Increasing smoking cessation care provision in hospitals: a meta-analysis of intervention effect

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CRD summary
The review found that interventions could be moderately effective in increasing routine provision of assistance and counselling to stop smoking for hospital patients. Potential for missed studies and the heterogeneous evidence mean the authors’ conclusions should be interpreted with caution.

Authors’ objectives
To evaluate the effectiveness of controlled intervention studies in increasing the routine provision of smoking cessation in hospitals.

Searching
MEDLINE, EMBASE, CINAHL and PsycINFO were searched from January 1994 to June 2007 for publications in English; search terms were reported. The bibliography of each retrieved article was handsearched. Only articles with abstracts that could be checked were searched. Dissertations were excluded.

Study selection
Intervention trials (including controlled trials, time-series and non-controlled before-and-after studies) of the effectiveness of interventions for increased smoking cessation care provision in a hospital setting (in-patient or outpatient, but excluding primary care) were eligible for inclusion. Studies needed to describe relevant care provided by medical officers, nurses or other allied health staff who were not part of an additional research team. Eligible studies had to report smoking cessation care at follow-up against a baseline or comparison group. If the setting was not clear, the study was excluded. A main objective was to obtain a detailed description of the intervention and its quality; studies with a minimal description of the intervention were excluded. Eligible studies had to describe at least one of the practices: smoking status; advice to quit; counselling or assistance to quit; advising, offering or providing nicotine replacement therapy; or follow-up or referral to a quit service. Eligible outcomes included the proportion of patients who received care and/or proportion of health professionals who provided care.

Intervention strategies were classified using definitions of Cochrane Effective Practice and Organisation of Care Group. Organisational change strategies and educational meetings were the most common interventions; these were combined most often with reminders or with audit and feedback. Many studies combined strategies. Control groups either received usual care or minimal smoking cessation care. Most of the included studies were in in-patient settings in USA. There was a wide range of patient diagnoses. Controlled studies had a high level of cardiac and antenatal patients. Smoking cessation care prevalence was reported mostly through patient report or medical notes audit. All except one study reported the proportion of patients who received smoking cessation care; a few studies reported the proportion of health professionals who provided care. Few studies reported patient smoking cessation as the primary outcome.

The authors did not state how many reviewers performed the study selection.

Assessment of study quality
Methodological quality was assessed by one reviewer and checked by a second reviewer. Differences were resolved by consensus. Criteria used included: selection bias; allocation bias; confounders; blinding; adequacy of data collection; appropriateness of analysis; intervention integration and timing; and withdrawals. Quality was rated for each criterion as strong, moderate or weak.

Data extraction
The proportion of patients who received smoking cessation care and proportion of health professionals who provided care was extracted. Prevalence of smoking cessation care practices was extracted at baseline and post-test for non-
controlled studies and compared at follow-up for control and intervention groups in controlled trials.

Data extraction was performed by one reviewer and checked by a second reviewer. Differences were resolved by consensus.

**Methods of synthesis**
A meta-analysis of pooled risk differences (PRD) with 95% confidence intervals (CI) was performed for the included controlled studies using a random effects model (DerSimonian and Laird) for prevalence of smoking cessation care practices. If it was reported that smoking cessation practices used more than one method then the median effect size was used for the meta-analysis. Between-study heterogeneity was determined using Cochrane's Q statistic and $I^2$ tests ($I^2=50\%$ indicated substantial heterogeneity). A narrative synthesis was provided for other outcomes.

**Results of the review**
Twenty-five relevant studies were identified: 10 controlled studies (n=10,639) that comprised five randomised controlled trials (RCTs) (n=1,929, range 188 to 650), one cluster randomised trial (n=5,849) and four quasi-experimental studies (n=2,861, range 193 to 1297); and 15 pre-post test studies (n=67,177, range 87 to 44,761). Only eight (all controlled trials) of the 25 studies were rated as moderate or strong quality on at least three of the six quality criteria. The non-controlled studies had predominately weak methodologies.

The pooled analysis for controlled trials showed a statistically significant increase in provision of assistance and counselling to quit with the intervention (PRD 16.6, 95% CI 4.9 to 28.3, $I^2=93.7\%$; eight studies), but no significant effect for assessment of smoking status (PRD 13.7, 95% CI -11.4 to 38.7; two studies), advice to quit (PRD 21.0, 95% CI -0.6 to 42.6, $I^2=97.9\%$; six studies) or the provision or offer of nicotine replacement therapy (PRD 50.2, 95% CI -29.7 to 130.2; two studies). All meta-analyses showed significant heterogeneity. One RCT found provision of referral or follow-up was 47.1% higher in the intervention group than the control group. Another controlled study found significantly more health professionals in the intervention group provided three out of seven care items describing assistance or counselling to quit.

**Authors' conclusions**
Interventions can have a moderate effect in increasing the routine provision of hospital smoking cessation care practice. Multistrategic approaches can be effective in achieving moderate increases in assistance and counselling to quit.

**CRD commentary**
The review addressed a clear question and inclusion criteria, but relevant outcomes were not clearly defined. Relevant databases were searched. Only studies published in English were eligible for inclusion and unpublished studies and dissertations were excluded; therefore, relevant studies may have been missed. Publication bias was not determined. Study quality was assessed with suitable criteria and relevant data were provided. Efforts were made to reduce error and bias in the review process, but the authors did not report how many reviewers performed the study selection. The authors did not report the results of the apparent most important study outcome, namely effectiveness of interventions in reducing smoking. Relevant study details were reported, but no details of the age or sex of patients were given. A high level of statistical heterogeneity was reported for all outcomes. The statistical method used for the meta-analysis of the controlled trials seemed appropriate; a separate meta-analysis for the RCTs would have been useful in view of the high level of heterogeneity found. There was no reported attempt to synthesis the results of the uncontrolled studies.

Potential for missed studies and heterogeneity of the evidence mean that the authors' conclusions should be interpreted with caution.

**Implications of the review for practice and research**
**Practice:** The authors stated that because a significant number of smokers were hospitalised each year, routine provision of smoking cessation care could have substantial benefits.
Research: The authors stated that future research should endeavour to use stronger study designs to examine hospital-wide provision of a broader range of smoking cessation care practices, particularly nicotine replacement therapy and follow-up or referral to further quitting assistance. Such research would be strengthened by improved reporting of intervention implementation that included integrity and timing of measurement in relation to implementation. Hospital administrators ought to focus on increasing compliance with existing best-practice guidelines.

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