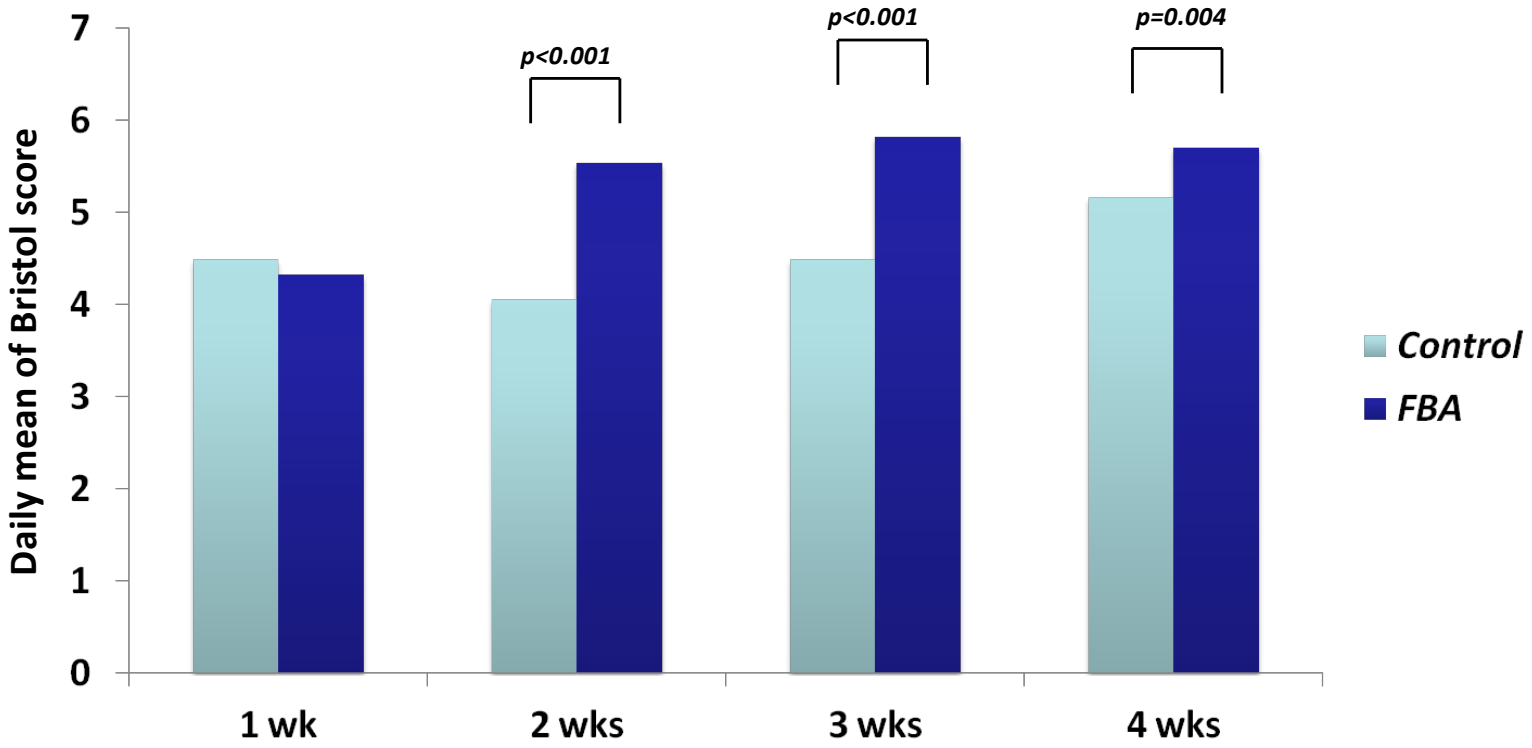
Bristol Score



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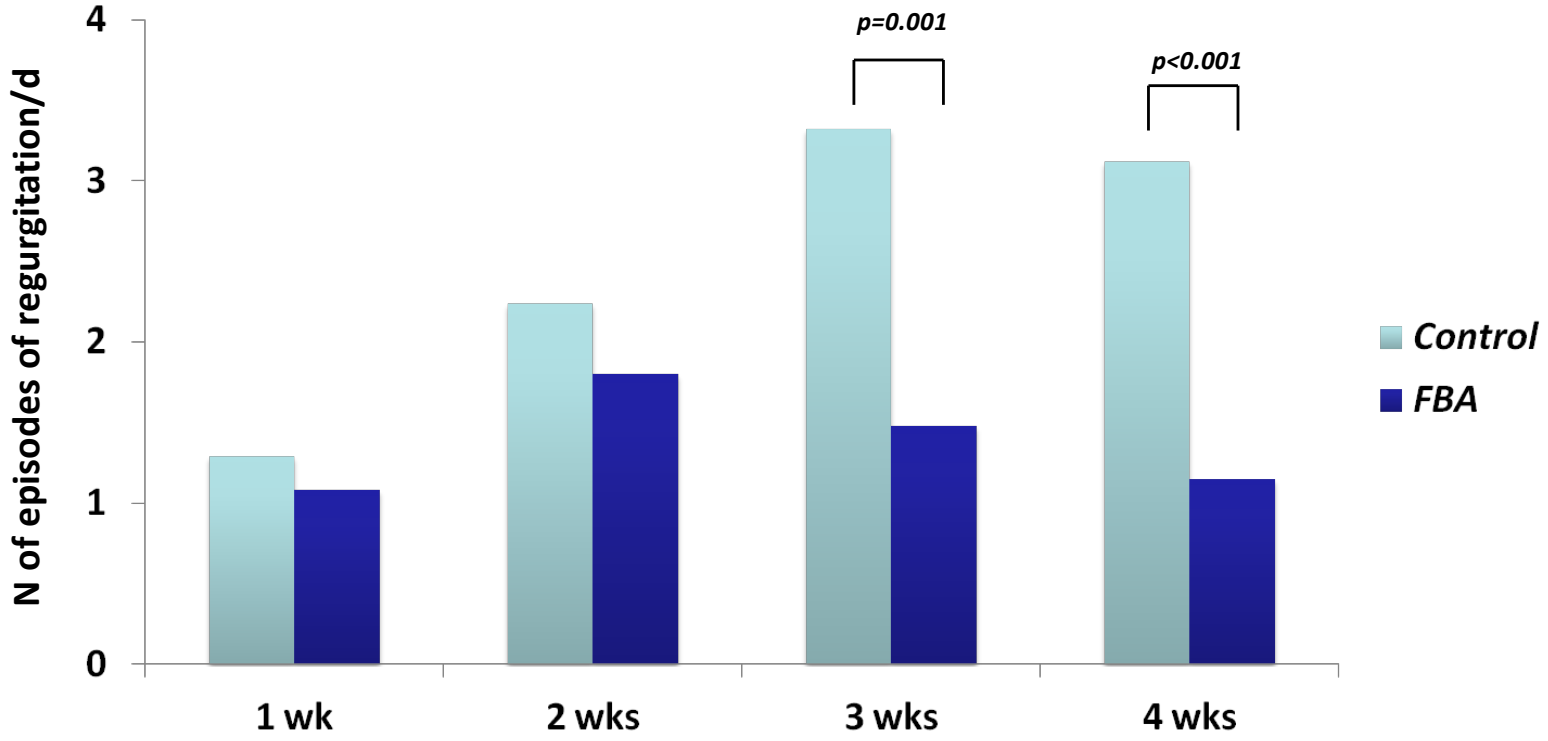
Number of regurgitation episodes



Passariello A et al. ESPGHAN Meeting 2010

Butyrate against pain and constipation

- **Reduction of pain** during defecation in pts with IBS with constipation (Na-butyrate, 2×150 mg/day for 12 wks)

- Dose-dependently **decrease functional visceral sensitivity** in healthy humans and in animal model of inflammation-related visceral and somatic pain (FBA better than Na-butyrate)

- Stimulation of the contractions of the intestine through an enteric cholinergic reflex = **constipation resolution**

Vanhoutvin SA et al., Neurogastroenterol Motil 2009
Banasiewicz T et al., Gastr Prakt 2011
Russo R et al. Pharmacol Res 2016
Ge X, et al. Sci Rep 2016

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frontiers | Frontiers in Allergy

BRIEF RESEARCH REPORT
published: 06 April 2022
doi: 10.3389/falgy.2022.873168

Evaluation of Stool Short Chain Fatty Acids Profiles in the First Year of Life With Childhood Atopy-Related Outcomes

*Hsin Yue Cheng[1], James Chun Yip Chan[2,3], Gaik Chin Yap[1], Chiung-Hui Huang[1], Dorinda Yan Qin Kioh[4], Elizabeth Huiwen Tham[1,5], Evelyn Xiu Ling Loo[6], Lynette P. C. Shek[1,5], Neerja Karnani[6], Anne Goh[7], Hugo P. S. Van Bever[1,7], Oon Hoe Teoh[7], Yiong Huak Chan[8], Christophe Lay[1,9], Jan Knol[10,11], Fabian Yap[7], Kok Hian Tan[7], Yap-Seng Chong[6,12], Keith M. Godfrey[13], Eric Chun Yong Chan[4], Bee Wah Lee[1] and Le Duc Huy Ta[1]**

Children with lower stool butyric acid levels (at 3/52, 3 & 6 mos) had higher odds ratio for wheezing, eczema, food sensitization and combined outcomes of both wheezing and eczema till age 8 years, compared to those with higher levels. Additionally, lower longitudinal levels of propionic acid over 4 time points in first year of life was associated with recurrent wheezing

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Butyrate Is Good for the Brain and Nerve Cells

- Butyrate, like exercise, places the brain into a state of “readiness for plasticity” and it facilitates **long-term memory**
- In **stroke** mice model treatment with butyrate supports the **development of new neurons** in the damaged areas helping recovery
- Butyrate protects nerve cells in the ear after treatment with antibiotics thus **preventing hearing loss**
- Butyrate prevents the death of neurons in the spine in the model of **spinal muscular atrophy** in mice
- Na-phenylbutyrate beneficial for the treatment of **amyotrophic lateral sclerosis** (ALS). It prevents the death of nerve cells responsible for activating movement

Ryu H et al. J Neurochem 2005
Kim HJ et al. J Neurochem 2009
Intlekofer Ka et al. Neuropsychopharmacology 2013
Wang J et al. Am J Otolaryngol 2015
Lei E et al. Neurochem Int 2016

Summary (SCFA)

- SCFA are a vital metabolic outcome from the infant microbiome
  - Role in gut health
  - Role in nutrient absorption
  - Impact on weight gain
  - Protective against food allergy and the atopic march
  - Significant multi prong impact in emotional intelligence and CNS development

  - In 2023 ……
  Inflammatory bowel disease, Parkinson's disease, alcoholic liver disease, Breast cancer, lymphoma, colorectal cancer

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Nourishing Fussy Eaters: Building blocks for feeding success

Dr Brooke Harcourt

Specialist Paediatric Dietitian and Feeding Therapist

PhD APD CEDC

Family Dietetics

Goals

- Understand the role of adequate nutrition in the treatment process for fussy and problematic feeders.
- Determine the best way to supplement nutrition for your paediatric clients in the community.
- Extended knoweledge of oral nutrition supplement use in the paediatric population.

Increased incidence of eating and feeding disorders in recent years

- Fussy eating
- First foods and slow transitions
- Food Play
- Problematic Feeding
- Paediatric Feeding Disorder
- Sensory Processing Disorder
- Eating disorders;
  - Avoidant Restrictive Food Intake Disorder
  - Anorexia Nervosa

Increased approaches to practically treat these conditions

- Family-focused Intervention
- Top-down Interventions, Direct work with the child on feeding skill
- Bottom- Up Intervention, Intrinsic interventions eg sensory

- AEIOU
- SENSE-ational Mealtimes
- Responsive Feeding Therapy
- Sequential Oral Sensory (SOS)
- Satter: Division of Responsibility
- Food Chaining
- Cooking Therapy
- Play Therapy
- CBT / DBT

Inadequate oral intake / Malnutrition status

Wasting, stunting, underweight, macro and micronutrient deficiencies

- Low weight for height – Wasting
- Low height for age – Stunting
- Low weight for age – Underweight, wasted, stunted or both

World Health Organisation, who.int/ factsheets/ malnutrition

Malnutrition status inhibits Feeding Therapy success

Loss of appetite
- Iron deficiency
- Zinc deficiency

Dysgeusia
- Zinc deficiency

Cognitive Impairment
- Vitamin B12 deficiency

Immune system impairment
- Vitamins C, D, A, E deficiency
- Zinc and Selenium deficiency
- Protein malnutrition

Vision Impairment
- Vitamin A deficiency

Poor metabolism
- Protein deficiency
- Carbohydrate deficiency

Poor muscle tone / Hypotonia
- Protein deficiency
- Calcium deficiency

Hypothyroidism
- Iodine deficiency

Ataxia
- Vitamin E deficiency

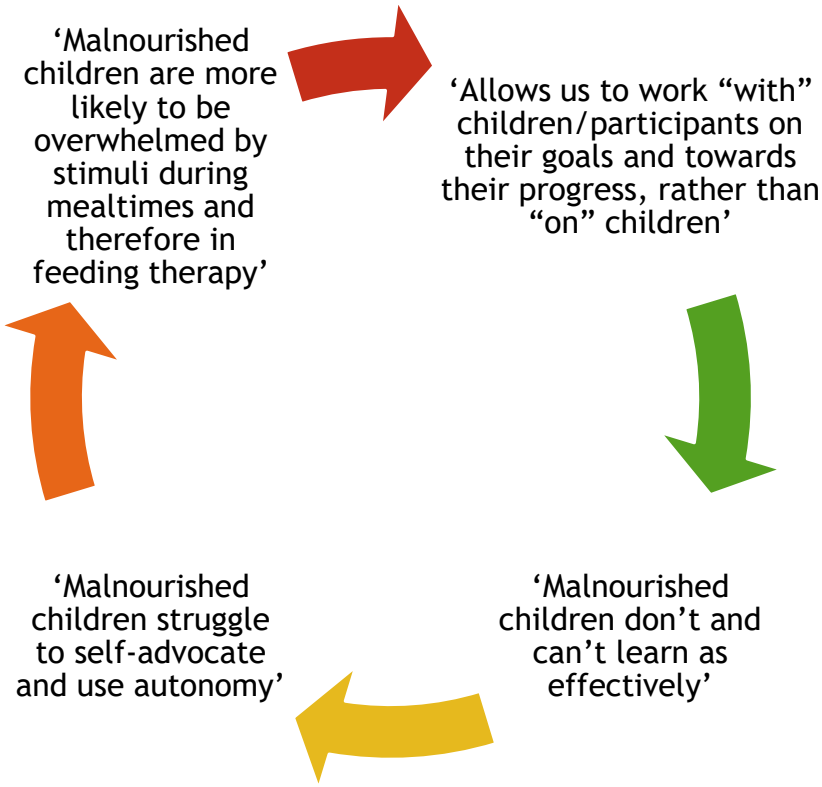
Dysarthria
- Vitamin E deficiency

Monitoring dietary requirements

- Diet intake interview or
- Food Diary
- Weekly intake, Paediatric dietary intake in calculated over a week
- Daily adequacy
- Food ‘Serves’
- Biochemistry (where participants are able)
- Height, weight, head circumference

Malnutrition status must be addressed as a first priority following identified reduced dietary intake.

“Feeding” prior to Feeding Therapy commencement improves success



Repairing inadequacy

Multivitamin

- Gummies
- Paediatric multivitamin liquids
- Multivitamin tablets
- Adult multivitamin liquids
- Effervescent tablets: Paed or Adult

Multiple nutrient approach

- 1.0 - 2.5 kcal/ml oral nutrition supplementation
- 1.0 - 2.5 kcal/ml enteral nutrition: NGT, PEG, PEJ

Repairing inadequacy

Single nutrients

- Vitamin / mineral
  - Tablets,
  - Powder, Pharmacy compound
  - Liquid, Pharmacy compound
  - Sublingual: Vitamin B12
  - Infusion: Iron, Vitamin C, Vitamin A
  - Injection: Vitamin B12, Vitamin A
- Protein powder: whey, legume, collagen & whey
- Carbohydrate
- Fat supplement

Repairing inadequacy

Meal Fortification – ‘More in’ in every mouthful

- Toddler milks / Stage 3 products
- Food Special Medical Purpose
- High Protein Milk, ie milk powder in milk
- Multivitamin Milk
- Milo / Aktavite / Ovaltine
- Eggs, nut powders
- Butter / oils
- Beans / Legumes

Repairing inadequacy

Preferred foods first

- Offering preferred foods at each meal and snack
- Regular offering of meals and snack
- 1 preferred protein? – Great, offer that!

Taking this time allows family processes and routines to be practiced and established

Mealtime processes that are established, provides a setting for Feeding Therapy to be translated to.

Regular opportunity for meals and snacks

Family-based Feeding Therapy

'Learning plate', cooking together

Family centred education

Appropriate seating positions / supported seating

Assisted cutlery

Notion of change

NUTRITION COUNSELLING

CBT / DBT PROGRAMS

CHANGES IN HOME / FEEDING ROUTINES

CHANGES IN LANGUAGE IN THE HOME & SELF-TALK

How much pre-time?

Dr Brooke Harcourt, info@familydietetics.com.au

Family Dietetics

www.familydietetics.com.au

Dr Fiona Arrowsmith
DIETITIAN
FOR
KIDS
Nutrition expertise for infants to teens

Challenges Experienced When Transitioning From Hospital to Home with a Feeding Tube

Dr Fiona Arrowsmith, PhD

Paediatric Dietitian

24th of April 2024

Overview

- Working as a dietitian in the hospital system versus community setting or private practice.
- Difference in interaction with clients and their families in the hospital versus community setting.
- Common problems and situations encountered in the community.
- Finding support for both dietitians and caregivers in the community setting.
- Lessons learned!

Hospital Versus Community For Dietitians

Hospital:

- Acute illnesses and surgery
- Short term nutrition goals to “get them home”
- Multidisciplinary team at your fingertips
- Instant access to colleagues for advice
- Easy access to resources, e.g. guidelines and journal articles
- More continuing education opportunities, e.g. journal club, grand rounds, funding for conferences
- More teaching and supervision
- Research opportunities / collaboration
- Access to equipment and resources

Hospital versus Community for Clients

- “Patients” versus “clients”
- Avoid describing children by their disability
- Get to know families on a more personal level
- Long-term nutrition goals and planning
  - “What suits you?”. Rather than “This is what we are going to do”
  - ?tube weaning
  - Balancing oral intake with tube feeding
  - BTF
- Day care / preschool / school feeding plans
- Adapting feeding plans around families

Common Problems Encountered in the Community

- Feed intolerance – vomiting, diarrhoea, constipation
- Leaking gastrostomy tubes
- NGT or gastrostomy dislodged
- Poor weight gain
- CREATE YOUR TEAM!
  - Nursing support
  - Feeding therapist (speech therapist)
  - Occupational therapist
- Challenge of contacting doctors to discuss concerns with clients and advocating for clients.

Client case study

- Ruby aged 11y
- Rare syndrome resulting in severe CP-like disability and epilepsy
- In foster care
- Reviewed via phone as no dietitians nearby with availability
- Lost to follow up with hospital dietitians >12 months
- Same feeding regimen “for years”. Powdered paediatric formula (64 kcal/100ml).
- 230ml x 4, 590 kcal/day
- Weight: 28.6 kg. No weight gain for >12 months
- Micronutrient analysis: not meeting several vitamins and minerals

Client Case Study….

- Regular leaking of gastrostomy button
- Constipation – using actilax and enemas
- Calculated EER: 1090 – 1300 kcal
- Current weight BMR – x1.2
- However, was receiving 590 kcal/day
- Plan
  - Increase calories by 10% to 650 kcal/day
  - Changed to an adult liquid ready to feed to better meet needs (80kcal/100ml)
  - Changed from actilax to Osmolax, constipation causing leaking?
  - Provided letter for nutritional biochemistry

Client Case Study…..

- Reviewed in person 1 month later at a respite facility
- Weight of 31.4 kg - likely inaccurate, gain of 3kg in 1 month
- Tolerating feeding regimen well with some leaking, changed button at respite
- Advised to continue, review in 3 months.
- Several appointment cancellations followed.
- Presented to hospital, weight loss, terrible leaking
- Sent home on original powdered feed, increased to 100kcal/100ml providing 1000 kcal/day, increase of 35% in calories.

Client case study….

- 2 weeks later carer contacted me in great distress, Ruby in a lot of pain, formula coming out through button in “chunks”
- Lost weight to 28kg
- Back on to liquid formula, 650kcal/day
- Engaged nursing support
- Foster care case manager now involved
- Referral to a gastroenterologist (no paediatrician involved, GP only)
- Changed to continuous pump feeds
- ?severe scoliosis potentially causing leaking, may need to transition to a gastro-jejunal tube

Resources for Dietitians

Resources

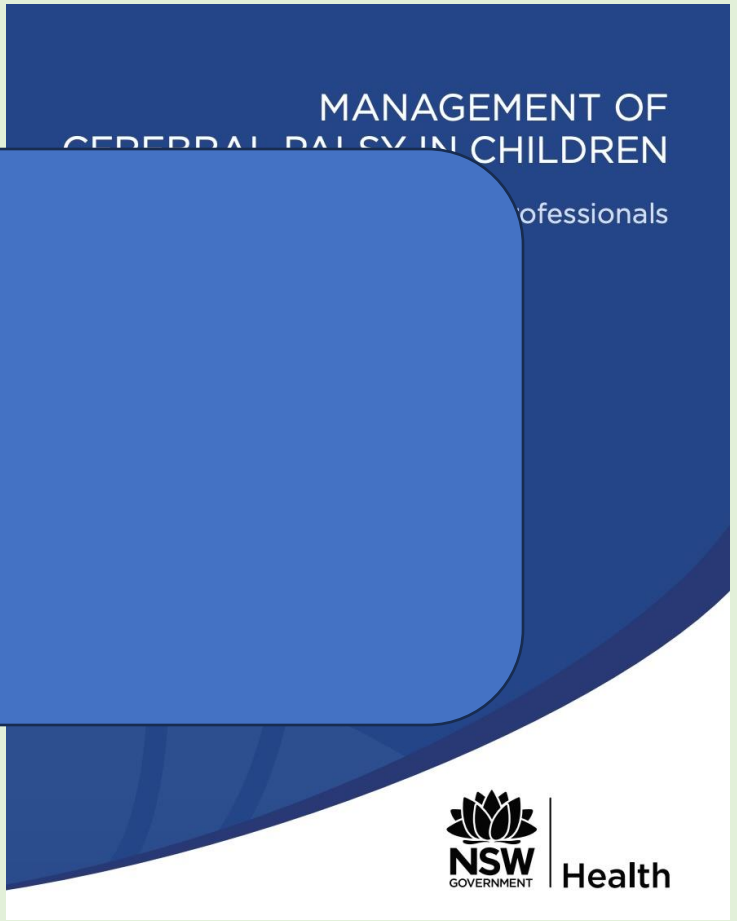
Companies

Disability Dietitians

Continuing

Guidelines

Supervision



Resources for Parents / Carers

Avanos

patient information leaflets

www.tubefed.com.au

www.childfeeding.org

Nutrition companies

Home Nursing Support services

DDWA

Developmental Disability WA

SCHN

fact sheets / care and troubleshooting

www.Tubiefun.com.au

Facebook groups

AuSPEN

resources for BTF

Lessons learned

- Create your support team
- Collaborative approach
- Learn to advocate for your client
- Teach your client / client's carer to advocate
- Family / carer support
- Tread carefully with tricky clients
- Continuing education
- Supervision and support for yourself