CRD summary
The authors concluded that probiotics may have a beneficial effect on the severity and duration of symptoms of respiratory tract infections but did not appear to reduce the incidence. Overall the review was well-conducted. The authors' cautious conclusions reflect the evidence and are likely to be reliable.

Authors' objectives
To evaluate probiotics for the prevention of respiratory tract infections.

Searching
PubMed, the Cochrane Central Register of Controlled Trials (CENTRAL) and SCOPUS were searched up to February 2008. Search terms were reported. Studies had to be published in English, German, French, Italian or Spanish. Studies were excluded if they were only reported as abstracts at conferences.

Study selection
Parallel-group randomised controlled trials (RCTs) that evaluated the clinical usefulness or safety of probiotics for the prevention of upper or lower respiratory tract infections were eligible for inclusion. In the review, upper respiratory tract infections included the common cold, acute otitis media, tonsillitis/tonsillopharyngitis, sinusitis and recurrent sinusitis; lower respiratory tract infections included bronchitis and pneumonia. The review assessed the incidence, symptom severity and duration of respiratory tract infections and safety of probiotics.

Just under half of the included trials were in healthy children or infants, and just under half were in healthy adults; two trials were in children or adults with a respiratory tract infection. Most of the included trials evaluated Lactobacillus strains or different combinations of Lactobacillus and Bifidobacterium strains. Probiotics were administered as tablets, capsules or liquid, including formula feeds, and compared with placebo or no treatment. Treatment duration ranged from a few days during antibiotic treatment to seven months. Concomitant treatments included antibiotics, prebiotics and feeding supplements. Included trials assessed a variety of outcome conditions including: acute otitis media; upper and lower respiratory tract infections; common colds; sick-leave due to respiratory tract infections; and relapses of chronic sinusitis.

Two reviewers independently selected studies.

Assessment of study quality
Validity was assessed and scored using the Jadad scale which considered randomisation, blinding and withdrawals. Trials scoring more than 2 out of the maximum possible 5 points were considered to be of adequate quality.

The authors did not state how the validity assessment was performed.

Data extraction
Two reviewers independently extracted outcome data for respiratory tract infections and adverse effects. Outcome data were presented as percentages of patients, mean values, numbers of events of interest with levels of statistical significance and odds ratios (OR) and mean differences between treatments with 95% confidence intervals (CI).

Methods of synthesis
The trials were grouped by outcome and combined in a narrative synthesis.

Results of the review
Fourteen RCTs were included (n=3,580 patients). Eleven RCTs were double-blind and two were open label; the remaining trial did not provide details of blinding. Nine RCTs scored more than 2 out of 5 points on the Jadad scale.
three scored 2 points and two scored 1 point. Sample size ranged from 47 to 571; only two trials has fewer than 100 patients.

**Incidence of respiratory tract infections** (14 RCTs): Ten of 14 RCTs reported no significant difference between the probiotic and control groups in the incidence of respiratory tract infections. Four RCTs reported a significantly lower incidence in probiotic treatment groups.

**Severity of symptoms** (six RCTs): Five out of six RCTs reported a significant reduction in symptom severity in probiotic treatment groups. The other RCT reported no significant difference between probiotics and control.

**Duration of symptoms** (nine RCTs): Three out of nine RCTs reported a significant reduction in symptom duration in probiotic treatment groups. The other six RCTs reported no significant difference between the probiotic and control groups.

**Safety** (10 RCTs): None of the RCTs reported any serious adverse events. Six RCTs reported no probiotic treatment related adverse events. Four RCTs reported minor adverse event including nausea, vomiting, bloating, diarrhoea or dyspepsia.

**Authors’ conclusions**
Probiotics may have a beneficial effect on the severity and duration of symptoms of respiratory tract infections but did not appear to reduce the incidence.

**CRD commentary**
The review question was clearly stated and inclusion criteria were appropriately defined. Several relevant sources were searched. Some attempts were made to reduce language bias, but no attempts were made to minimise publication bias. Methods were used to minimise reviewer errors and bias in the selection of trials and extraction of data, but it was not clear whether similar steps were taken in the assessment of validity.

Only RCTs were included; validity was assessed and results were reported. In view of the diversity among trials, a narrative synthesis was appropriate.

Overall the review was well-conducted. The authors’ cautious conclusions reflect the evidence and are likely to be reliable.

**Implications of the review for practice and research**
**Practice**: The authors did not state any implications for practice.

**Research**: The authors stated that further research is required to evaluate probiotic organisms for the prevention of respiratory tract infections.

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.