Diarrhoea

<table>
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<th>Practice points</th>
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<tr>
<td>• A number of probiotic strains may be useful in treating or preventing diarrhoea of varying aetiologies. Benefits may be strain-specific</td>
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<td>• Probiotic supplements are best taken with meals to enhance bacterial survival</td>
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<td>• Zinc may prevent or reduce diarrhoeal symptoms in children. Trials are lacking for adults.</td>
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<th>Description</th>
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<td>• Alteration in normal bowel movements characterized by an increase in the water content, volume, or frequency of stools. Most episodes are self-limiting.</td>
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<td>• Common accompanying symptoms include: weakness, lethargy and dehydration; electrolyte abnormalities may develop.</td>
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<td>• Surveys indicate the prevalence of diarrhoea in Australia is between 6.4–7.4%.</td>
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<td>- Highest among women and young children.</td>
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<td>• Aetiology can be infectious (viral, bacterial, parasitic) or non-infectious (medication effects, gastroenterological disease, acute abdominal processes).</td>
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<th>Management principles</th>
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<td>• Initially focus on preventing and treating dehydration. Diagnostic investigation should be reserved for severe illness or comorbidities.</td>
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<td>• Monitor condition with supportive medical advice. If symptoms persist or worsen, if there is blood in the stool or severe abdominal pain, fever or inability to increase fluid intake, seek medical advice.</td>
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<td>7 Acute diarrhoea can be dangerous for infants and young children due to increased risk of severe dehydration.</td>
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Complementary medicines

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<th>Primary recommendations</th>
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<td>PROBIOTICS</td>
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**Mechanism of action**

• Bacteriocin and short chain fatty acid production
• Lower gut pH
• Competitive inhibition of adhesion of pathogens
• Stimulation of mucosal barrier function and immunomodulation
• Influences aspects of the acquired and innate immune response

**Research**

Evidence suggests that probiotics may be a useful adjunct to diarrhoea management and rehydration therapy in both adults and children:

• Acute diarrhoea (prevention): meta-analysis found probiotics were associated with a 35% reduction in risk (overall reduction: children 57%; adults 26%). Protective effect did not vary significantly among strains used: *Saccharomyces boulardii*, *Lactobacillus rhamnosus* GG, *L. acidophilus*, *L. bulgaricus*, other strains used alone or in combinations of two or more strains. 12
• Antibiotic-associated diarrhoea (AAD) (prevention): meta-analysis found probiotics significantly reduce risk of AAD in adults and children with with a relative risk (RR) of 0.58. Many trials used blends of probiotic genera, primarily *Lactobacillus*, alone or in combination. In one study comparing LGG, *S. boulardii*, and *L. acidophilus* plus *Bifidobacterium lactis*, none of the species or combinations showed substantial superiority over the others. A 2015 Cochrane Review found a protective effect of probiotics on paediatric AAD with a RR 0.46. Among the probiotics evaluated, *L. rhamnosus* or *S. boulardii*...
at 5 to 40 billion CFUs/d may be appropriate. Randomised controlled trials have found *L. reuteri* significantly lowers incidence of diarrhoea in adults and children undergoing antibiotic therapy.\(^\text{15,16}\)

- **Traveller's diarrhoea (prevention):** meta-analysis found probiotics significantly prevent traveller's diarrhoea (RR 0.85 for pooled data). *S. boulardii* and a mixture of *L. acidophilus* and *B. bifidum* had significant efficacy.\(^\text{17}\)

- **Infectious diarrhoea (treatment):** meta-analysis found probiotics reduced mean duration of diarrhoea, risk for diarrhoea lasting >4 days, and stool frequency on day 2. Most studies tested lactic acid bacteria and *Bifidobacteria*. The most common organisms evaluated were *L. casei* strain GG, *S. boulardii* and *Enterococcus*.

### Adverse effects

- Orally, probiotic species are well tolerated with few confirmed adverse reactions in immunocompetent individuals.\(^\text{19}\)

### Interactions

- Probiotics (*L. acidophilus; L. reuteri, S. boulardii*) may decrease diarrhoeal side effects of antibiotics (positive interaction).\(^\text{15,20}\)

### Dosage

- Typically found in tablet/capsule or powder form
- Strength of probiotic preparations is quantified number of viable colony-forming units (CFUs): therapeutic effects between $10^9$ (1 billion)–$10^{11}$ (150 billion) CFUs.\(^\text{19}\)

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### Secondary recommendation

**ZINC**

#### Mechanism of action\(^\text{21}\)

- Regulates T-cell functions and promotes production of antibodies and circulating lymphocytes against intestinal pathogens
- Promotes immunity and mucosal resistance to infection
- Restores mucosal barrier integrity and enterocyte brush-border enzyme activity

#### Research

While evidence for the use of zinc supplementation in adult diarrhoea is needed, there is good evidence for use in children although the majority of studies investigate use in developing countries:

- Meta-analyses have found zinc supplementation:
  - Reduced the frequency and severity of diarrhoea, and the duration of diarrhoeal attacks in children between the ages of 3 months and 5 years.\(^\text{22}\)
  - Modestly reduced incidence of diarrhoea (9%) and more significantly reduced prevalence (19%), and occurrence of multiple episodes (22%).\(^\text{23}\)
  - A randomised controlled trial found zinc 15 mg plus iron 60 mg and folic acid 250 µg/d taken from 10-24 weeks gestation until one month postpartum significantly reduced duration of diarrhoea in infants compared to placebo.\(^\text{24}\)

#### Adverse effects

- High doses (50-150 mg/d) may cause gastrointestinal symptoms.\(^\text{19}\)

#### Interactions

- Hypoglycaemic drugs: zinc may increase drug effect.\(^\text{20}\)
- Penicillamine: zinc may decrease drug effect unless doses are separated by 2 hours.\(^\text{20}\)
- Tetracycline or quinolone antibiotics (not doxycycline): zinc may decrease absorption and blood levels of these drug unless doses are separated by 2 hours.\(^\text{20}\)
- ACE inhibitors, angiotensin receptor blockers, thiazide diuretics: may cause increased urinary zinc excretion with long-term use.\(^\text{20}\)

#### Dosage and formulation

- Typically found in tablet form
- Children ≤5 years: 10-20 mg/d (studies in children with a high prevalence of zinc deficiency)
- Australian RDI: Children: 3–13 mg/d (upper limit 4–35 mg/d), adults: 8–14 mg/d (upper limit 40 mg/d).\(^\text{26}\)
- Deficiency: 25–50 mg elemental zinc/d.\(^\text{20}\)
I Diet and lifestyle recommendations I

- Hand washing is an effective way to prevent spread of infection⁷
- Follow food safety precautions⁸
- Keep hydrated with adequate fluids containing water, salt and sugar⁷
- Consume boiled starches, cereals, vegetables, bananas and soups⁷
- In children, lactose restriction may alleviate symptoms, particularly in more severe episodes⁹
- Avoid diuretics such as caffeine that may worsen dehydration¹⁰