Spirometry as a motivational tool to improve smoking cessation rates: a systematic review of the literature

Wilt TJ, Niewoehner D, Kane RL, MacDonald R, Joseph AM

CRD summary
This review evaluated the effects on smoking cessation of providing spirometry test results to smokers. The authors concluded that there was insufficient evidence from flawed studies. The review appeared to be well-conducted apart from the lack of reporting of review methods which made it difficult to confirm the reliability of the authors' conclusions.

Authors' objectives
To determine whether the provision of spirometry test results to smokers increases the rates of smoking cessation.

Searching
MEDLINE (1966 to October 2005) and the Cochrane Database of Systematic Reviews were searched using the reported terms. In addition, references in all published studies were screened and experts in the field and members of the Society for Research on Nicotine and Tobacco were contacted for details of other published, unpublished and ongoing trials. Only studies reported in English were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) with at least 25 patients per treatment arm and a minimum follow-up period of 6 months were eligible for inclusion in the review. Observational studies were also included but these were not the main focus of the review. In the included RCTs, the duration of follow-up ranged from 9 to 36 months.

Specific interventions included in the review
Studies that evaluated the provision of spirometry test results alone or in conjunction with another intervention for smoking cessation were eligible for inclusion. In all but one of the included studies, smoking cessation counselling was provided to both treatment groups. Similarly, in all but one of the included studies, cointerventions that had been proven to improve smoking cessation rates were used for experimental groups. The majority of studies provided relevant training to health care providers. None of the studies used a hand-held spirometer.

Participants included in the review
Studies of current smokers were eligible for inclusion, regardless of respiratory symptoms or spirometry results. Where reported, the participants in the included studies had a mean age of 42 years (range: 16 to 75) and 90% were male. In none of the studies was participant selection based on motivation to quit. The participants included out-patients, workers and volunteers; in some studies the participants were at high risk (based on cardiopulmonary status or previous exposure to asbestos).

Outcomes assessed in the review
Studies that assessed smoking cessation rates were eligible for inclusion. The primary review outcome was long-term sustained abstinence, measured at least 6 months after the start of the intervention; abstinence could be measured biochemically by cotinine or expired carbon monoxide levels, or based on self-report (biochemical validation was preferred). The secondary review outcomes were patient self-reported and point prevalence abstinence, attempts at quitting and changes in lung function.

How were decisions on the relevance of primary studies made?
The authors did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
Studies were assessed for the independence of effect of spirometry, adequacy of randomisation, duration of follow-up,
selection of the participants, compliance and losses to follow-up. The validity assessment was based on the methods described by Schulz et al. The authors did not state how the validity assessment was performed, or how many reviewers performed the assessment.

Data extraction
Data were extracted onto a standardised form, but the authors did not state how many reviewers performed the data extraction. Where possible, cessation rates were calculated on an intention-to-treat basis, assuming that patients lost to follow-up were still smoking.

Methods of synthesis
How were the studies combined?
The studies were grouped by interventions and outcomes and combined in a narrative.

How were differences between studies investigated?
Differences between the studies were discussed in the text, with reference to the intervention and aspects of study design.

Results of the review
Seven RCTs (n=6,052) were included.

One study clearly reported adequate methods of randomisation. Six studies provided sufficient information to permit the calculation of intention-to-treat data. In one study randomisation was not maintained because of poor compliance. Attrition rates ranged from 7 to 36% across treatment arms. In 3 studies the attrition rates were greater in the intervention groups than in the control groups. Four studies reported problems with compliance.

Abstinence rates: 2 studies reported significantly greater smoking cessation rates associated with the intervention after 6 to 12 months compared with the control groups; both of these studies used self-reported abstinence rates. The only study that evaluated the independent contribution of providing spirometry results to smokers reported no significant difference in biochemically validated abstinence rates between groups after 12 months’ follow-up. The other 2 studies that most closely approximated to an independent evaluation of spirometry also reported no significant difference between treatment groups.

Self-reported abstinence rates: 2 of 5 studies reported significantly greater self-reported abstinence rates at 6 to 12 months in the intervention groups compared with control groups.

Biologically verified abstinence rates: 2 of 4 studies that reported biologically verified abstinence rates reported that spirometry interventions were associated with a statistically significant increase in abstinence rates compared with the control.

Sustained abstinence: 2 of 3 studies that reported sustained abstinence rates reported that spirometry interventions were associated with a statistically significant increase in cessation rates compared with the control; one used self-reported rates at 11 months and the other used biologically validated sustained abstinence rates at 36 months.

Authors’ conclusions
There was insufficient evidence to evaluate the effect of providing spirometry results to smokers.

CRD commentary
The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched and attempts were made to minimise publication bias. No attempts were made to minimise language bias. Adequate information was provided about the included studies. Validity was assessed and the results of this assessment and other aspects of study design were discussed. The methods used to select studies, assess validity and extract the data were not described, so it is not known whether any efforts were made to reduce reviewer error and bias. In view of the differences between the studies, the narrative synthesis, which took account of study quality, was appropriate. The conclusion was supported by the results presented, but the lack of reporting of review methods makes it difficult to confirm the reliability of the authors’ conclusions.
Implications of the review for practice and research

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

Research: The authors stated the need for RCTs to determine whether spirometry in primary care office-based settings improves smoking cessation and long-term abstinence rates, and to investigate the influence of type of participant, type of smoking counselling, and pharmacological and other interventions.

Funding
Agency for Healthcare Research and Quality, contract number 290-02-0009.

Bibliographic details

PubMedID
17365733

DOI
10.1080/14622200601078509

Other publications of related interest

Indexing Status
Subject indexing assigned by NLM

MeSH
Humans; Randomized Controlled Trials as Topic; Smoking /prevention & control; Smoking Cessation /methods /statistics & numerical data; Spirometry /instrumentation

AccessionNumber
12006008146

Date bibliographic record published
20/09/2007

Date abstract record published
01/09/2008

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.