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Using Probiotics in Paediatric Populations

Developed by Juliette Eshleman and Dr. Justine Turner for PedsCases.com.
Jan 11, 2026

Hi everyone, and welcome to another PedsCases podcast! I'm Juliette Eshleman, a third-year medical student at the University of Calgary, Cumming School of Medicine. This podcast on using probiotics in the pediatric population was created with the help of Dr. Justine Turner, pediatric gastroenterologist and PhD in Nutrition with the University of Alberta's Department of Pediatrics.

Today, we're diving into a question that comes up frequently with parents and caregivers when it comes to their little ones: "Should my child take a probiotic?" You might see this in clinic when a child's starting antibiotics, or when a baby is struggling with colic. Probiotics sound simple—live gut organisms like bacteria or yeast that promote gut health— but figuring out when, for whom, and which probiotic to use takes nuance. So, let's walk through the evidence together and explore how to turn that science into sound, supportive advice for the families we care for.

This PedsCases podcast aims to address four key learning objectives: By the end of this podcast, you should be able to:

1. Define probiotics and describe how they may benefit children.
2. Identify clinical situations where probiotic use is supported by evidence.
3. Recognize the limitations and risks associated with probiotics in paediatrics.
4. Apply evidence-based guidance when considering probiotics in common clinical scenarios.

Let's start off by framing our conversation around a clinical case: Imagine you're seeing Lucas, a three-month-old baby brought in by his worried and exhausted parents. They tell you he cries for hours each evening, pulling up his legs and clenching his fists. They've stopped breast feeding and have tried multiple different formula, and held him upright after feeds. Nothing seems to be helping. You ask about other symptoms, and parents report that he's growing well, not vomiting, and his diapers look normal.

Then, they ask: "What about probiotics? Could that help?"

Let's explore what the science says—and how we can guide families like Lucas's.

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Defining Probiotics

Probiotics are live microorganisms that, when given in adequate amounts, can offer a health benefit. You've probably seen them marketed in yogurts, supplements, and even baby drops. However, not all probiotics are the same— their benefits are highly strain-specific, and the products have limited regulation compared to medicines and can vary widely in quality. Each strain has a different effect, and few are backed by strong evidence.

Common bacterial strains include *Lactobacillus* and *Bifidobacterium*, and fungal species include *Saccharomyces*. These organisms may work by balancing gut bacteria, supporting the gut barrier, producing antimicrobial compounds, and modulating immune responses. You can think of them as “friendly” microbes we give to try to shift the balance in the gut microbiome in a way that promotes the human hosts health.

Though they might help by keeping the gut lining healthy, nudging the immune system toward balance, or even crowding out less helpful bacteria, probiotics are not precision therapies. Their effects vary based on strain, dose, host factors (including baseline microbiome), and clinical context—a key limitation highlighted by pediatric GI societies.

When Probiotics Help

When discussing benefits, it's important to distinguish where evidence is strongest, where it is weak, and which specific strains have supporting data.

Let's break down some clinical scenarios where probiotics can make a meaningful difference:

1. Preterm Babies:

Multiple systematic reviews, including a 2020 Cochrane review, show that multi-strain probiotics reduce the incidence of necrotizing enterocolitis (NEC) in preterm infants, particularly those >1000 g birth weight, and may reduce late-onset sepsis and all-cause mortality. However, there is no consistent reduction in NEC-related mortality. The certainty of this evidence is low to moderate, and benefit was seen with multi-strain combinations (not single-strain products).

That said, this is an area of significant controversy and evolving practice. In 2023, the FDA issued warnings about probiotic use in hospitalized preterm infants due to reports of invasive, sometimes fatal infections and lack of FDA-approved, pharmaceutical-grade products. As a result, probiotic use in NICUs has dropped substantially in North America.

Importantly, human milk has strong, high-quality evidence for reducing NEC and sepsis risk and should always be prioritized.

Because of safety concerns, product variability, and regulatory gaps, routine universal probiotic use is not recommended, particularly in infants <1000 g, and practice varies widely by institution.

2. Infantile Colic:

For infantile colic, the best-studied probiotic is *Lactobacillus reuteri* DSM 17938. Meta-analyses show that breastfed infants given this strain cry 25–50 minutes less per day compared with placebo.

Certainty of evidence: moderate

Strength of recommendation: weak

However:

- Benefit is much less consistent in formula-fed infants
- Trials were small, heterogeneous, and some industry-funded
- Not all infants with colic have altered lactobacilli levels

Therefore, it is reasonable to consider a trial in breastfed infants, but families of formula-fed infants should be counselled that benefit is uncertain. Breastfeeding should never be replaced with probiotic-containing formula, as this lacks evidence and may be harmful.

3. Antibiotic-Associated Diarrhea:

There is moderate-quality evidence supporting the use of:

- *Lactobacillus rhamnosus* GG
- *Saccharomyces boulardii*

These reduce the risk of antibiotic-associated diarrhea when started early and at adequate doses.

Strength of recommendation: strong (in selected patients)

4. C. diff Prevention:, Probiotics—particularly *L. rhamnosus* GG and *S. boulardii*—can reduce the incidence of *C. difficile*–associated diarrhea in children on antibiotics who are at high baseline risk (>5%).

They do not treat active infection and should not replace standard therapy.

5. Functional GI Disorders:

For functional abdominal pain and IBS, probiotics may offer modest symptom reduction:

- Best evidence: *L. rhamnosus* GG

Certainty of evidence: low to moderate

Strength of recommendation: weak

They may be considered as an adjunct though evidence does not support their use as a primary therapy.

6. Eczema Prevention:

There's emerging evidence that starting probiotics during pregnancy and infancy might help reduce eczema risk later on. One long-term study showed benefit lasting into childhood. Further research is needed to determine optimal strains and the timing of starting a probiotic.

When Evidence Is Lacking

According to the CPS and pediatric GI society guidelines, probiotics are **not recommended** for:

- Treating active *C. difficile* infection
- Preventing infection in otherwise healthy children
- Managing asthma, allergic rhinitis, cow's milk protein allergy
- Treating inflammatory bowel disease or cystic fibrosis

They're also not routinely recommended for persistent diarrhea in Canadian kids.

While there is buzz around using probiotics for treating symptoms in autism spectrum disorder or preventing cavities, we don't have enough solid data to support routine use.

It is important to bear in mind that just because a product is marketed as a probiotic doesn't mean it's effective or appropriate—always weigh the evidence before making a recommendation for your patients.

Safety Considerations

Probiotics are generally considered safe for healthy children. However, in immunocompromised, critically ill, or very premature infants, they've been linked to rare but serious infections, like fungemia from *Saccharomyces* or bacteremia from *Lactobacillus*.

Other things to consider include D-lactic acidosis in children with short bowel syndrome, inconsistent product labeling, and the theoretical risk of antibiotic resistance genes.

Overall, choosing studied strains, using trusted products, and exercising caution with high-risk populations is important. Safety isn't one-size-fits-all, know your patient and use probiotics thoughtfully.

It is also important to think about other limitations for using probiotics including the burden of cost for patients and families balanced against often low-quality evidence for effect of small to modest effect sizes. Also, theoretically the long term impact of using probiotics in young children with a developing microbiome cannot fully be known, although aside from those infants with immune deficiencies, very preterm infants, or those with central lines they are considered relatively safe.

Case Wrap-Up

Returning to Lucas, you explain that there is some evidence supporting the use of *Lactobacillus reuteri* for colic—particularly in breastfed babies. You clarify that the same benefit hasn't been shown in formula-fed infants, like Lucas, so low expectations should be balanced with the cost of using these products for this family and an understanding that in a healthy baby like Lucas they are probably not going to be harmful. His parents are grateful for a thoughtful, evidence-based recommendation and decide to give it a shot—with a follow-up plan in place.

Let's Tie It All Together

Before we go, let's come back to our learning objectives and summarize what we've covered:

- First, we defined probiotics as beneficial live microbes that, in the right context, can help support gut and immune health.
- Second, we identified evidence-backed indications—like NEC prevention, colic support, and prevention of antibiotic-associated diarrhea.
- Third, we looked at where the evidence is inconclusive—and when not to use probiotics.
- And finally, we explored how to apply this knowledge in practice, balancing safety, efficacy, and patient-specific factors when talking to families.

Outro

That wraps up our PedsCases podcast on probiotics in paediatrics. Thanks so much for joining me! For more details, check out the CPS position statement and chat with your preceptors to see how these recommendations play out in real-world practice. Until next time!

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