Telehealth in cystic fibrosis: a systematic review
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CRD summary
This review found insufficient evidence on the role of telehealth interventions for patients with cystic fibrosis. The review was generally well conducted and the authors' conclusion was appropriate.

Authors' objectives
To evaluate remote health care (telehealth) interventions for patients with cystic fibrosis.

Searching
PubMed, CINAHL, and Cochrane Cystic Fibrosis and Genetic Disorders Group Trials Register were searched, for relevant studies, from 1998 to January 2011; search terms were reported.

Study selection
Studies that evaluated telehealth interventions for patients with cystic fibrosis were eligible for inclusion. Telehealth interventions had to be designed to monitor symptoms, assess adherence to prescribed medication, or provide therapy, using an electronic interface, such as a telephone, videoconferencing, or an electronic diary. Assessments of the reliability of home-monitoring equipment were excluded.

In the included studies, the patients were children, adolescents, adults, or a mixture. The interventions were telemedicine assessments at home; downloading of data on adherence and medication re-orders; the assessment of equipment usability in hospital; the provision of behavioural and nutritional interventions for toddlers; and automated downloads of spirometry and symptoms. Some studies had control groups, which were usual care, where stated. The outcomes included calorie intake, health care use, respiratory exacerbation rate, antibiotic use, adherence to interventions, and psychological outcomes.

Two reviewers independently selected studies; any discrepancies were resolved by a third reviewer.

Assessment of study quality
Methodological quality was assessed by two reviewers, using the Downs and Black checklist, with 27 items on the reporting, and internal and external validity. The reviewers did not assess the use of power calculations, so the maximum possible score was 26 points. Any disagreements were resolved by a third reviewer.

Data extraction
Two reviewers extracted the data as presented in the studies; any disagreements between the reviewers were resolved by a third reviewer.

Methods of synthesis
The results were presented in a narrative summary.

Results of the review
Eight studies, with approximately 200 participants, were included in the review. Two were randomised controlled trials, one was a controlled study, and five were single-group studies which included a case study. Five studies were classified as feasibility studies. The mean quality score was 12 (range 4 to 18). Where stated, follow-up ranged from six weeks to 7.04 months.

One randomised controlled trial (seven patients) found no differences, between intervention and control groups, in length of hospital stay, number of clinic visits, and anxiety and depression scores, in adolescent and adult patients. In the other randomised trial (60 patients), half of the intervention group dropped out because of failure to transmit data. Most of those who completed the study did not require assistance to collect or transmit data. Adherence in four studies ranged from 52 to 80% of possible occasions for data recording.
Four studies evaluated the collection and transmission of spirometry data; the drop-out rate ranged from 43 to 63%. Most drop-outs were attributed to failure to comply with the minimum data submission requirements. One study of adolescent patients found oral antibiotic use was higher in the telehealth group than in the control group (p=0.02).

**Authors' conclusions**
There was insufficient evidence to draw firm conclusions on the benefits of telehealth interventions for patients with cystic fibrosis, and further research was needed.

**CRD commentary**
The review addressed a clear question, and broad criteria for the inclusion of studies in the review were defined. Some appropriate databases were searched for relevant studies, but there were no attempts to identify unpublished studies. Steps were taken to minimise reviewer error and bias at each stage of the process. Methodological quality was assessed and found to be generally poor; the reporting of drop-outs was inconsistent across the studies. The authors' decision to combine the results in a narrative was justified given the variation in interventions, patients and outcomes. The limitations of the review were acknowledged, by the authors, and were a lack of good quality evidence, the short duration of the studies, and the inclusion of only clinically stable patients.

The review was generally well conducted and the authors' cautious conclusions 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 information was required, on patient quality of life and health care use, to determine the effectiveness of telehealth interventions. The provision of physical activity programmes by telehealth and the cost-effectiveness of this, required investigation.

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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.