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This educational module was developed by Danone and reviewed by paediatrician **Dr Anthony Chitti.**

The module is presented by **Dr Anthony Chitti.**

Breast milk is best for babies. A healthy diet is important for breastfeeding. A decision not to breastfeed, or partial bottle feed, may reduce milk supply making it difficult to reverse. Use formula as directed. For Healthcare Professionals only - not for distribution to the general public.

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ACCREDITED CPD

Accreditation Number: A2512FGID1

This activity has been accredited for 1.0 hr of Group 1 CPD (or 1.0 CPD credit) suitable for inclusion in an individual pharmacist's CPD plan which can be converted to 1.0 hr of Group 2 CPD (or 2.0 CPD credits) upon successful completion of relevant assessment activities.

Pharmacist Competencies: 1.5, 2.1, 2.2, 2.3, 3.1, 3.2

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Functional Gastrointestinal Disorders (FGIDs) in Infancy: Nutrition-First Management

November 2025

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Learning Outcomes

By the end of this learning module you will be able to:

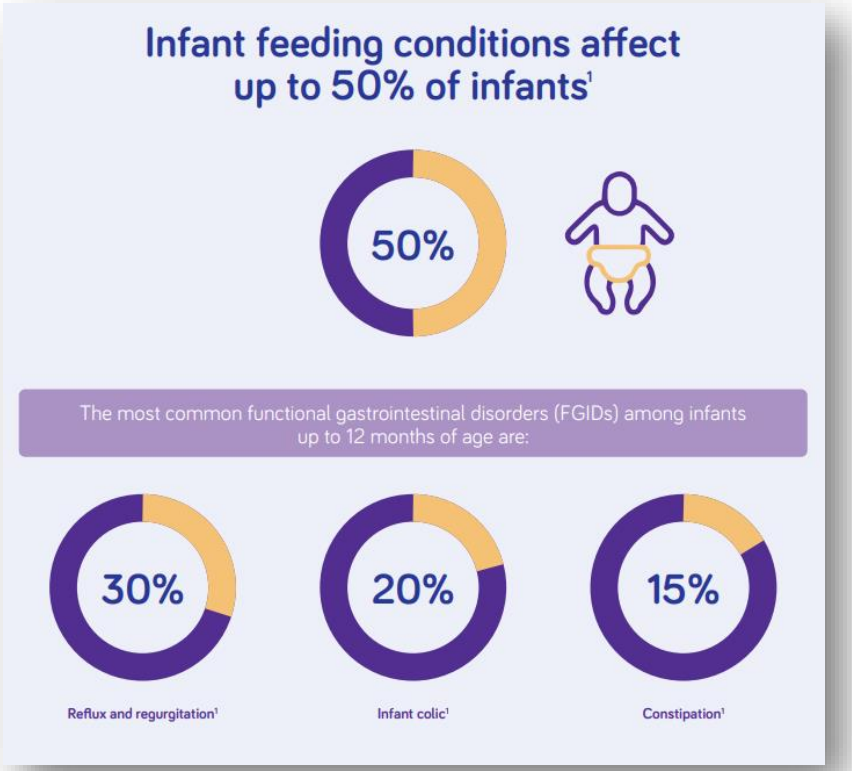
1. Distinguish between each clinical condition (FGID)- Constipation, Infantile colic, and Regurgitation - including prevalence, symptoms, diagnosis and management strategies
2. Summarise the role of parental reassurance and appropriate nutritional intervention to manage FGIDs
3. Recognise FGID symptoms and determine when to advocate for “Nutrition First” management vs when to refer a patient back to their GP for further management
4. Recall the current guidelines to manage FGID symptoms in infancy

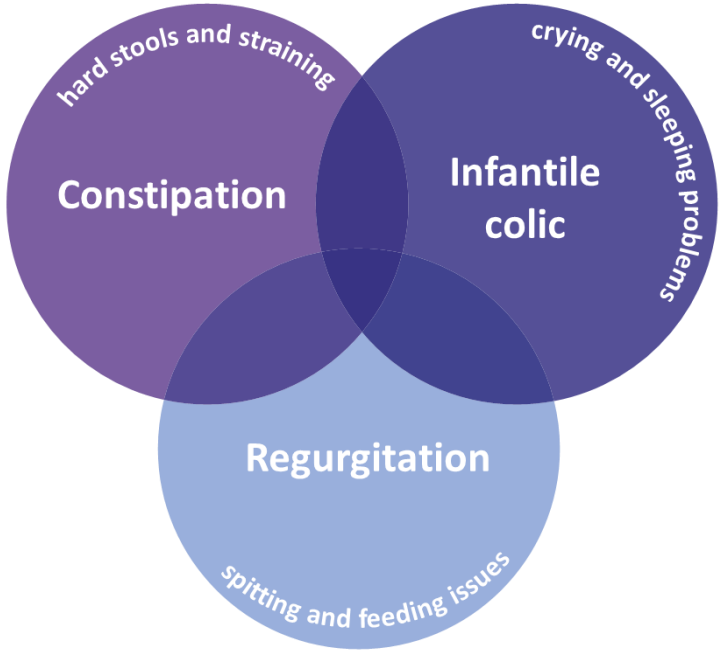
The ABCs of FGIDs

A. What are they and how prevalent are they?
B. How are they diagnosed?
C. What is their impact?

Functional Gastrointestinal Disorders (FGIDs) in infancy

Prevalence:
More than 50% of infants in the first year of life





Ref: Glanville *et al.* BMJ Open 2016;6:e011475.

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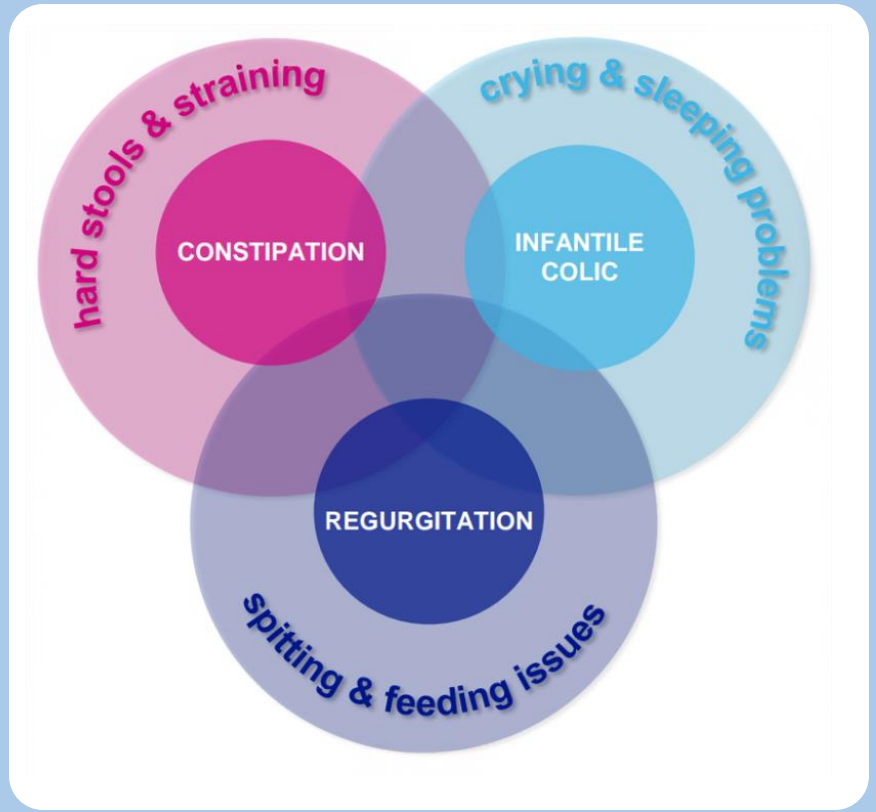
Ref: (1) Vandenplas Y et al. J PediatrGastroenterolNutr2015b;61:531-7. (2) Glanville et al. BMJ Open 2016;6:e011475.

Multiple FGIDs at one time are common

- FGIDs are generally described as separate conditions
- A prospective observational study by Bellaiche et al (2018) found 78% of infants were diagnosed with multiple FGIDs

Prevalence of FGIDs in all infants (0 – 6 months of age)		
No of FGID	**No of infants (%)**	
1	602 (22%)	
2	1739 (63%)	78%
≥ 3	406 (15%)	
Total	2747 (100%)	



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Bellaiche, M., Oozeer, R., Gerardi-Temporel, G., Faure, C. and Vandenplas, Y., 2018. Multiple functional gastrointestinal disorders are frequent in formula-fed infants and decrease their quality of life. Acta Paediatrica, 107(7), pp.1276-1282.

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Regurgitation vs reflux vs GERD in infants

Regurgitation: the most common infant feeding problem affecting almost 1 in 3 infants[1]

Condition	Definition	Key Signs & Symptoms	Frequency and progression over time	Status
Regurgitation	Passive movement of stomach contents into the esophagus and out of the mouth (spitting up).	Normal physiological process in infants. Visible spit-up, baby remains happy and feeds well.	Common in infants <6 months; improves by 12 months.	✓ Normal
Reflux (Gastroesophageal Reflux/ GER) Rosen et al. 2018 NASPGHAN ESGPHAN guidelines on Reflux.pdf	Movement of stomach contents back into the esophagus, may or may not result in visible spit-up.	Normal physiological process in infants. Usually no distress; normal feeding and weight gain.	Peaks at 4–5 months; resolves by 12 months.	✓ Normal
Gastroesophageal Reflux Disease (GERD)	Reflux that causes troublesome symptoms or complications (e.g., poor weight gain, distress).	Irritability, feeding refusal, poor growth, vomiting blood/bile.	Persistent or worsening; requires medical intervention.	✗ Concerning

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Ref: 1. Rosen et al. 2018 (2) Benninga et al. 2016

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Colic and constipation: clinical indication and symptoms

Condition	Definition	Key Signs and Symptoms	Frequency and progression over time
 **Colic**	Infant <5 months with recurrent, prolonged crying/fussing without clear cause[2]; no fever, illness or failure to thrive[2].	• Clenching fists • Pulling legs to chest • Extended inconsolable crying	Starts in first weeks, peaks at 4–6 weeks, improves by 12 weeks[1]
 **Constipation**	**≥1 month with ≥1 of:** • ≤2 bowel movements/week • Excessive stool retention • Painful/hard stools • Large stools • Large fecal mass in rectum[2]	• Excessive stool retention • Dry, large stools • Crying/pain during bowel movement	Rare in breastfed infants[1]; check formula concentration (formula that is too concentrated can lead to constipation)

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Ref: (1) Vandenplas et al. Pediatr Gastroenterol Hepatol Nutri. 2019; 22(3):207-216; (2) Bennina MA et al., Gastroenterology. 2016; 150:1443-1445

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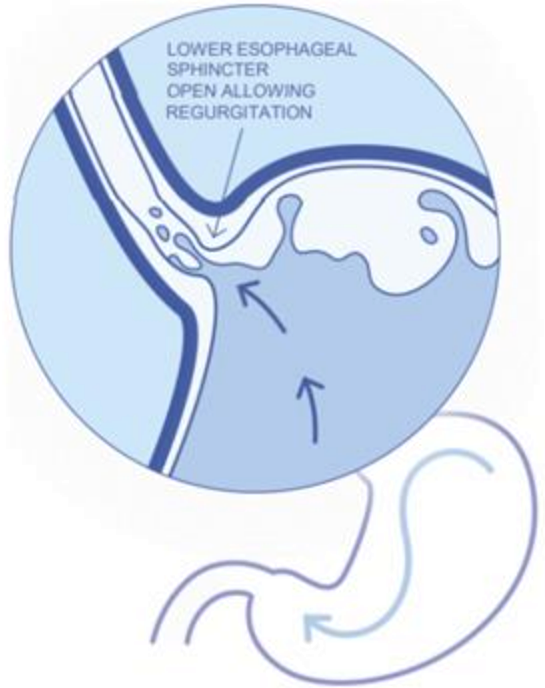
Regurgitation & reflux are caused by early immaturity

Immaturity of the lower oesophageal sphincter & still obtuse angle of His:

Allowing reflux of gastric contents back into the esophagus (& out of the mouth)



Diagnostic criteria for **FGIDs**

Rome IV criteria: Internationally agreed diagnostic criteria for FGIDs, known as the Rome criteria, were first published in 1989, and have been regularly updated, most recently in 2016

Table 3 Diagnostic criteria for infant regurgitation, infantile colic and functional constipation in infancy

Infant regurgitation	Infant colic	Functional constipation
Must include both of the following in otherwise healthy infants 3 weeks to 12 months of age: 1. Regurgitation 2 or more times per day for 3 or more weeks 2. No retching, haematemesis, aspiration, apnoea, failure to thrive, feeding or swallowing difficulties, or abnormal posturing	Must include all of the following: 1. An infant who is <5 months of age when the symptoms start and stop 2. Recurrent and prolonged periods of infant crying, fussing, or irritability that occur without obvious cause and cannot be prevented or resolved by caregivers 3. No evidence of failure to thrive, fever or illness	Must include 1 month of at least 2 of the following in infants up to 4 years of age: 1. Two or fewer defecations per week 2. History of excessive stool retention 3. History of painful or hard bowel movements 4. History of large-diameter stools 5. Presence of a large faecal mass in the rectum

Adapted from Benninga et al., 2016 (14).

Benninga et al, 2016 - Rome IV criteria. Diagnosing reflux, C&C.pdf

Ref: (1) Benninga MA et al., Gastroenterology. 2016; 150:1443-1445.

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Lactose intolerance: Clinical indication & symptoms

Lactose Intolerance: Undigested lactose enters the small bowel & is fermented by gut flora = resulting in symptoms (loose stools, bloating, flatulence & abdominal pain).

Type	Definition	Key Features	Frequency and progression over time
Primary Lactose Intolerance	Lack or deficiency of lactase enzyme that breaks down lactose (milk sugar).	Very rare in infants.	Common in older children/adults; not typical in infancy.
Secondary Lactose Intolerance	Temporary loss of lactase due to small intestine injury (e.g., infection, inflammation).	Loose stools, bloating, flatulence, abdominal pain.	Usually resolves within 1–2 months; may follow gastroenteritis or conditions like coeliac disease.

Heyman et al. Lactose intolerance in infants, children, and adults. AAP, 2006.pdf

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Ref: (1) Heyman et al. Pediatrics 2006; 118:1279–1286. (2) https://www.rch.org.au/kidsinfo/fact_sheets/Lactose_intolerance/

Is it lactose intolerance or Cow's Milk Protein Allergy (CMPA)?

	Cow's Milk Protein Allergy (CMPA)	Lactose Intolerance
Prevalence	Common food allergy in childhood (≈1.5% at 1 year).	Primary lactose intolerance under 5 years is uncommon.
Symptoms	Loose stools, bloating, flatulence, abdominal pain after cow's milk exposure.	Similar GI symptoms but due to enzyme deficiency.
Associated signs	- Dermatological: Up to 90% have eczema, rashes. - Respiratory: Up to 30% have wheezing, cough. - GI: Up to 60% have diarrhea, constipation, vomiting, regurgitation, blood/mucus in stools.	GI symptoms only (no skin or respiratory involvement).
Key takeaway	CMPA often involves multiple systems and symptoms.	Lactose intolerance is rare in infants and usually isolated to GI.

Remember:
- Primary lactose intolerance in children under 5 years is uncommon[1]
- Could it be Cow's Milk Protein Allergy (CMPA)?
- Correct diagnosis is key
- Confusion = Delayed diagnosis & inappropriate dietary intervention[1]

Lactose intolerance & gastrointestinal cow's milk allergy in infants & children - common misconceptions revisited (Heine et al. 2017)

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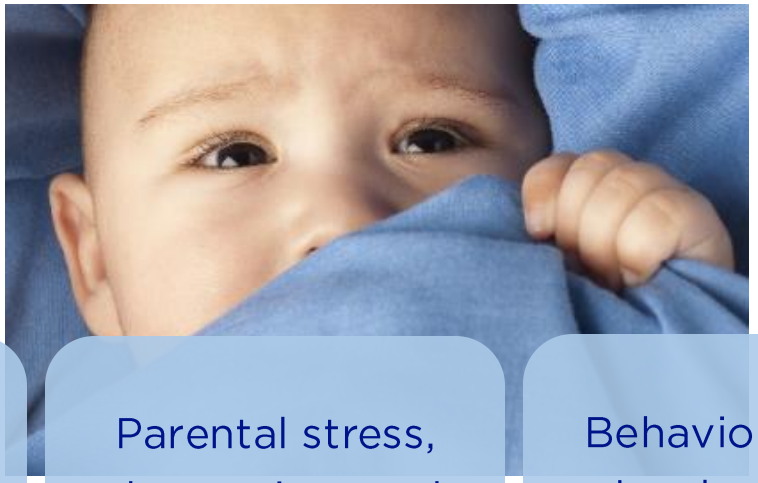
Burden of disease – triple impact (social, economic & nutritional impacts)

Feeding difficulties, discontinuation of breastfeeding [1,2]



Parental stress, depression, and insecurity [3,4]

Behavioural and developmental challenges [5]

Challenged family quality of life >3 years later [6,7]

Later life FGIDs [8,9]

short term → long term

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Ref: 1. Lacono et al. Dig Liver Dis 2005; 37:432-8. 2. Horward et al. Breastfeed Med 2006;1:146-55. 3. Vik et al. Acta Paediatr 2009;98:1344-8. 4. Hyman et al. Gastroenterology 2006;130:1519-26. 5. Akman et al. Arch Dis Child 2006;91:417-9. 6. Rautava et al. Pediatrics 1995;96:43-7.
7. Brown et al. J Paediatr Child health 2009;45:254-62. 8. Martin et al. Pediatrics 2002;109:1061-7. 9. Indrio et al. Eur J Pediatr 2015;174:841-2.

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Open Access Research

BMJ Open

The costs of functional gastrointestinal disorders and related signs and symptoms in infants: a systematic literature review and cost calculation for England

James Mahon,[1] Carlos Lifschitz,[2] Thomas Ludwig,[3] Nikhil Thapar,[4] Julie Glanville,[1] Mohamad Miqdady,[5] Miguel Saps,[6] Seng Hock Quak,[7] Irene Lenoir Wijnkoop,[8] Mary Edwards,[1] Hannah Wood,[1] Hania Szajewska[9]

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Economic impact

Based on prescribed medication by doctors and purchased OTC remedies by parents:
Crying, regurgitation and constipation are of relevant parental concern

There is a significant gap between:

1. What guidelines emphasise (parental reassurance and nutritional advice)

AND

2. What HCPs and parents are actually doing…

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FGID management

- **Management guidelines, parental reassurance & nutrition first:**
  - Regurgitation and reflux
  - Colic and constipation
  - Lactose intolerance
- **The role of pharmacological therapy**

FGIDs in infancy

Management guidelines: regurgitation and reflux

Recommendation	Management advice
Avoid overfeeding	Feed smaller amounts more frequently to reduce regurgitation.
Continue breastfeeding	Maintain breastfeeding as the preferred feeding method.
Thicken feeds	Use thickened formula or add thickening agents (under guidance) to reduce reflux episodes.
ESPGHAN/NASPGHAN Official guidelines: Parental education and reassurance [1-5]	Explain that regurgitation is common and usually resolves naturally; provide nutritional advice as first-line management.

HHS Public Access

Author manuscript

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Pediatric Gastroesophageal Reflux Clinical Practice Guidelines: Joint Recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN)

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Nutrition-first management: formulas and reflux

Reflux formulas can be an option for nutrition first management of regurgitation and mild reflux. These typically contain a thickener agent in order to increase the viscosity of the formula thus reducing the incidence of reflux episodes. The type of thickener used can vary across formulations.

Carob bean gum thickened formula maintains its viscosity more effectively compared to starch based formula. This prevents regurgitation and mild reflux. [1]

TYPE OF THICKENER USED ACROSS REFLUX FORMULA BRANDS			
Aptamil	Novalac	Alula	Nestle NAN
Carob bean gum	Starch	Starch	Starch

Carob bean gum thickened formula **resists digestion in the mouth and maintains thickness in the stomach**[5]

Adapted from Nutricia Research; Artificial digestion model.[5] Demonstration of changes in formula viscosity from mouth to stomach.

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1. Wenzl T et al. Paediatrics 2003; 111:e355–e359

FGIDs in infancy management guidelines: **Colic & constipation**

Condition	Recommended Approach
Infantile Colic [1,2]	• Continue breastfeeding • Provide parental education and reassurance • If cow's milk protein allergy is not suspected, consider partially hydrolyzed formula (lactose-reduced or lactose-free) with probiotics • Avoid pharmacological therapy (ineffective and may cause adverse effects)
Functional Constipation [1,3,4]	• Continue breastfeeding • Educate parents and reassure with information on normal infant bowel patterns • Check correct formula preparation for formula-fed infants • Lactulose may be considered for constipation, but can cause flatulence

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Nutrition-first management:

Formulas and colic & constipation

Formula fed infants with colic and/or constipation may benefit from a partially hydrolysed whey formula with prebiotics , beta palmitate and reduced lactose.

Ingredient	Function and Benefit
Partially hydrolysed whey protein	Improves gastric emptying for easier digestion[1,2]
Prebiotic oligosaccharides (scGOS/scFOS 9:1)	Promotes microbiota composition and function closer to breastfed infants[3]; produces softer, more frequent stools[4]
β-palmitate	Aids absorption of fat and calcium; produces softer stools[5]
Reduced lactose	Leads to less fermentation of undigested lactose, helping reduce discomfort from flatulence and painful wind[6]

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Ref: 1. Billeaud et al. Eur J Clin Nutr .1990; 44:577-583. 2.Tolia et al. JPGN. 1992;15:297-301. 3. Moro et al. JPGN. 2002;34:3. 4. Schmelzle H et al. JPGN. 2003; 36:343-351 5. Havlicekova et al. Nutr J. 2015;15:1-(28). 6. Heyman P. Paediatrics 2006; 118:1279–1286.

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	Aptamil Colic & Constipation	Novalac Colic	Novalac Constipation
Partially hydrolysed whey	✓	X	X
Prebiotics	✓	X	X
Beta palmitate	✓	X	X
Carbohydrate content (including lactose)	7.2g/100ml	7.4g/100ml	7.5g/100ml

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Management guidelines: **Lactose intolerance**

Step	Recommendation
1. Continue Breastfeeding	• Even if the mother reduces lactose in her diet, lactose will still be present in breastmilk.
2. Correct Diagnosis	• Primary lactose intolerance in infancy is very rare. • Rule out cow's milk protein allergy. • Inform parents that lactose intolerance is usually transient and resolves within 1–2 months.
3. Suitable Nutrition	• If confirmed, use infant formula low in lactose. Soy formula is not recommended for infants <6 months.

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Ref: https://www.rch.org.au/kidsinfo/fact_sheets/Lactose_intolerance/

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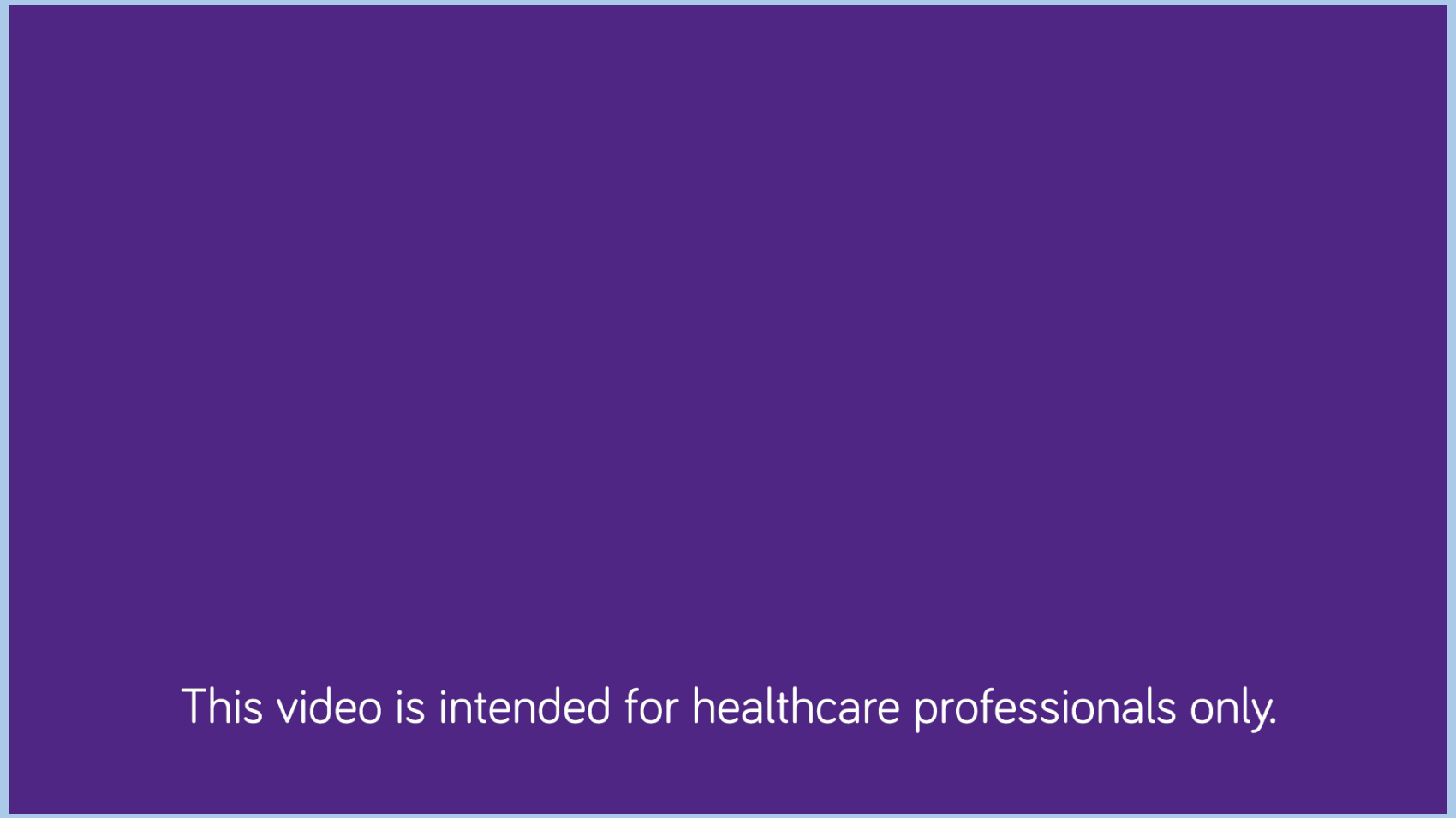
FGIDs in infancy

Management: “Parental reassurance & nutrition-first is endorsed by ESPGHAN/ NASPGHAN”



Common medicines & over-the-counter remedies in **ANZ**

REFLUX & REGURGITATION	COLIC	CONSTIPATION
 Antacids	 Simethicone	 Laxatives
 Thickening agents	 Gripe water	
 Proton pump inhibitors	 Probiotics	

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Pharmacological therapy is often unnecessary for common FGIDs

Reference	Excerpt of current recommendations on pharmacological therapy
NASPGHAN/ESPGHAN[1]	•No pharmacological treatment of crying/distress or visible regurgitation in otherwise healthy infants •Proton pump inhibitors (PPIs) only in case of GORD, prescribed the lowest doses and for the shortest length of time possible
Expert group review[2]	•No indication for drug treatment in 'happy spitters' or in infants without troublesome regurgitation •PPI do not decrease infant regurgitation, crying or fussiness and should not be empirically started
NICE[3]	•No acid-suppressing drugs (e.g. PPI or Histamine-2 receptor antagonists) to treat overt regurgitation in infants and children occurring as an isolated symptom

NO pharmacological therapy for infant regurgitation in otherwise healthy children.

Only moderate use in the case of a clear diagnosis of GORD.

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The science of **breastmilk** and the gut microbiome

- The first 1000 days
- Breastmilk : The Gold Standard
- Prebiotics and HMOs

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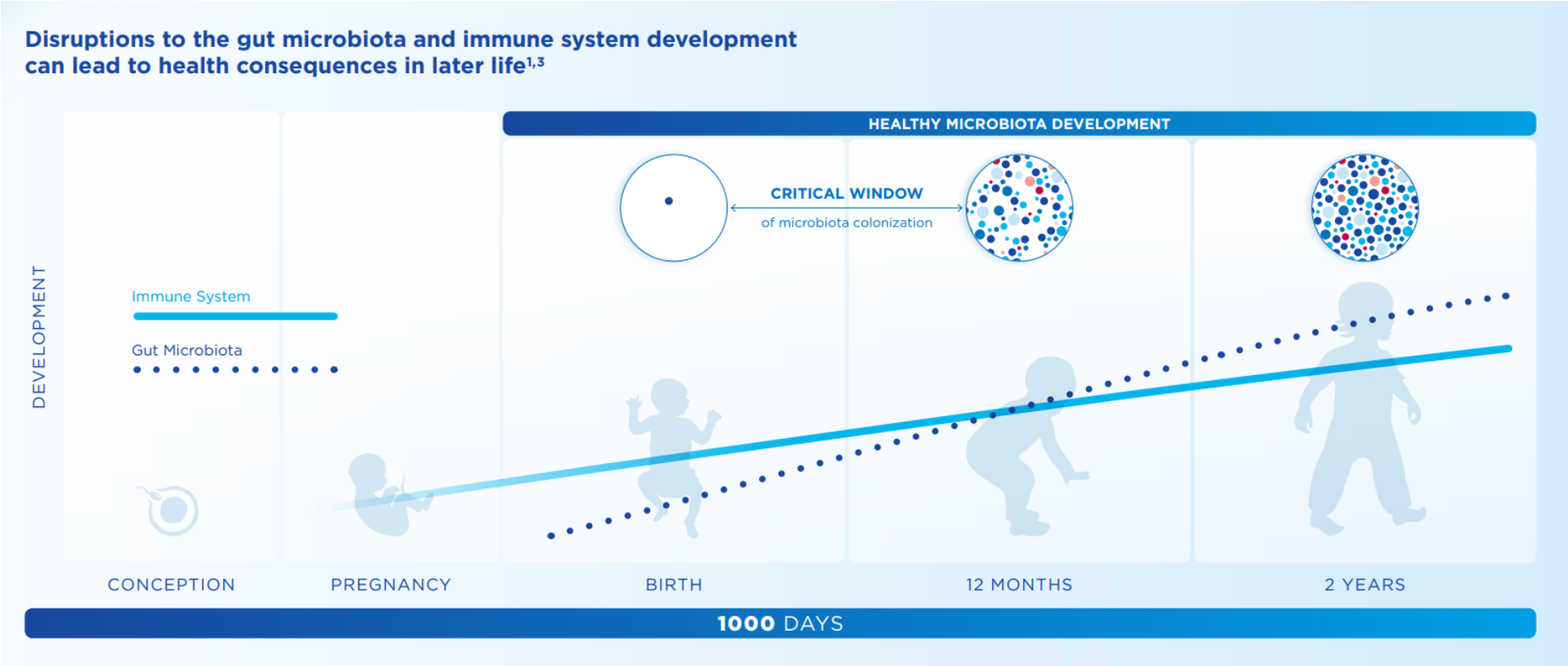
The importance of **the first 1000 days:** Conception to 2 years of age



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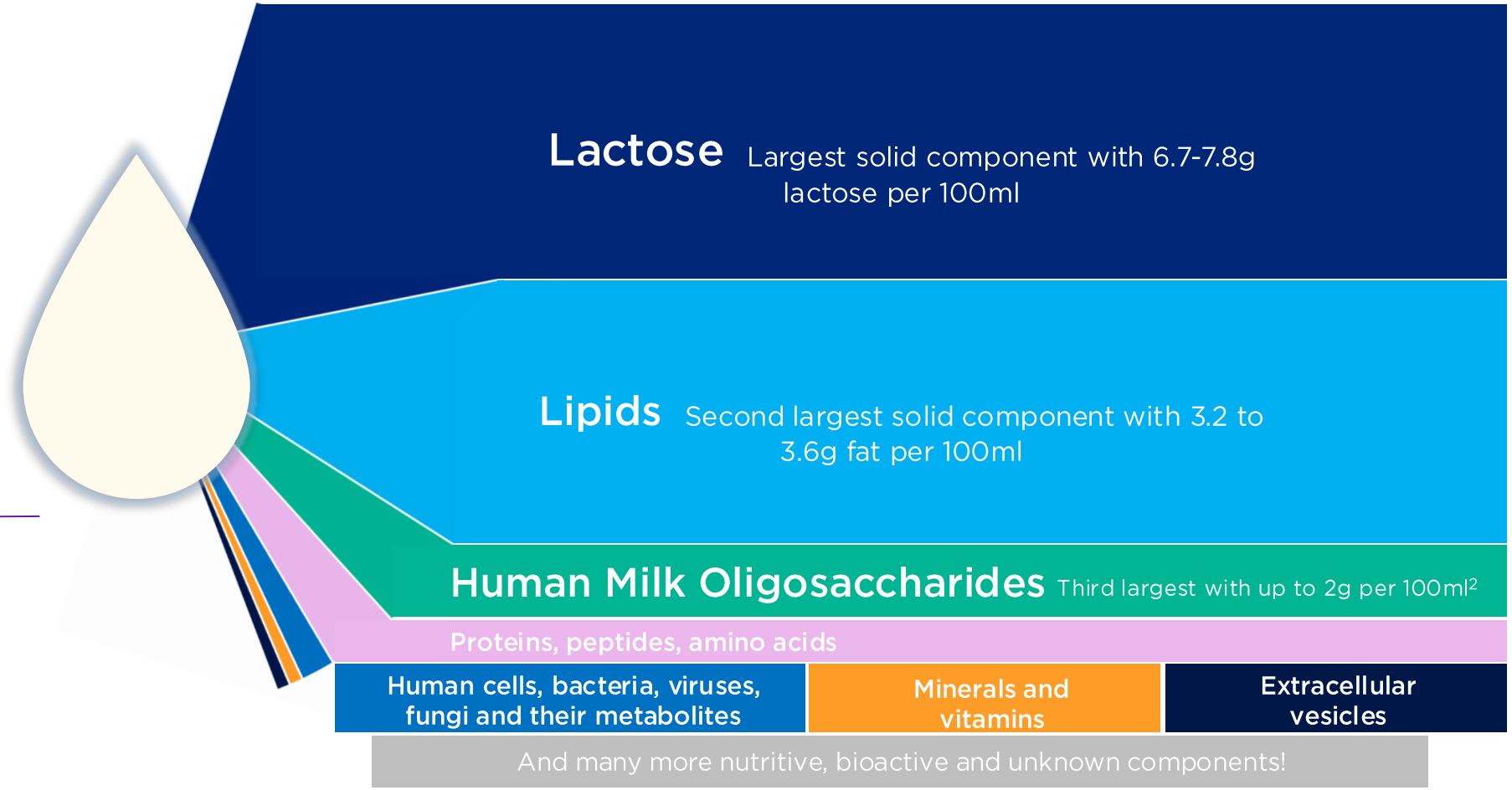
References: 1. West CE, et al. J Allergy Clin Immunol. 2015;135(1):3–13. 2. Martin R, et al. Benef Microbes. 2010;1(4):367–82.

Nothing compares to breast milk – it's the gold standard nutrition for infants



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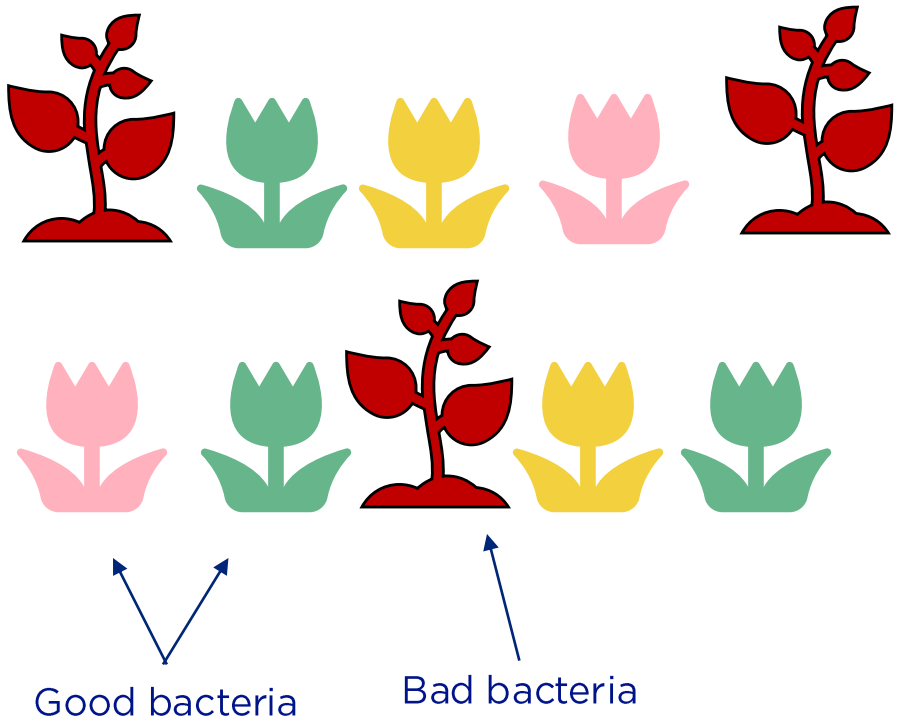
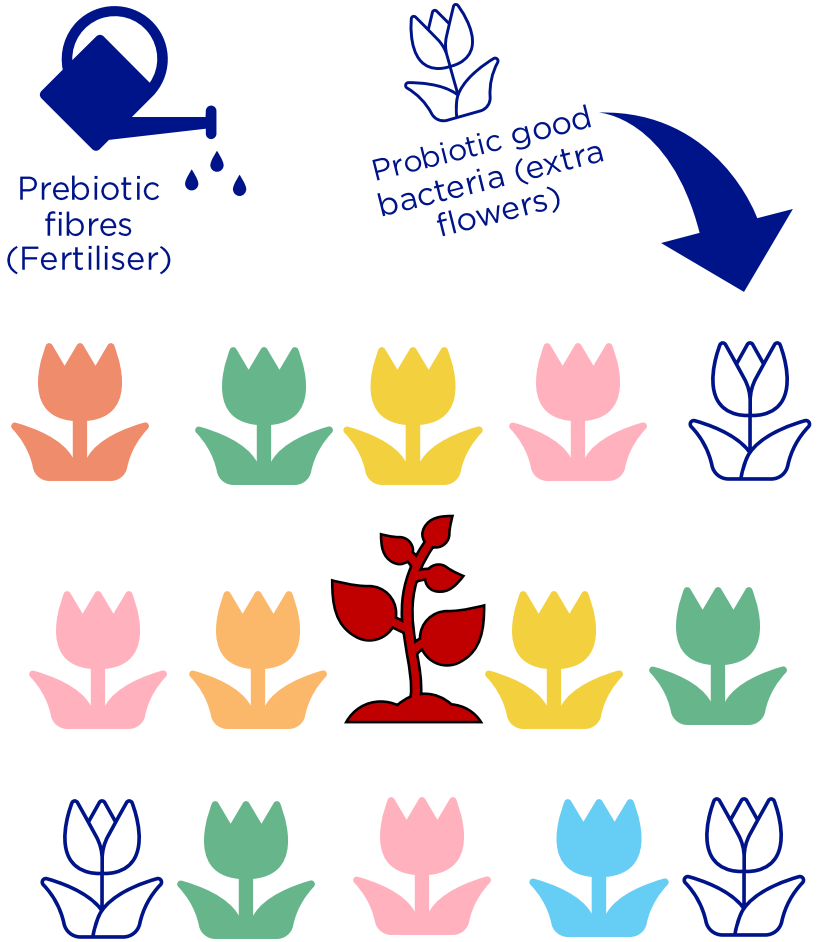
References: 1. Ballard O, Morrow AL. Pediatr Clin North Am. 2013;60(1):49–74. 2. Thurl S, et al. Nutr Rev. 2017 Nov; 75(11): 920–33.

Your gut microbiota garden analogy: Prebiotics & probiotics

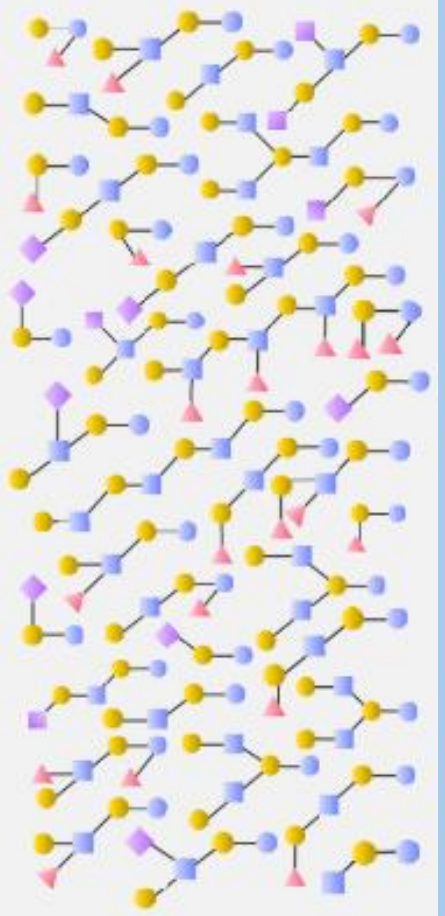
"Gut microbiome/microbiota" = ecosystem of (mostly good) microbes that live in your gut (bacteria, fungi, viruses etc)





Breast milk is best for babies. A healthy diet is important for breastfeeding. A decision not to breastfeed, or partial bottle feed, may reduce milk supply making it difficult to reverse. Use formula as directed. For Healthcare Professionals only - not for distribution to the general public.

Human milk Oligosaccharides (HMOs) in breastmilk



>1000 different structures
Short and long chains in a 9 to 1 ratio

For illustrative purposes only

Breast milk composition: HMOs

- Human milk oligosaccharides (HMOs) play a key role in influencing the infant's gut microbiota, and therefore the maturation of their immune system and overall health [1,2]
- HMOs are the third most abundant (solid) component of breast milk
    - **QUANTITY:** Up to 2g/100ml[3]
- **>200 HMO structures have been identified**
    - **DIVERSITY:** Short & long chain structures in a 9:1 ratio
- HMOs act like prebiotics, and yield the following benefits:
    - **FUNCTIONALITY:**
        - Gut microbiota development[4]
        - Healthy stool characteristics[5]
        - Immune benefits[2]

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1. Dinleyici, M. et al. Gut Microbes. 2023;15(1):2186115. 2. Bode L et al. Thromb Haemost. 2004;92(6):1402-10 3. Lordan, C. et al. Microbiol Mol Bio Rev. 2024;88(1):e00094-23. 4. Wickramasinghe S et al. BMC Microbiol. 2015;15:172 5. Scholtens PA et al. World J Gastroenterol. 2014;20(37):13446-13452.

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GOS/FOS prebiotic blend

In 2002, Danone R&I was the first to introduce a prebiotic blend in a 9:1 ratio in infant formula, short chain galacto-oligosaccharide (scGOS) & long chain fructo-oligosaccharide (lcFOS). It was created to help mimic the quantity, diversity and functionality of the diverse pool of HMOs in breast milk.

This prebiotic blend is supported by >40 clinical studies (>90 publications) and has a long history of safe use. It is proven to improve digestive health. It Increases beneficial bacteria, closer to a breastfed infant and promotes softer, more regular stools[1].

	Aptamil Colic & Constipation	Aptamil Reflux	Karicare	Novalac Reflux	NAN Reflux	NAN Comfort
scGOS/lcFOS (9:1)/100ml	0.8g	0.4g	0.4g	0g	0g	0g
HiMOs	0g	0g	0g	0g	0g	0g

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1. Moro et al, Acta Paediatr Suppl 2003;91(441):77-79

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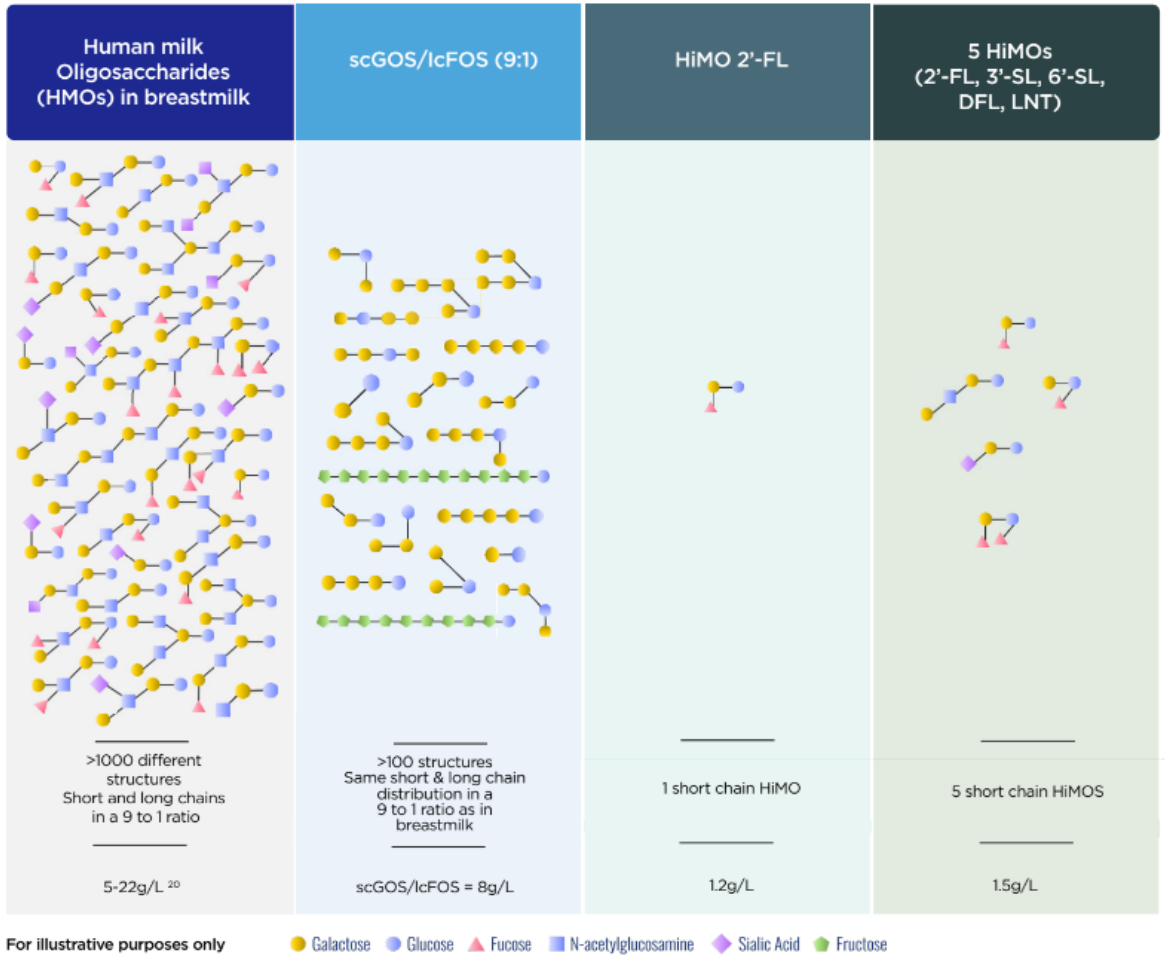
HMOs vs scGOS / lcFOS (9:1) and HiMOs: Diversity and concentration



The number of commercially available synthetic HiMOs is increasing, but it is not yet possible to mimic the diverse & complex pool of HMOs in breast milk...

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Quantity and diversity of Oligosaccharide structures across formulations

	[Mature] Human Milk Oligosaccharides	Aptamil Gold+ Prebiotic Blend scGOS/lcFOS (9:1)	NAN Supreme Pro 3 5 HiMO's (2FL, DFL, LNT, 6SL, 3SL)	Alula Advance + 2 HiMOs
Quantity of oligosaccharides	~20g/100mL	0.8g/100mL	0.15g/100mL	0.15g/100mL
Number of structures	>1000	100's	5	2
Diversity of structures	90% short chain 10% long chain	90% short chain 10% long chain	100% short chain	100% short chain
Identical structure to HMOs	✓	✗	✓	✓
Functional benefits shown in clinical research	Endless list	✓	✓	✗
Probiotics	Yes	+ BBM16V	+ B Lactis	✗

The scGOS/lcFOS (9:1) prebiotic blend is supported by >40 clinical studies (>90 publications) and has a long history of safe use. Existing data on HiMOs is encouraging, but future studies are needed to further explore the potential benefits of infant formulas with HiMOs.

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Product information sourced from manufacturer websites as of November 2025.

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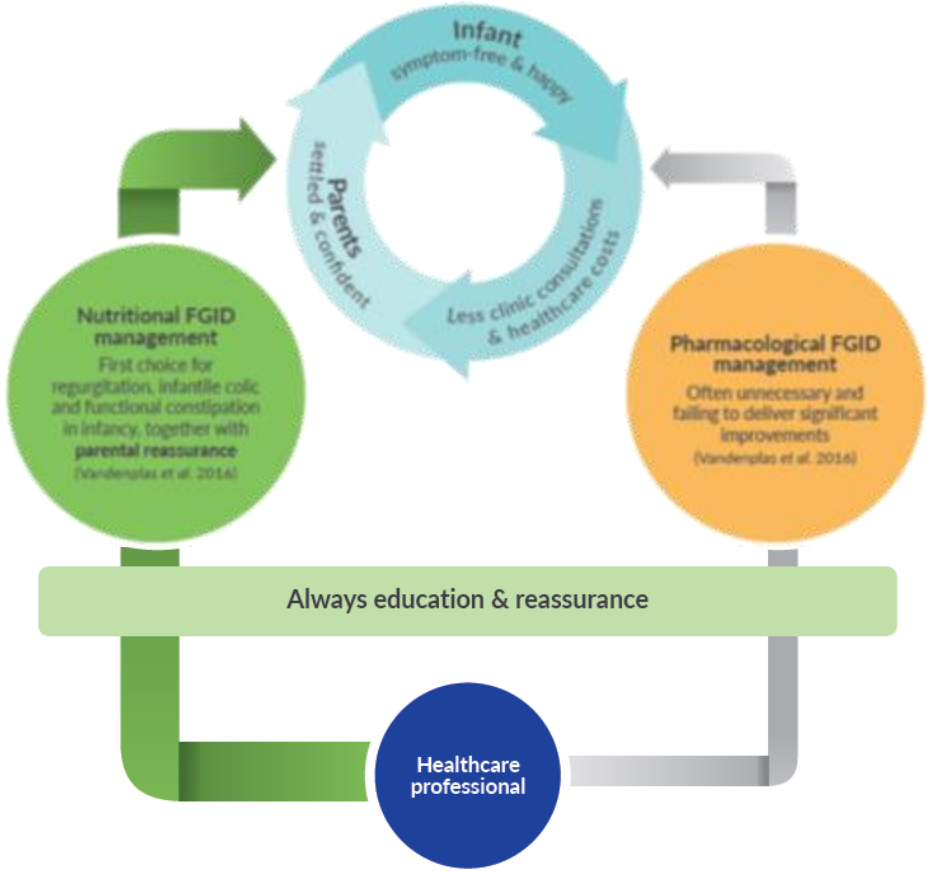
Key takeaways

Breast milk is best for babies. A healthy diet is important for breastfeeding. A decision not to breastfeed, or partial bottle feed, may reduce milk supply making it difficult to reverse. Use formula as directed. For Healthcare Professionals only - not for distribution to the general public.

How to achieve a “virtuous cycle”

Best practice:
Always combine parental reassurance with nutritional advice in FGID management



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Ref: 1. Vandenplas Y et al. Functional gastro-intestinal disorder algorithms focus on early recognition, parental reassurance and nutritional strategies. Acta Paediatr 2016;105:244-52.

First line management of FGIDS in infants

- **Parental Reassurance**
- Encourage mothers to **continue breastfeeding** through nutritional advice.
- Explain that **colic and regurgitation are temporary** and usually resolve within the first few months of life.
- **Avoid pharmacological approaches** for colic and regurgitation as they are unnecessary and may harm infants.
- Provide **nutritional guidance** on:
  - Feeding techniques (positioning, formula preparation)
  - Appropriate volume and frequency
- Offer **education on normal infant bowel patterns and soothing strategies** during crying episodes.

Clinically proven nutritional solutions

Breastmilk is Best

- Breastmilk directly supports a child's developing digestive system.
- It is considered the most suitable nutrition for infants.
- Breastfeeding should be recommended and supported, even when infants show persistent or severe FGIDs.

In Formula-Fed Infants

- For infants with ongoing symptoms, special infant formulas with proven benefits may be considered.
- These should be used only if reassurance and nutritional advice on nutrition, based on correct volume and frequency of milk intake, fail.

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Nutritional solutions in breastfed & formula fed infants

Condition	Recommended Nutritional Approach
Regurgitation or Reflux	• Use thickened anti-regurgitation formula to reduce persistent regurgitation in formula-fed infants.
Infantile Colic	• Probiotics (e.g., Lactobacillus reuteri DSM 17938) may benefit exclusively breastfed infants. • Formula-fed infants may benefit from partially hydrolysed formula (pHF) with prebiotics and beta-palmitate, or synbiotic formula with reduced lactose and partially hydrolysed protein.
Constipation	• Rare in breastfed infants; consider alternative causes. • Nutritional advice may not suffice for exclusively breastfed infants; laxatives may be needed first-line. • Formula-fed infants may benefit from partially hydrolysed whey formula with prebiotics and beta-palmitate, or formula with higher magnesium (within normal range).

When FGIDs are present in early life, think NUTRITION FIRST

By offering appropriate advice and reassurance to parents, accompanied by proper nutritional guidance, healthcare professionals can help to reduce infants' distress, parental anxiety and improve the quality of life for the family while protecting healthcare budgets.

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How can you offer ongoing **support & parenting advice?**

- A team of expert advisors and trusted health care professionals supporting all Nutricia products across Australia and New Zealand.
- The team of midwives, dietitians and nutritionists are available online and over the phone to support and reassure your customers.

Contact us at Call or Live Chat Nutricia Careline team in Australia or NZ

NUTRICIA CARELINE

You can Live Chat or call us:

AU: 1800 438 500

NZ: 0800 438 500

(Mon to Fri 7.30am to 5pm AEST / 9.30am to 7pm NZ time).

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