

INFECTIONS IN EARLY CHILDHOOD:

What is the role of prebiotics?

- ✓ A nourished immune system during the **first 1,000 days** (from conception to 2 years) is crucial for reducing infection risk and predicts lifelong health¹.
- ✓ An increasing body of evidence highlights the critical role of **prebiotics** in nourishing the gut microbiota and helping to reduce infection risk during this time²⁻⁴.



INFECTIONS ARE A KEY EARLY LIFE HEALTH CONCERN

#1

reason infants visit
doctors and hospitals in
Australia⁵

72%

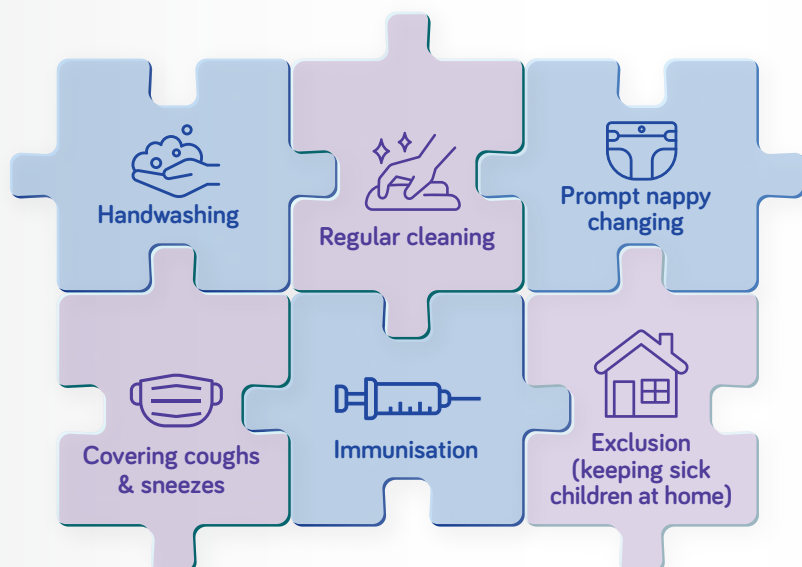
of infants have seen a
GP for an infection by
1 year of age⁵

up
to **12**

viral infections per year
are commonly reported
in many young children⁶

HOW TO REDUCE INFECTIONS

Existing Guidelines⁷⁻⁸

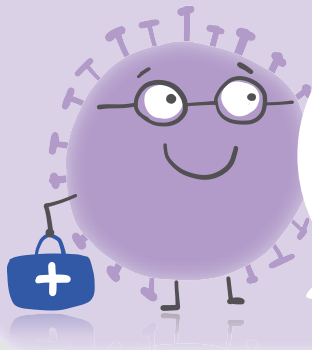


Emerging Recommendations²⁻⁴



Increasing evidence highlights the critical role of nutrition, including prebiotics, in reducing risk for infectious diseases.

WHAT ARE PREBIOTICS?



Only defined in 1995, prebiotics are now well established for their role in gut and immune health by feeding the beneficial gut bacteria⁹.

Key Characteristics¹⁰:

- ✓ Found in breast milk, foods and beverages
- ✓ Benefit health by nourishing the gut microbiota

Key Types¹¹:

- Human Milk Oligosaccharides (HMOs)
- Galacto-oligosaccharides (GOS)
- Fructo-oligosaccharides (FOS)
- Resistant starch
- Pectin
- Beta-glucans
- Inulin



BREAST MILK: THE GOLD STANDARD FOR PREBIOTICS

Breast milk was once valued mainly for its antibodies. Now we know its prebiotics also play a key role in infant immunity:

- Has a bifidogenic effect, nourishing beneficial gut bacteria like *Bifidobacterium*¹².
- Provides strong protection against infectious diseases, reducing infection risk in the first 6 months by at least 88%¹³.

Recommend (where possible) for optimal immune benefits for at least the first 6 months¹⁴.

DID YOU KNOW?

In breastfed infants, 50-90% of their gut bacteria are beneficial *Bifidobacterium*, which help to shape a healthy immune system and protect against infection¹⁵.

PREBIOTICS IN FOOD

Commencement of solids can expose young children to potential allergens and pathogens¹⁶. Prebiotic-rich foods can help to support the gut microbiome and immune system during this time.

Include prebiotic-rich foods when starting solids at ~ 6 months.

Key sources for young children:



Bananas (FOS)



Sweet Potatoes (Resistant starch)



Apples (Pectin)



Legumes/beans (GOS)



Oats (Beta-glucans)



Other: Asparagus, peas, avocado, onions, corn, dates

PRACTICAL TIPS FOR KEY STAGES



BIRTH - 6 MONTHS

- Educate on breast milk benefits and its prebiotic effects.
- Mixed feeding may be appropriate when exclusive breastfeeding isn't possible.
- Suggest formula with clinically-validated prebiotics if not breastfeeding.



6 - 12 MONTHS

- Breast milk, mixed feeding, or prebiotic-enriched formula if breast milk is not possible, can continue to support immune health.
- Gradually introduce simple and soft prebiotic-foods like bananas, oats, sweet potato and avocado.



12-24 MONTHS

- Continue breastfeeding (if possible) alongside a variety of prebiotic foods.
- If breastfeeding is not possible, toddler milks containing prebiotics are not essential but can supplement prebiotic intake if dietary variety is limited.

PREBIOTICS IN INFANT FORMULAS

- The gut microbiota of formula-fed infants differs from that of breastfed infants, with lower levels of beneficial *Bifidobacterium* and higher levels of potentially harmful bacteria. This can lead to a higher risk of infections¹⁷.
- When breastfeeding is not possible, immune health can be supported by recommending formulas supplemented with clinically-validated prebiotics¹⁸.

Most Studied Prebiotics in Infant Formula^{17,19}:

GOS and FOS are the most studied prebiotics in infant formula, due to their ability to mimic some of the structure and functional benefits of breast milk prebiotics.

- **GOS:** Typically produced from lactose (a sugar naturally found in both breast milk and dairy products).
- **FOS:** Occurs naturally in foods like onions, garlic, bananas, and chicory root. In infant formula, FOS is typically derived from chicory root.

DID YOU KNOW?

The 9:1 ratio of GOS to FOS is a clinically validated & safe prebiotic blend for supporting immune health of young children²⁰. In randomised trials, it has led to a reduction in the incidence of gastrointestinal and respiratory infections²¹⁻²⁴.

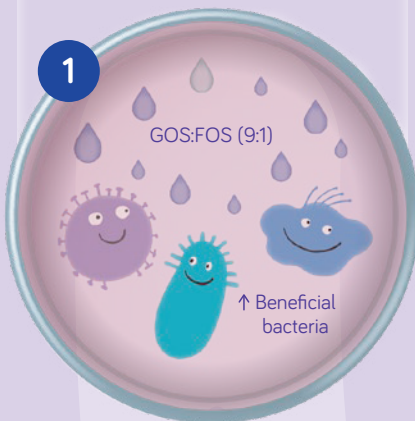


HOW GOS: FOS (9:1) CAN REDUCE THE RISK OF INFECTION

Gut Bacteria Growth

GOS: FOS (9:1) nourishes beneficial bacteria, like *Bifidobacterium* and *Lactobacillus*, supporting a healthy gut microbiome²⁰.

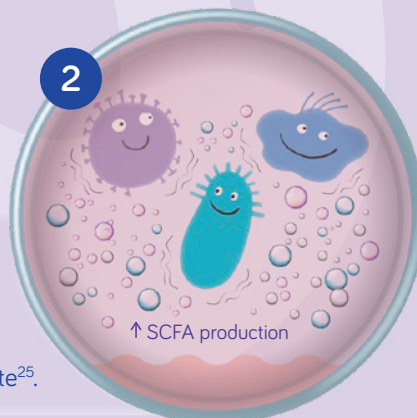
1



Short-Chain Fatty Acid Production

The beneficial bacteria ferment GOS:FOS (9:1) into SCFAs, particularly acetate and propionate²⁵.

2



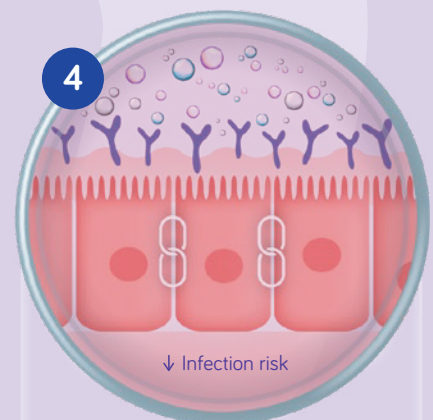
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Increased Secretory IgA and Lower Gut pH

SCFAs may enhance secretory IgA production, an important antibody that lines the gut mucosal layer. SCFAs also lower the gut pH, creating a more acidic environment²⁶.

4



Gut Barrier Protection

SCFAs and secretory IgA can strengthen the gut barrier, which may limit harmful pathogens from crossing²⁰. The lower pH further makes the gut environment less favourable for pathogens.

CASE STUDY 1

Scenario

Sarah, a paramedic, returns to work, and her 7-month-old daughter, Olivia, starts daycare. Sarah is concerned about Olivia's increased risk of infections and seeks guidance on supporting her immune health.

Solution

- Still prioritise breastfeeding where possible, as breast milk contains immune-supporting components like antibodies and prebiotics.
- When breastfeeding isn't possible, choosing a formula containing GOS/FOS (9:1) helps to provide prebiotics to support immune health at this time of transition.
- Introduce solid foods with prebiotics, such as oats and bananas, to promote beneficial gut bacteria.



CASE STUDY 2

Scenario

Emily and James' 5-month-old daughter, Sophie, is exclusively formula-fed and experiences some digestive issues and sickness. They seek advice on how they can improve her digestive health and immunity.

Solution

- A comprehensive prebiotic-enriched formula with GOS and FOS (9:1) can help nourish Sophie's gut microbiota, regulate digestion, and enhance immune function.
- This may aid in improving her bowel movements and overall digestive and immune health²⁰ - making it a well-rounded choice for her early development.



BEST-PRACTICE GUIDELINES FOR PREBIOTICS & INFECTION:



Breastfeeding for 6 months & beyond

Provides antibodies and prebiotics that help establish a healthy gut microbiota and immune system.

Prebiotic formula if needed

For non-breastfed infants, recommend formula with clinically validated prebiotics (e.g., GOS/FOS 9:1) to support gut bacteria and immune health.

Introduce prebiotic-foods from ~6 months

Such as bananas, oats, and sweet potatoes, to support gut health and immunity.

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Breast milk is best for babies. 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.

This information is general only and healthcare professionals should rely on their own assessment of patients.