Pelargonium sidoides for acute bronchitis: a systematic review and meta-analysis
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CRD summary
This review evaluated the effectiveness of *Pelargonium sidoides* herbal medicine in patients with acute bronchitis. The authors concluded that this herbal treatment was effective compared with placebo, specifically in terms of reducing the Bronchitis Severity Score. Based on the evidence presented in this well-conducted review, the authors' conclusion is likely to be reliable.

Authors' objectives
To evaluate the effectiveness of *Pelargonium sidoides* herbal medicine for treating acute bronchitis.

Searching
MEDLINE, AMED, EMBASE, CINAHL, and the Cochrane Library were searched (with dates spanning 1950 to 2007) for relevant articles in any language for inclusion in the review. Search terms were reported. Reference lists of all retrieved articles were scanned for further relevant studies. Manufacturers were contacted for further information, including unpublished material.

Study selection
Randomised controlled trials (RCTs) of mono-preparations of *Pelargonium sidoides*, administered orally to any patient with acute bronchitis as sole or adjunctive treatment, compared with placebo or conventional therapy, were eligible for inclusion in the review. All clinically relevant outcomes were of interest. Trials of patients with pre-existing chronic bronchitis or other infectious diseases were excluded. The primary outcome measure was the change in Bronchitis Severity Score, with all included participants having a baseline score of at least five.

The age of participants in included trials ranged from six to 66 years; all had a Bronchitis Severity Score of at least five. Treatment in included trials was delivered by drops or tablets (doses are given in the paper) over a period of seven days; the control treatment was placebo or acetylcysteine granules (200mg twice daily). Included trials originated in Russia and the Ukraine.

Studies were selected for inclusion by two independent reviewers and disagreements were resolved by discussion, or by referral to a third reviewer.

Assessment of study quality
Study quality was assessed by two independent reviewers using the Jadad scale (blinding, randomisation, attrition), with a maximum possible score of 5 points. Allocation concealment and the use of intention-to-treat data were also assessed. Disagreements were resolved by discussion.

Data extraction
Data were extracted in order to calculate the weighted mean difference (WMD) and 95% confidence interval (CI). Trials were grouped according to herbal medicine compared with conventional therapy or placebo. Data were extracted by two independent reviewers.

Methods of synthesis
Weighted mean differences and 95% confidence intervals were pooled in a fixed-effect meta-analysis. Sensitivity analysis was conducted to test the effect of removing unpublished studies. Heterogeneity was assessed using the $X^2$ test and $I^2$ statistic. Publication bias was assessed using a funnel plot, using the effect size for Bronchitis Severity Score as the primary outcome of change.

Results of the review
Six RCTs (n=1,681 participants) were included in the review, including two unpublished trials. Sample sizes ranged
from 60 to 476 participants. The quality of included trials was reported to be generally good (three trials achieved the maximum score of 5 points). Four RCTs (n=1,012) of adult participants were eligible for inclusion in the meta-analysis for herbal medicine versus placebo. A fifth trial conducted in children was excluded from this meta-analysis.

**Herbal medicine versus placebo** (four trials): All trials were carried out with adults. The pooled estimate showed a statistically significant reduction in the Bronchitis Severity Score score in patients receiving *Pelargonium sidoides* treatment compared with those receiving placebo (WMD 2.80 points, 95% CI 2.44 to 3.15). Heterogeneity was reported ($I^2 = 54.4\% ; p=0.09$). The small number of trials meant that it was not possible to produce a useful funnel plot. Statistical significance in the Bronchitis Severity Score in patients was maintained when the unpublished study was removed from the analysis (WMD 2.48 points, 95% CI 2.05 to 2.92) and heterogeneity was reduced ($I^2=0\% ; p=0.67$). Positive effects were noted in the treatment groups for a number of secondary outcomes including: participant health status; speed of onset of treatment effect; duration of illness; improvements in individual components of Bronchitis Severity Score; quality of life; patient satisfaction; and complete recovery at day seven.

**Herbal medicine versus conventional treatment** (one trial; Jadad score of 2 points): In children aged between six and 12 years, bronchitis specific symptoms were reduced more effectively in those receiving *Pelargonium sidoides* treatment than in those receiving acetylcysteine, but the difference between the groups was not significant.

No mild or serious adverse events were reported in the five RCTs that supplied information.

**Authors' conclusions**

*Pelargonium sidoides* treatment was effective compared with placebo for treating patients with acute bronchitis.

**CRD commentary**

The review question was clear and supported by detailed inclusion criteria, which appeared to be potentially reproducible. The search strategy included several relevant sources, and attempts were made to minimise language and publication biases. Publication bias was assessed and was also included in sensitivity analysis. An appropriate validity assessment was carried out, and the results of this were used to interpret the findings of the review. All aspects of the review process were carried out appropriately to minimise potential error and bias, and trial details were adequately provided. The choice of synthesis appeared to be appropriate, especially as heterogeneity was explored and subsequently eliminated from the analysis to maintain statistically significant results. It should be noted that the majority of included trials were manufacturer-funded, as was the lead author. This was a well-conducted review. Based on the evidence presented, the authors' conclusion is likely to be reliable.

**Implications of the review for practice and research**

The authors did not state any implications for practice or further research.

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