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## Home telehealth for chronic obstructive pulmonary disease: a systematic review and meta-analysis

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### CRD summary

The authors concluded that home telehealth was generally clinically effective for chronic obstructive pulmonary disease and no adverse events were reported in selected studies; evidence on health services utilisation was limited. The review was well-conducted, but limitations of the evidence should be taken into account when interpreting the review findings.

### Authors' objectives

To compare home telehealth against usual care for patients with chronic obstructive pulmonary disease (COPD).

This paper was based on a Health Technology Assessment report (see Other Publications of Related Interest).

### Searching

PubMed, MEDLINE Daily Update, MEDLINE In-Process and Other Non-Indexed Citations, BIOSIS Previews, EMBASE, CINAHL, PsycINFO, The Cochrane Library and CRD databases were searched for studies published from 1998. Key words were reported. No language restrictions were applied.

### Study selection

Randomised controlled trials (RCTs) and observational studies that compared home telehealth (home telemonitoring or telephone support) against usual care were eligible if they involved patients with COPD. Review outcomes were use of health care resources and quality of life (QoL).

In all studies, the mean age of patients was more than 60 years and the mean forced expiratory volume in one second ranged from 27% to 46%. Most studies excluded patients with terminal illness, lung cancer, cognitive impairment, mental illness, language barriers and other major chronic diseases. Most studies were set in European countries. Studies used different measures to assess quality of life.

Two reviewers independently selected studies and resolved disagreements by consensus.

### Assessment of study quality

Validity was assessed using a modified version of a tool developed by Hailey et al. Items were related to study design, patient selection, description of comparators and outcomes. Studies were rated from A (high quality) to E (poor quality).

Two reviewers independently assessed validity. Discrepancies were resolved by consensus.

### Data extraction

Two reviewers independently extracted data using a structured form. Disagreements were resolved by consensus.

### Methods of synthesis

Where possible, pooled summary measures (risk ratios, RRs) and 95% confidence intervals (CI) were calculated using a random-effects model. Heterogeneity was assessed using the  $I^2$  statistic. Subgroup analysis based on study design and type of telehealth intervention was used to attempt to explain substantial heterogeneity ( $I^2 \geq 50\%$ ). Where significant heterogeneity remained, studies were combined in a narrative synthesis.

### Results of the review

Nine studies were included (n=858 patients). Sample size ranged from 18 to 191. Four studies (one RCT, one pre/post

study, one quasi-experimental study and one prospective study) compared home telemonitoring to usual care. Of these studies, one was rated A, one rated B, one C and one D.

Five RCTs compared telephone support to usual care. Of these studies, two were rated A, two B and one D. The duration of follow-up ranged from three to nine months.

**Home telemonitoring:** Compared to usual care, home telemonitoring was associated with a lower number of hospital admissions (one RCT and two observational studies), a lower mean number of emergency department and scheduled visits (one pre/post study) and a lower mean number of home care visits per patient (one observational study).

Home telemonitoring was associated with mixed effects on bed days of care (two observational studies reported reductions and one reported an increase) and an increase in the mean number of office visits per patient (one observational study).

**Telephone support:** Compared to usual care, telephone support was associated with a lower number of patients hospitalised or hospitalised at least once (two RCTs), a lower number of patients who visited emergency departments (one RCT), a lower mean number of hospitalisations per patient (five statistically heterogeneous RCTs), a lower mean number of emergency department visits per patient (four statistically heterogeneous RCTs), a lower mean number of office visits (one RCT), a lower mean number of primary care visits per patient (one RCT), a slightly lower mean number of specialist visits per patient (one RCT) and a lower mean number of office visits (one RCT). Telephone support was associated with a non-significantly increased risk of mortality (RR 1.21, 95% CI 0.84 to 1.75; three RCTs, no significant heterogeneity) and mixed effects on bed days of care (two RCTs reported reductions and one RCT reported an increase).

**Quality of life (home telemonitoring or telephone support):** Two of four studies reported no difference between groups and two studies reported that home telehealth was associated with improved quality of life and patient satisfaction.

### **Authors' conclusions**

Home telehealth was generally clinically effective and no adverse events were reported in selected studies. Evidence on use of health services was limited.

### **CRD commentary**

The review question was clearly stated and inclusion criteria were appropriately defined. Several sources were searched. Attempts were made to minimise language bias. Validity was assessed; only the aggregate grade was reported. Methods were used to minimise reviewer errors and bias during study selection of studies, data extraction and validity assessment. Appropriate methods were used to combine the studies. The authors acknowledged the potentially limited generalisability of findings since studies excluded patients with coexisting physical and mental health problems.

This was a well-conducted and clearly presented review. Limitations of the evidence, such as small sample sizes from a small number of studies and clinical differences between studies, should be taken into account when interpreting the review findings.

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

**Practice:** The authors did not state any implications for practice.

**Research:** The authors stated a need for higher quality research (such as multicentre RCTs) to evaluate the long-term effects of home telehealth in patients with COPD. Future studies should include a greater diversity of patients, assess clinical outcomes, compare real-time with asynchronous modalities of telehealth and evaluate interventions using standardised methods.

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**Bibliographic details**

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**Other publications of related interest**

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