Interventions for smoking cessation in hospitalised patients (Review)

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TABLE OF CONTENTS

[Intervention Review]

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ABSTRACT

Background

An admission to hospital provides an opportunity to help people stop smoking. Individuals may be more open to help at a time of perceived vulnerability, and may find it easier to quit in an environment where smoking is restricted or prohibited. Initiating smoking cessation services during hospitalisation may help more people to make and sustain a quit attempt.

Objectives

To determine the effectiveness of interventions for smoking cessation that are initiated for hospitalised patients.

Search strategy

We searched the Cochrane Tobacco Addiction Group register which includes papers identified from CENTRAL, MEDLINE, EMBASE and PSYCINFO in January 2007, and CINAHL in August 2006 for studies of interventions for smoking cessation in hospitalised patients, using terms including (hospital and patient*) or hospitali* or inpatient* or admission* or admitted.

Selection criteria

Randomized and quasi-randomized trials of behavioural, pharmacological or multicomponent interventions to help patients stop smoking, conducted with hospitalised patients who were current smokers or recent quitters (defined as having quit more than one month before hospital admission). The intervention had to start in the hospital but could continue after hospital discharge. We excluded studies of patients admitted for psychiatric disorders or substance abuse, studies that did not report abstinence rates and studies with follow up of less than six months.

Data collection and analysis

Two authors extracted data independently for each paper, with disagreements resolved by consensus.

Main results

Thirty-three trials met the inclusion criteria. Intensive counselling interventions that began during the hospital stay and continued with supportive contacts for at least one month after discharge increased smoking cessation rates after discharge (Odds Ratio (OR) 1.65, 95% confidence interval (CI) 1.44 to 1.90; 17 trials). No statistically significant benefit was found for less intensive counselling interventions. The one study that tested a single brief (<=15 minutes) in-hospital intervention did not find it to be effective (OR 1.16, 95% CI 0.80 to 1.67). Counselling of longer duration during the hospital stay was not associated with a higher quit rate (OR 1.08,

95% CI 0.89 to 1.29, eight trials). Even counselling that began in the hospital but had less than one month of supportive contact after discharge did not show significant benefit (OR 1.09, 95% CI 0.91 to 1.31, six trials). Adding nicotine replacement therapy (NRT) did not produce a statistically significant increase in cessation over what was achieved by intensive counselling alone (OR 1.47, 95% CI 0.92 to 2.35, five studies). The one study that tested the effect of adding bupropion to intensive counselling had a similar nonsignificant effect (OR 1.56, 95% CI 0.79 to 3.06). A similar pattern of results was observed in smokers admitted to hospital because of cardiovascular disease (CVD). In this subgroup, intensive intervention with follow-up support increased the odds of smoking cessation (OR 1.81, 95% CI 1.54 to 2.15, 11 trials), but less intensive interventions did not. One trial of intensive intervention including counselling and pharmacotherapy for smokers admitted with CVD assessed clinical and health care utilization endpoints, and found significant reductions in all-cause mortality and hospital readmission rates over a two-year follow-up period.

Authors' conclusions

High intensity behavioural interventions that begin during a hospital stay and include at least one month of supportive contact after discharge promote smoking cessation among hospitalised patients. These interventions are effective regardless of the patient's admitting diagnosis. Interventions of lower intensity or shorter duration have not been shown to be effective in this setting. There is insufficient direct evidence to conclude that adding NRT or bupropion to intensive counselling increases cessation rates over what is achieved by counselling alone, but the evidence of benefit for NRT has strengthened in this update and the point estimates are compatible with research in other settings showing that NRT and bupropion are effective.

PLAIN LANGUAGE SUMMARY

Do smoking cessation interventions started during hospitalisation help people to stop smoking

Smoking contributes to many health problems including cancers, cardiovascular disease, and lung diseases. Smoking also increases the risk associated with hospitalisation for surgery. People who are in hospital because of a smoking-related illness are likely to be more receptive to help to give up smoking. Our review of trials found that programmes to stop smoking that begin during a hospital stay and include follow-up support for at least one month after discharge are effective. Such programmes are effective when administered to all hospitalised smokers, regardless of admitting diagnosis, and in the subset of smokers who are admitted to hospital with cardiovascular disease.

BACKGROUND

Smoking contributes to many of the health problems leading to hospitalisation, particularly vascular disease, respiratory illness and certain cancers. In addition, smoking increases the risk associated with hospitalisations for surgical procedures. Hospitalisation, especially for a tobacco-related illness, may boost receptivity to smoking cessation messages by increasing perceived vulnerability, a so-called 'teachable moment'. Illness also brings smokers to the healthcare setting, where they have contact with health professionals who can provide a smoking cessation message or intervention. Procedures such as coronary arteriography that provides detail of the patient's cardiac status may minimise the subsequent denial of cardiac risk by the patient (Ockene 1992). Many hospitals restrict or prohibit smoking by patients to protect patients and staff from passive smoking. This smoke-free environment may also provide an opportunity to attempt tobacco abstinence away from the usual environmental cues to smoke. For these reasons, providing (or at least initiating) tobacco dependence treatments in hospitals may be an effective preventive health strategy.

A number of studies have evaluated smoking cessation services provided or initiated in hospital. The interventions have included behavioural counselling of different forms and intensity (including post-hospitalisation contacts), pharmacological therapies (such as nicotine replacement therapy [NRT] and bupropion), and combinations of the two. The aim of this review is to evaluate the effectiveness of smoking cessation interventions directed at the hospitalised patient. In order to inform policy, we aimed to identify

the components of effective programmes. In addition, we aimed to explore whether there is a difference in effect according to the reason for hospitalisation or whether the effect holds for patients with a variety of admission diagnoses.

OBJECTIVES

The primary objective was to determine the efficacy of any type of smoking cessation programme for hospitalised patients. Our hypotheses were that:

- Systematic behavioural intervention (brief advice, individual counselling, provision of self-help materials, group therapy) increases quit rates more than usual care, and intensive intervention increases quit rates more than brief intervention.

- Interventions that occur both in hospital and after discharge increase quit rates more than interventions limited to the hospital stay, and longer post-discharge follow up increases quit rates more than short follow up.

- Adding pharmacotherapy (such as NRT or bupropion) to a behavioural intervention increases quit rates more than placebo or no medication, and combining pharmacotherapy with a behavioural intervention increases quit rates more than either alone.

A secondary objective was to explore the possibility that the efficacy of interventions differed for patients with different diagnoses. This was done using subgroup analysis of trials that recruited patients from more than one specialty, and by indirect comparison of trials that recruited patients from within one disease category.

METHODS

Criteria for considering studies for this review

Types of studies

Randomized or quasi-randomized controlled trials.

Types of participants

Participants were patients who were hospitalised and who were currently smoking or had recently quit (defined as quit more than one month before hospital admission). We excluded trials of secondary prevention or cardiac rehabilitation that did not recruit on the basis of smoking history, and trials in patients hospitalised for psychiatric disorders or substance abuse (including inpatient tobacco addiction programmes). We included trials that recruited all hospitalised smokers and those limited to patients who planned to quit smoking after hospital discharge. Trials in which 'recent quitters' were classified as smokers were included, but a sensitivity analysis was performed on these data to determine whether they differed from trials that excluded such individuals.

Types of interventions

Any intervention that was initiated during the hospitalization and that aimed to increase motivation to quit, to assist a quit attempt, or to help recent quitters avoid relapse was included. Interventions that began in hospital and continued after discharge were included. The intervention could be delivered by physicians, nursing staff, psychologists, smoking cessation counsellors or other hospital staff. The intervention could include advice, more intensive behavioural therapy, or smoking cessation pharmacotherapy, with or without continued contact after hospital discharge. The control intervention could be any less intensive intervention, such as brief advice to quit, or it could be usual care. Studies that provided identical interventions during the hospital stay but differed in post-discharge interventions were included. We included studies of smoking interventions that were part of a broader rehabilitation programme only if it was possible to extract data on the outcome effects of the smoking cessation component specifically, and if details of the nature of the intervention and control were explicitly stated. We included studies that reported the use of NRT, bupropion, or other pharmacotherapy for smoking cessation.
We categorised behavioural interventions during the hospital stay according to whether they included follow up after discharge. Within these categories we further defined both the hospital and follow-up interventions by level of intensity. This led to four categories of intervention intensity:
1. Single contact in hospital lasting <= 15 minutes, no follow-up support.
2. One or more contacts in hospital lasting in total > 15 minutes, no follow-up support.
3. Any hospital contact plus follow-up <=1 month.
4. Any hospital contact plus follow-up > 1 month.

Types of outcome measures

The principal outcome measure was abstinence from smoking, at least six months after the start of the intervention. We used the most conservative measure of quitting at the longest follow up, i.e.

we preferred a biochemically validated quit rate to self-reported abstinence, and continuous or sustained abstinence in preference to point prevalence abstinence. We used abstinence at 12-month follow up in preference to abstinence at six-month follow up. We counted participants lost to follow up as continuing smokers.

Search methods for identification of studies

We searched the Tobacco Addiction Group trials register in January 2007. This specialised register is regularly updated by electronic searches of databases including CENTRAL (2006 issue 4), MEDLINE (January 2007), EMBASE (January 2007), PsycINFO (January 2007) and handsearching of conference abstracts. Searches for the register cover smoking cessation, nicotine dependence, nicotine addiction and tobacco use. In addition, we searched CINAHL (August 2006). We searched the Centers for Disease Control Smoking and Health database for the original review but since it did not retrieve any additional studies we did not use it for the update. We asked individuals with expertise in the area of smoking cessation for details of conference abstracts and studies in press. We hand-checked bibliographies of studies generated by the search for further studies. We identified one paper which was not indexed at the time of the trials register search from current contents alerting (Mohiuddin 2007).

Search strategy for the Tobacco Addiction specialised register
(hospital and patient*) or hospitali* or inpatient* or admission* or admitted

Search strategy for CINAHL (OVID):
#1 ((hospital with patient*) in TI OR AB
#2 (hospitali* OR inpatient* OR admission* OR admitted) in TI OR AB
#3 (hospitali* OR inpatient*) in DE
#4 (quit* OR smok* OR cigar* OR tobacco OR nicotine) in TI OR AB
#5 (smok* OR tobacco OR nicotine) in DE
(#1 OR #2 OR # 3) AND (#4 OR #5)

Data collection and analysis

Identification of studies and data extraction

Three authors checked studies identified by the search strategies for relevance. Two authors extracted data independently. Disagreements were resolved by consensus. We noted reasons for the exclusion of studies. For each study we extracted the following data:
(i) author(s) and year of publication,
(ii) methods (country of origin, recruitment, randomization and participants),
(iii) description of intervention(s) and control, including a designation of intensity (1-4),
(iv) outcomes (length of follow up, definition of abstinence, validation technique).

If necessary we contacted the original authors for clarification of data.

We reported the following information about each trial in the table 'Characteristics of Included Studies':

- Country
- Reasons for hospitalisation or specialty of admission.
- Criteria for recruitment (e.g. current smokers only or recent quitters) and whether selected according to willingness to make a quit attempt.
- Method of randomization and adequacy of concealment.
- Smoking behaviour and characteristics of participants.
- Therapist types.
- Description of experimental and control interventions and classification by length of in hospital contact and post-discharge support.
- Outcome measures (definition of abstinence used in review, use of biochemical validation), number of deaths.

Evaluation of quality

We evaluated studies on the basis of the quality of the randomization and allocation concealment procedure used, as this is the main source of bias which has been empirically associated with overestimation of treatment effects (Schulz 1995). We also assessed whether the studies reported validation of self-reported smoking cessation, and how they handled patients lost to follow up, since these are possible sources of bias in smoking cessation studies. At the suggestion of a peer reviewer, we also assessed the extent to which study populations consisted of current smokers and recent quitters.

Analysis of the data

We used statistical methods for pooling using a Mantel-Haenszel fixed-effect method, with 95% confidence intervals. This summary statistic replaces the Peto method (Yusuf 1985) used in previous versions of this review, since the Mantel-Haenszel method is now recommended for Cochrane reviews (Cochrane Handbook). Differences in results using the two methods are small, and most likely to be apparent where numbers are unbalanced between groups, in which case the Peto method may give biased results. Where there was substantial heterogeneity between studies we explored possible reasons using subgroup analyses or considered the impact of outliers. We express results as an odds ratio (intervention odds/control odds) for achieving abstinence from smoking together with the 95% confidence interval for this estimate. To investigate statistical heterogeneity we used the I^2 statistic, given by the formula [(Q - df)/Q] x 100%, where Q is the chi squared statistic and df is its degrees of freedom (Higgins 2003). This describes the percentage of the variability in effect estimates that is due to heterogeneity rather than sampling error (chance). A value greater than 50% may be considered to indicate moderate to substantial heterogeneity.

We calculated quit rates based on the numbers of patients randomized to an intervention, excluding any deaths. Those who

dropped out or were lost to follow up were counted as continuing smokers. Most studies verified self-reported smoking status with a biochemical test. In these studies, self-reported nonsmokers who did not pass the verification procedure were counted as smokers. We noted the number of deaths in the Table of Included Studies. We analysed data according to our pre-determined classification of four levels of intensity (see Types of Intervention, above). Where we included studies that were judged by quality criteria to be more prone to bias, we planned sensitivity analyses to assess whether their inclusion altered our findings. We also planned sensitivity analyses to explore, where possible, the contribution of different components to an overall effect (for example, the role of NRT in a multicomponent intervention) and to determine whether the effects were different when the study population was restricted to those wishing to stop.

In an exploratory analysis, we evaluated the effects of interventions in patients admitted to hospital because of these specific diagnoses: cardiovascular disease, respiratory disease and cancer. We also assessed the effects of interventions that were designed to be delivered to all (or nearly all) of the smokers who were admitted to hospital regardless of the smoker's admitting diagnosis. Where there were insufficient data for meta-analysis, the results were tabulated. In cases where a single study reported data on patients from different categories, we pooled the data only when it was possible to extract data by disease category. Otherwise we included only those studies reporting data from patients in a single disease category.

We include in this updated review the Tobacco Addiction Group glossary of tobacco-specific terms (Appendix 1).

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

Thirty-three trials conducted in the United States, the United Kingdom, Australia, Canada, Denmark, Japan, Netherlands, Norway, and Spain between 1990 and 2007 met the inclusion criteria and contributed to the review. The previous version of this review included 17 trials published between 1990 and 2002; the update includes 16 new studies. All but three of these studies contributed to the main comparison of a behavioural counselling intervention, classified by intensity, versus control. Those that did not contribute (Campbell 1991; Campbell 1996; Rigotti 2006) did not include a control group of usual care or less intensive counselling; the intervention tested in those studies was pharmacotherapy as an adjunct to behavioural support. Twenty-one studies (Taylor 1990; Campbell 1991; Pederson 1991; CASIS 1992; De Busk 1994; Rigotti 1994; Campbell 1996; Miller 1997; Dornelas 2000; Ortigosa 2000; Hajek 2002; Bolman 2002; Feeney 2001; Reid 2003; Quist-Paulsen 2003; Froelicher 2004; Chouinard 2005; Pedersen 2005; Rigotti 2006; Mohiuddin 2007; Croghan 2005) provided separate data by disease and contributed to the comparison of intervention versus control in different disease categories. We excluded 51 studies which appeared relevant but did not meet all inclusion criteria (see Table of Excluded Studies). We describe each intervention in the Table of Included Studies.

Counselling interventions

Advice to quit smoking and/or behavioural counselling was provided in all 33 studies. In 32 of them, a nurse or counsellor provided stop-smoking advice and/or behavioural counselling. Eleven studies included physician advice to quit (Campbell 1991; De Busk 1994; Campbell 1996; Miller 1997; Lewis 1998; Pelletier 1998; Ortigosa 2000; Feeney 2001; Froelicher 2004; Croghan 2005; Hennrikus 2005), and in one study (Pederson 1991) physician advice was offered prior to admission. In another (Rigotti 1997) the patient chart was stamped with a prompt to remind the physician to offer smoking cessation advice. Counselling ranged in duration from less than five minutes to one hour. Counselling was delivered on more than one occasion during the hospitalisation period in four studies (Pederson 1991; CASIS 1992; Rigotti 1994; Nagle 2005). Most studies also included materials such as self-help booklets, relaxation audio tapes and video tapes.

Twenty-five of 33 studies (all except Pederson 1991; Pelletier 1998; Bolman 2002; Hajek 2002; Molyneux 2003; Croghan 2005; Hennrikus 2005; Nagle 2005) offered follow-up support following discharge. Of these, 19 offered support by telephone (Taylor 1990; CASIS 1992; Stevens 1993; De Busk 1994; Rigotti 1994; Miller 1997; Rigotti 1997; Simon 1997; Lewis 1998; Dornelas 2000; Ortigosa 2000; Stevens 2000; Quist-Paulsen 2003; Simon 2003; Froelicher 2004; Hasuo 2004; Chouinard 2005; Hennrikus 2005; Rigotti 2006), three at an outpatient clinic (Campbell 1991; Campbell 1996; Pedersen 2005) one at group sessions (Mohiuddin 2007) , one at either a hospital or community pharmacy (Vial 2002) and one offered in-person counselling for people still smoking (Reid 2003). The duration of extended support ranged from one week to six months from discharge.

Pharmacotherapy

No studies tested the efficacy of pharmacotherapy with nicotine replacement therapy (NRT) or bupropion versus placebo in the absence of a counselling intervention. However, five studies (Campbell 1991; Campbell 1996; Lewis 1998; Vial 2002; Molyneux 2003) tested the marginal value of adding NRT to a counselling intervention, one study (Rigotti 2006) tested the marginal value of adding bupropion to a counselling intervention, and one trial (Simon 2003) tested the marginal value of adding counselling to pharmacotherapy with NRT. In a number of other studies, especially the newer studies, pharmacotherapy was allowed as part of the intervention or available to participants in the trial but was not specifically offered to all participants in one group and to

none in another. Ten studies reporting provided NRT to a subgroup of patients or did not specify the extent of its use (Taylor 1990; De Busk 1994; Rigotti 1997; Simon 1997; Quist-Paulsen 2003; Reid 2003; Simon 2003; Froelicher 2004; Chouinard 2005; Pedersen 2005). Two studies included bupropion in a similar fashion (Chouinard 2005; Mohiuddin 2007).

Other study characteristics

Three studies compared two intervention conditions with a usual care control (Miller 1997; Chouinard 2005; Hennrikus 2005), with the difference between the two intervention conditions being in the duration of post-discharge follow up. Results from each arm of this study were included separately in the analysis by intervention intensity. In three other studies that compared two intervention arms to a usual care control, the behavioural support offered in the two arms was comparable and results of the two intervention arms were combined for the intensity analysis by intensity subgroups (Lewis 1998; Molyneux 2003; Vial 2002). In two of these, the two intervention arms differed by the presence or absence of nicotine replacement (Lewis 1998; Molyneux 2003), and these arms were directly compared in the pooled analysis of the effect of NRT. In the third, both intervention arms included the use of NRT, and compared follow up from either a hospital or community pharmacist (Vial 2002). In one study the smoking cessation intervention was part of a multicomponent risk intervention for patients with cardiovascular disease (De Busk 1994). In this case the smoking cessation intervention was well-defined and met our inclusion criteria.

Most studies (28 of 33) assessed cigarette abstinence 12 months after hospital discharge. Only five studies reported a shorter follow-up period of six months (Lewis 1998; Pederson 1991; Rigotti 1997; Pedersen 2005; Croghan 2005). About half of the studies (16 of 33) used the preferred outcome measure, sustained abstinence. The remaining 17 studies used point prevalence abstinence as the outcome measure. One study reported sustained abstinence rates for overall cessation but point prevalence rates by diagnosis (Miller 1997).

All studies except one included both males and females; the exception (Froelicher 2004) included only females. All studies included adults who smoked cigarettes currently or recently (e.g., within the past month). Six studies included recent quitters as well as current smokers (CASIS 1992; Stevens 1993; De Busk 1994; Rigotti 1994; Stevens 2000; Nagle 2005).

Risk of bias in included studies

Fifteen of the thirty-three studies reported a procedure for random sequence generation and allocation concealment that we judged likely to avoid recruitment bias (Taylor 1990, Miller 1997, Simon 1997, Lewis 1998, Dornelas 2000; Feeney 2001; Hajek 2002; Vial 2002; Quist-Paulsen 2003; Reid 2003; Froelicher 2004; Hasuo 2004; Nagle 2005; Pedersen 2005; Rigotti 2006). Fourteen studies did not report the method of randomization and concealment in enough detail to judge the quality. Four studies did not allocate treatment at the individual patient level (Stevens 1993; Stevens 2000; Pelletier 1998; Bolman 2002). Two of them allocated treatment by alternating between hospitals over time (Stevens 1993, Stevens 2000) and one study employed a quasi-experimental design with one intervention and two control hospitals (Pelletier 1998). One other study (Bolman 2002) was not fully randomized; 7 of 11 participating hospitals were randomized to condition, but four others selected their study arm. All four of these studies share the potential problems of recruitment bias and of underestimation of confidence limits due to intracluster correlation. Therefore, we conducted sensitivity analyses on the effect of excluding them.

Most studies (28 of 33) used a method to validate subjects' self-reports of quitting at the follow-up assessment. Biochemical validation of smoking status was done in 27 studies, by expired air carbon monoxide in 13 studies (Taylor 1990, Campbell 1991, CASIS 1992, De Busk 1994, Campbell 1996, Lewis 1998, Ortigosa 2000, Hajek 2002; Croghan 2005; Mohiuddin 2007; Molyneux 2003; Reid 2003; Vial 2002), and by plasma, salivary, or urinary cotinine in 15 studies (De Busk 1994, Rigotti 1994, Miller 1997, Rigotti 1997, Simon 1997; Hajek 2002; Feeney 2001; Chouinard 2005; Froelicher 2004; Hennrikus 2005; Hasuo 2004; Nagle 2005; Quist-Paulsen 2003; Rigotti 2006; Simon 2003). One study used "corroboration by significant other" as the only validation method (Dornelas 2000), and four other studies used "corroboration by significant other" in cases where a plasma or salivary cotinine measure was not available (Miller 1997, Lewis 1998;Simon 2003; Froelicher 2004). Five studies (Stevens 1993, Pelletier 1998, Stevens 2000; Bolman 2002; Pedersen 2005) did not validate self-reported quitting at the follow-up assessment, and three others (Pederson 1991, Reid 2003; Vial 2002) did not validate all self-reported quitters. Four studies used more than one means of validation other than corroboration by significant other (Taylor 1990, De Busk 1994; Chouinard 2005; Rigotti 2006).

Most studies recruited participants on the basis of a convenience sample, with randomization being to group (intervention or control) rather than to initial inclusion. Participation rates (i.e., the proportion of those approached who agreed to take part in the trial) were also seldom recorded. Most studies recorded those lost to follow-up as continuing smokers. In one study (Stevens 2000), the intervention was offered inconsistently, with only 68% of those eligible for the intervention actually being approached.

Effects of interventions

Effect of counselling interventions categorised by intensity

Only one included study (Hennrikus 2005) reported on the effect of a brief intervention in hospitalised patients with no follow-up after discharge (intensity 1). That study had a large sample size (>650 subjects per study arm). The brief intervention was no more effective than usual care (OR 1.16, 95% CI 0.80 to 1.67)

although the confidence limits did not exclude the possibility of a benefit. Eight studies (Pederson 1991; Pelletier 1998; Hajek 2002; Bolman 2002; Molyneux 2003; Chouinard 2005; Croghan 2005; Nagle 2005) used a more intensive intervention in hospital but had no follow-up intervention component after discharge (intensity 2). There was no evidence of a significant benefit from pooling these studies and in updating the review the confidence intervals have narrowed, suggesting that any effect is likely to be small (OR 1.08, 95% CI 0.89 to 1.29, I^2 = 24%). Similar lack of statistically significant benefit was observed in a pooled analysis of the six studies that tested the effect of an intervention that began during hospitalisation and continued for up to 1 month after discharge (intensity 3). The odds ratio and confidence interval for the estimate of the effect of this level of intervention (OR 1.09, 95% CI 0.91 to 1.31, I^2 = 0%) is almost identical to that produced by the intensity 2 intervention.

We identified substantial heterogeneity (I^2 = 53%) in the results of 18 studies that tested the highest intensity intervention (intensity 4), consisting of counselling that began in the hospital and continued for more than 1 month after discharge. One study (Feeney 2001) was an extreme outlier reporting a very large effect (OR 49). In this trial amongst 198 patients admitted to a coronary care unit there was a very high drop out rate (79%) and low quit rate (1%) at 12 months in the usual care condition whilst the dropout rate was 55% and the quit rate 34% in the intervention group. The intervention group quit rate was comparable to that of other trials in the intensity 4 subgroup, but control group quit rates in the other trials were typically over 10%. This suggested that the difference in relative effect might have been due to characteristics of the support given the control group and we decided to exclude this trial from the meta-analysis. This reduced the heterogeneity (I^2 = 35%) and the pooled estimate showed a statistically significant increase in quit rates (OR 1.65, 95% CI 1.44 to 1.90).

Sensitivity analyses

Some studies of behavioural counselling also included the option of pharmacotherapy, principally NRT. A sensitivity analysis excluding thirteen studies that reported the use of NRT within the highest intervention intensity (Taylor 1990, De Busk 1994, Simon 1997, Miller 1997, Lewis 1998; Vial 2002; Quist-Paulsen 2003; Reid 2003; Simon 2003; Froelicher 2004; Chouinard 2005; Pedersen 2005; Mohiuddin 2007) did not suggest that the efficacy of these interventions was due to the use of NRT. The result, though smaller, remained statistically significant (OR 1.36, 95% CI 1.04 to 1.77, I^2 = 0%).

Another sensitivity analysis excluded studies that did not randomly assign subjects to condition. Within studies that did not provide follow-up (intensity 2) we performed a sensitivity analysis excluding data reported by two studies that did not fully randomize patients (Bolman 2002; Pelletier 1998). Although the point estimate dropped below 1.0, the conclusion did not change (OR 0.94, 95% CI 0.74 to 1.20, I^2 = 0%). Within the group of studies that delivered an intervention with minimal follow-up (intensity 3) a sensitivity analysis excluding the data reported by two studies that did not randomize patients (Stevens 1993, Stevens 2000) changed the point estimate, but did not substantially affect the confidence intervals (OR 1.01, 95% CI 0.78 to 1.31, I^2 = 0%).

Approximately half of studies that delivered the highest intervention intensity (intensity 4) excluded smokers who were not willing to attempt cessation after discharge. We performed a sensitivity analysis excluding the data reported by nine studies in which participants were selected on the basis of their willingness to make a quit attempt (Taylor 1990; De Busk 1994; Miller 1997; Simon 1997; Lewis 1998; Vial 2002; Reid 2003; Froelicher 2004; Hasuo 2004) An intervention effect persisted in the remaining eight studies (OR 1.70, 95% CI 1.38 to 2.09, I^2 = 50%).

We performed a sensitivity analysis excluding studies that reported data from quitters (defined as having not smoked for more than 1 month before admission) as well as current smokers (Taylor 1990; CASIS 1992, Stevens 1993, De Busk 1994, Rigotti 1994, Stevens 2000, Nagle 2005). For intensity 3 (studies delivering a minimal intensity intervention with short-term follow up), limiting the analysis to current smokers produced little change in the result (OR 1.01, 95% CI 0.77 to 1.32, I^2 = 0%). For studies delivering the highest intervention intensity (intensity 4), a statistically significant increase in quitting remained even after the exclusion of studies that included quitters, and the point estimate changed little (OR 1.57, 95% CI 1.35 to 1.82, I^2 = 30%).

We performed a sensitivity analysis excluding five studies that did not validate self-reported smoking cessation outcomes (Bolman 2002; Pedersen 2005; Pelletier 1998; Stevens 1993; Stevens 2000). This did not alter the results. The point estimates for the lower intensity interventions declined slightly, but confidence intervals remained wide and conclusions did not change [Intensity 2 OR 0.94, 95% CI 0.74 to 1.20, I^2 = 0%); Intensity 3 OR 1.01, 95% CI 0.78 to 1.31, I^2 = 0%)]. Only one study in the most intensive intervention category (intensity 4) did not validate self-reported smoking cessation (Pedersen 2005). Excluding it did not alter the point estimate or statistical significance of the effect (OR 1.65, 95% CI 1.44 to 1.90, I^2 = 39%).

Effect of pharmacotherapy

The effect of pharmacotherapy compared with placebo as a single intervention in the absence of counselling has not been tested. A few trials have tested the effect of adding pharmacotherapy to a counselling intervention or, conversely, of adding counselling to a pharmacotherapy intervention. Five trials (Campbell 1991, Campbell 1996, Lewis 1998; Molyneux 2003; Vial 2002) tested the marginal effect of NRT added to counselling. In these trials, NRT was compared with placebo NRT or no NRT and all subjects received a counselling intervention. Pooled analysis of these studies produced an OR of 1.47, but it did not reach statistical significance (95% CI 0.92 to 2.35, I^2 = 42%). However, this result is consistent with the effect of NRT seen in other settings

(Silagy 2004b). One trial compared the effect of adding intensive counselling versus minimal counselling to an NRT intervention (Simon 2003). The study had an OR of 1.71 for sustained abstinence, but the confidence limits of that estimate missed statistical significance (95% CI 0.90 to 3.23). However, the result was consistent with the impact of intensive counselling observed in the absence of pharmacotherapy.

One study (Rigotti 2006) systematically compared the use of bupropion with placebo. It did not detect a statistically significant effect of the drug over intensive counselling alone (OR 1.56, 95% CI 0.79 to 3.06). However, the confidence limits were wide and encompass the confidence limits for the effect of bupropion in other settings (OR 1.94, 95% CI 1.72 to 2.19, Hughes 2007).

Effect of intervention by diagnosis

The included studies were heterogeneous in the types of hospitalised patients who were recruited. Eleven studies enrolled hospital patients with a wide range of admitting diagnoses. These studies tested smoking intervention programs that were implemented hospital-wide (Hasuo 2004; Hennrikus 2005; Lewis 1998; Miller 1997; Molyneux 2003; Nagle 2005; Rigotti 1997; Simon 2003; Stevens 1993; Stevens 2000; Vial 2002). Eighteen studies (Taylor 1990, Campbell 1991, CASIS 1992, De Busk 1994, Rigotti 1994, Miller 1997, Pelletier 1998, Dornelas 2000, Ortigosa 2000, Hajek 2002 ;Bolman 2002;Quist-Paulsen 2003;Reid 2003;Froelicher 2004;Chouinard 2005;Pedersen 2005;Rigotti 2006; Mohiuddin 2007) reported on the effects of interventions in patients hospitalised with a cardiovascular diagnosis. Four studies reported on interventions in patients with a respiratory diagnosis (Campbell 1991;Campbell 1996; Miller 1997; Pederson 1991). Only one small pilot study that recruited hospitalised patients admitted for a cancer diagnosis was found (Croghan 2005). Because of this diagnostic heterogeneity, we examined the results of interventions within these diagnostic groups, keeping the same intensity subgroups where there number of studies justified it.

The pattern of effect across intervention intensities was similar for the eleven studies that enrolled patients with all admitting diagnoses (Comparison 02.01). Interventions categorized as intensity 4 (counselling in hospital and more than one month of follow-up contact after discharge) were effective in a pooled analysis of six studies in this subgroup. (OR 1.43, 95% CI 1.17 to 1.75, I^2 = 0%, Hasuo 2004; Hennrikus 2005; Lewis 1998; Miller 1997; Simon 2003; Vial 2002). The odds ratio was lower than the effect of the intensity 4 intervention in the overall analysis, but the confidence intervals overlap and we cannot conclude that intensive interventions are less effective in this subgroup. Pooled analysis of less intensive interventions demonstrated no effect and did not differ from the overall analysis (intensity 2: OR 0.90, 95% CI 0.62 to 1.30, I^2 = 0%, Molyneux 2003; Nagle 2005); intensity 3, OR 1.12, 95% CI 0.93 to 1.34, I^2 = 27%, Miller 1997; Rigotti 1997; Stevens 1993; Stevens 2000).

The estimate of the effect for each level of intervention intensity among patients with a cardiovascular diagnosis was also very similar to that for the entire sample of hospitalized patients (Comparison 02.02). Pooled analysis of 11 studies reporting on the effect of the most intensive intervention (intensity 4) (Taylor 1990; CASIS 1992; De Busk 1994; Miller 1997; Dornelas 2000; Quist-Paulsen 2003; Reid 2003; Froelicher 2004; Chouinard 2005; Pedersen 2005; Mohiuddin 2007) found a statistically significant effect (OR 1.81, 95% CI 1.53 to 2.15, I^2 = 43%). The point estimate of the effect was slightly higher than that for overall analysis (OR 1.65, 95% CI 1.44 to 1.90), but the confidence intervals overlap and we cannot conclude that interventions in patients hospitalized for cardiovascular disease are more effective than in the general hospital population. No statistically significant effect was found for interventions of lower intensity. Pooled analysis of four studies of in-hospital counselling without follow-up after discharge (intensity 2) found no intervention effect (OR 1.14, 95% CI 0.92 to 1.43, I^2 = 55%, Bolman 2002; Hajek 2002; Chouinard 2005;Pelletier 1998). Pooled analysis of three studies that provided in-hospital counselling and brief follow-up contact after discharge (intensity 3) also found no intervention effect (OR 1.07, 95% CI 0.74 to 1.55, I^2 = 0%, Rigotti 1994;Miller 1997;Ortigosa 2000).

One of the trials that tested an intensity 4 smoking intervention in the cardiovascular subgroup (Mohiuddin 2007) also assessed all-cause mortality and hospital readmission rates as endpoints. Over a 2-year follow-up, the intervention produced a relative risk reduction of 0.77 (95% CI 0.27-0.93, p=.014) in all-cause mortality and a relative risk reduction of 0.44 (95% CI 0.16 to 0.63, p=.007) in hospital readmissions.

Four studies provided interventions to patients hospitalised with a respiratory diagnosis, none of which showed significant effects. Two studies evaluated NRT (Campbell 1991; Campbell 1996) and the two studies of counselling interventions used different intensity interventions (Miller 1997; Pederson 1991) so we did not estimate a pooled effect.

One pilot study reported on the effects of a hospital-based intervention for patients with cancer (Croghan 2005). It found no evidence of efficacy but the sample size was very small and the confidence limits were very broad.

DISCUSSION

The results of this review indicate that smoking cessation counselling interventions delivered during a period of hospitalisation and including follow-up support that lasts at least one month after discharge increase smoking cessation rates. The estimated effect of such interventions was to increase the odds of smoking cessation by 65% at 6-12 months after hospital discharge. This finding was robust. It remained statistically significant in sensitivity analyses that excluded studies of lower quality (e.g., those that did not validate self-reported smoking cessation at outcome or those that were not randomized). Neither the exclusion of studies that included recent quitters as well as current smokers nor those that included

patients selected for motivation significantly affected the relative effect of intervention over control. This review found no evidence to support the efficacy of less intensive counselling interventions, such as those delivered only during hospitalisation or those which include less than one month of follow-up support after discharge. Therefore, post-discharge follow-up support appears to be an important component of interventions that begin during hospitalisation. We caution that the effect sizes observed in all these studies may be artificially modest because in many cases the "control" condition was more intensive than usual care or simply brief advice.

The counselling intervention in these studies was generally delivered by a research nurse or trained smoking cessation counsellor, not by a nurse responsible for other aspects of the patients' clinical care. Physician advice was a component of the intervention in many trials. There is no specific evidence from this review that brief physician advice to quit is effective by itself in the hospital setting, although evidence from trials in primary care settings support the efficacy of physician advice to quit (Silagy 2004a). Pharmacotherapy with NRT or bupropion was included in some of the counselling studies, especially the more recent ones. In most of these trials, the pharmacotherapy was not systematically provided to all subjects in the intervention arm or excluded from all subjects in the control arm. The efficacy of counselling interventions remained after excluding those studies that reported the use of NRT, suggesting that counselling alone is effective.

In hospitalised smokers the effect of pharmacotherapy by itself, compared to placebo or no pharmacotherapy, in the absence of counselling cannot be determined because no such trials have conducted. However, the marginal effect of NRT when added to counselling in the hospital setting has been tested. Pooled analysis of five studies estimated a 47% increase in the odds of quitting when NRT was added to counselling, but the result missed achieving statistical significance. There was a trend toward efficacy and the confidence intervals were compatible with an effect of NRT similar to that found in other settings. The estimate ORs from the Cochrane review of NRT are 1.66 (95% CI 1.52 to 1.81) for nicotine gum and 1.81 (95% CI 1.63 to 2.02) for nicotine patch (Silagy 2004b). Hence these data are supportive of its usefulness in appropriate patients during and following hospitalisation. The marginal effect of counselling when added to NRT begun in the hospital was tested in only one study (Simon 2003). Intensive counselling increased the odds of smoking cessation over that achieved by NRT alone, but the confidence limits of that estimate missed statistical significance (OR 1.71,95% CI 0.90, 3.23). However, the result was consistent with the pooled estimate from this review of the effect of intensive counselling without pharmacotherapy. One study compared the marginal efficacy of bupropion over intensive counselling in the hospital setting (Rigotti 2006). Bupropion was not more effective than placebo in that study, but the confidence limits were broad and the effect size was consistent with evidence from other populations that bupropion is effective for smoking cessation (Hughes 2007). These data support including pharmacotherapy with NRT or bupropion to hospital-initiated smoking interventions, when there is no clinical contra-indication.

The analyses by diagnosis demonstrate that the intensive counselling intervention is effective in the subgroup of patients admitted to hospital with a cardiovascular diagnosis, as it is for the overall group of hospitalised smokers who are not selected by diagnosis. The absolute cessation rates amongst smokers admitted with cardiovascular disease tended to be higher than amongst smokers not selected by diagnosis, but the relative effect of an intensive counselling intervention was not significantly greater in CVD patients. The potential benefit of intensive intervention in smokers with CVD was illustrated in the one study that assessed health care utilization and mortality outcomes (Mohiuddin 2007). That study produced a large increase in smoking cessation, and at two-year follow-up, a substantial decline in hospital readmission and all-cause mortality rates. There was a possibility of confounding due to better control of blood pressure and cholesterol and better medication compliance in the intervention group. The effectiveness of smoking cessation interventions for patients who are admitted to hospital with a respiratory diagnosis is less clear, in part because of a small number of studies in this subgroup. Overall, there is no strong evidence for a differential effect of the intensive counselling intervention by diagnosis. These data support offering hospital-based interventions to all smokers, regardless of admitting diagnosis.

Determining how to translate these findings effectively and consistently into routine clinical practice is the next challenge for this field. The intervention in most of the trials included in this review was delivered by research staff. The effectiveness of implementing the intervention in routine clinical practice, where interventions will be delivered by clinical staff, needs to be demonstrated. Feasible models that can be readily implemented in hospital settings are needed. Current evidence on this point is limited. Two studies included in this review illustrate the challenge (Stevens 1993; Stevens 2000). Both studies provided a similar counselling intervention in a similar setting, but counselling was delivered by research staff (masters-level psychologists) in the first study and by clinical staff (trained respiratory therapists) in the second study. The intervention efficacy was demonstrated in the first study but did not persist in the second study. The feasibility of maintaining an efficacious intervention after the conclusion of a research trial was investigated for another study included in this systematic review (Miller 1997). The counselling intervention was maintained in the same hospitals for three years after the clinical trial ended. During that time approximately half of the smokers accepted the offer of intervention, and those smokers had a cessation rate comparable to that achieved in the randomized trial. These results suggested that programme effectiveness was maintained (Smith 2002). More studies are needed to demonstrate the feasibility and

effectiveness of hospital-initiated smoking cessation interventions in routine practice.

AUTHORS' CONCLUSIONS

Implications for practice

The results support the use of smoking cessation counselling interventions that begin during the hospitalisation period and include at least one month of follow-up supportive contact after discharge. There is no evidence that less intensive counselling interventions, particularly those that do not continue after hospital discharge, are effective in promoting smoking cessation. The efficacy of the counselling intervention does not clearly vary by a smoker's admitting diagnosis, and it is appropriate to offer the intervention to hospitalised smokers regardless of their admitting diagnosis. Although adding nicotine replacement therapy (NRT) or bupropion to the intensive counselling intervention did not produce a statistically significant increase in cessation rates, there was a trend toward statistical significance in the NRT group, and the results are compatible with data which show the effectiveness of NRT and bupropion in other settings. The totality of evidence clearly shows that pharmacotherapy should be part of the in-hospital intervention in addition to counselling when clinically indicated.

Implications for research

The impact of an intensive counselling intervention is well established. Further studies testing the efficacy of adding smoking cessation pharmacotherapy to counselling might generate sufficient data to produce a statistically significant result in future pooled analyses. However, the existing studies of NRT and bupropion have produced odds ratios and confidence intervals that are consistent with the established efficacy of these pharmacotherapies. The efficacy of starting varenicline, a newer smoking cessation pharmacotherapy, in the hospital setting has not been studied.

Research is needed to identify effective strategies for implementing this evidence in routine practice in health care systems.

Additional research needs are to assess the cost-effectiveness of the intensive counselling intervention and to explore the impact of counselling on health and healthcare utilization outcomes.

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REFERENCES

References to studies included in this review

Bolman 2002 *{published data only}*

Bolman C, de Vries H, Van Breukelen G. Evaluation of a nurse-managed minimal-contact smoking cessation intervention for cardiac inpatients. *Health Education Research* 2002;**17**:99–116.

* Bolman C, De Vries H, van Breukelen G. A minimal-contact intervention for cardiac inpatients: long-term effects on smoking cessation. *Preventive Medicine* 2002;**35**:181–92.

Spencer L, .Anderson DRE. A minimal-contact intervention for cardiac inpatients: Long-term effects on smoking cessation. *American Journal of Health Promotion* 2004;**18**:399–400.

Campbell 1991 *{published data only}*

* Campbell IA, Prescott RJ, Tjeder-Burton SM. Smoking cessation in hospital patients given repeated advice plus nicotine or placebo chewing gum. *Respiratory Medicine* 1991;**85**:155–7. [MEDLINE: 1991360932]

Campbell 1996 *{published data only}*

* Campbell IA, Prescott RJ, Tjeder-Burton SM. Transdermal nicotine plus support in patients attending hospital with smoking related diseases - a placebo controlled study. *Respiratory Medicine* 1996;**90**(1):47–51. [MEDLINE: 1997010265]

CASIS 1992 *{published data only}*

* Ockene JK, Kristeller J, Goldberg R, Ockene IS, Merriam P, Barrett S, et al.Smoking cessation and severity of disease: The coronary artery smoking intervention study. *Health Psychology* 1992;**11**:119–26. [MEDLINE: 1992258345]

Rosal MC, Ockene JK, Ma YS, Hebert JR, Ockene IS, Merriam P, et al.Coronary Artery Smoking Intervention Study (CASIS): 5-year Follow-up. *Health Psychology* 1998;**17**(5):476–8. [MEDLINE: 1998446902]

Chouinard 2005 *{published data only}*

Chouinard MC, Robichaud-Ekstrand S. The effectiveness of a nursing inpatient smoking cessation program in individuals with cardiovascular disease. *Nursing Research* 2005;**54**(4):243–54.

Croghan 2005 *{unpublished data only}*

Croghan GA, Croghan IT, Frost MH, Sloan JA, Novotny PJ, Nelson MA, et al.Smoking cessation interventions and post-operative outcomes in esophageal and lung cancer patients [POS3-101]. Society for Research on Nicotine and Tobacco 11th Annual Meeting, 20-23 March; Prague, Czech Republic. 2005:139.

De Busk 1994 *{published data only}*

* DeBusk RF, Houston-Miller N, Superko HR, Dennis CA,

Thomas RJ, Lew HT, et al.A case-management system for coronary risk factor modification after acute myocardial infarction. *Annals of Internal Medicine* 1994;**120**(9):721–9.

Dornelas 2000 ***{published data only}***

* Dornelas EA, Sampson RA, Gray JF, Waters D, Thompson PD. A randomized controlled trial of smoking cessation counseling after myocardial infarction. *Preventive Medicine* 2000;**30**:261–8.

Feeney 2001 ***{published data only}***

Feeney GF, McPherson A, Connor JP, McAlister A, Young MR, Garrahy P. Randomized controlled trial of two cigarette quit programmes in coronary care patients after acute myocardial infarction. *Internal Medicine Journal* 2001;**31**(8):470–5.

Froelicher 2004 ***{published data only}***

Froelicher ES, Christopherson DJ. Women's Initiative for Nonsmoking (WINS) I: Design and methods. *Heart & Lung* 2000; **29**(6):429–37.

Froelicher ES, Christopherson DJ, Miller NH, Martin K. Women's initiative for nonsmoking (WINS) IV: description of 277 women smokers hospitalized with cardiovascular disease. *Heart & Lung* 2002;**31**:3–14.

Froelicher ES, Li WW, Mahrer-Imhof R, Christopherson D, Stewart AL. Women's Initiative for Non-Smoking (WINS) VI: Reliability and validity of health and psychosocial measures in women smokers with cardiovascular disease. *Heart & Lung* 2004; **33**(3):162–75.

Mahrer-Imhof R, Froelicher ES, Li WW, Parker KM, Benowitz N. Women's Initiative for Nonsmoking (WINS)V: under-use of nicotine replacement therapy. *Heart & Lung* 2002;**31**:368–73.

Martin K, Froelicher ES, Miller NH. Women's Initiative for Nonsmoking (WINS) II: The intervention. *Heart & Lung* 2000;**29** (6):438–45.

* Sivarajan Froelicher ES, Miller NH, Christopherson DJ, Martin K, Parker KM, Amonetti M, et al.High rates of sustained smoking cessation in women hospitalized with cardiovascular disease: the Women's Initiative for Nonsmoking (WINS). *Circulation* 2004;**109** (5):587–93.

Hajek 2002 ***{published data only}***

* Hajek P, Taylor TZ, Mills P. Brief intervention during hospital admission to help patients to give up smoking after myocardial infarction and bypass surgery: Randomised controlled trial. *BMJ* 2002;**324**:87–9.

Hasuo 2004 ***{published data only}***

Hasuo S, Tanaka H, Oshima A. [Efficacy of a smoking relapse prevention program by postdischarge telephone contacts: a randomized trial] (Japanese). *Nippon Koshu Eisei Zasshi [Japanese Journal of Public Health]* 2004;**51**(6):403–12.

Hennrikus 2005 ***{published data only}***

Hennrikus D, Lando HA, McCarty MC, Vessey JT. The effectiveness of a systems approach to smoking cessation in hospital inpatients. Society for Research on Nicotine and Tobacco 7th Annual Meeting March 23-23 Seattle Washington. 2001:47.

* Hennrikus DJ, Lando HA, McCarty MC, Klevan D, Holtan N, Huebsch JA, et al.The TEAM project: the effectiveness of smoking cessation interventions with hospital patients. *Preventive Medicine* 2005;**40**:249–58.

Lewis 1998 ***{published data only}***

* Lewis SF, Piasecki TM, Fiore MC, Anderson JE, Baker TB. Transdermal nicotine replacement for hospitalized patients: A randomized clinical trial. *Preventive Medicine* 1998;**27**(2):296–303. [MEDLINE: 1998240165]

Miller 1997 ***{published data only}***

* Miller NH, Smith PM, DeBusk RF, Sobel DS, Taylor CB. Smoking cessation in hospitalized patients - Results of a randomized trial. *Archives of Internal Medicine* 1997;**157**:409–15. [MEDLINE: 1997198917]

Taylor CB, Miller NH, Herman S, Smith PM, Sobel D, Fisher L, et al.A nurse-managed smoking cessation program for hospitalized smokers. *American Journal of Public Health* 1996;**86**:1557–60.

Mohiuddin 2007 ***{published data only}***

Mohiuddin SM, Mooss AN, Hunter CB, Grollmes TL, Cloutier DA, Hilleman DE. Intensive smoking cessation intervention reduces mortality in high-risk smokers with cardiovascular disease. *Chest* 2007;**131**:446–52.

Molyneux 2003 ***{published data only}***

Molyneux A, Lewis S, Leivers U, Anderton A, Antoniak M, Brackenridge A, et al.Clinical trial comparing nicotine replacement therapy (NRT) plus brief counselling, brief counselling alone, and minimal intervention on smoking cessation in hospital inpatients. *Thorax* 2003;**58**(6):484–88.

Nagle 2005 ***{published data only}***

Hensley MJ, Nagle AL, Hensley MJ, Schofield MJ, Koschel A. Efficacy of a brief nurse provided nicotine management intervention for hospitalised smokers. *Respirology* 2002;**7**:A12.

* Nagle AL, Hensley MJ, Schofield MJ, Koschel AJ. A randomised controlled trial to evaluate the efficacy of a nurse-provided intervention for hospitalised smokers. *Australian and New Zealand Journal of Public Health* 2005;**29**(3):285–91.

Ortigosa 2000 ***{published data only}***

* Ortigosa AM, Gomez FJO, Ramalle-Gomara E, Reta IS, Esteban MVF, Diaz MQ. Efficacy of an intervention in smoking cessation in patients with myocardial infarction [Eficacia de una intervencion para dejar de fumar en pacientes con infarto de miocardio]. *Medicina Clinica (Barc)* 2000;**114**:209–10.

Pedersen 2005 ***{published data only}***

Pedersen L, Johansen S, Eksten L. [Smoking cessation among patients with acute heart disease. A randomised intervention project] (Danish). *Ugeskrift for Laeger* 2005;**167**(33):3044–7.

Pederson 1991 ***{published data only}***

* Pederson LL, Wanklin JM, Lefcoe NM. The effects of counseling on smoking cessation among patients hospitalized with chronic obstructive pulmonary disease: a randomized clinical trial. *International Journal of the Addictions* 1991;**26**(1):107–19. [MEDLINE: 1991293892]

Pelletier 1998 ***{published data only}***

* Pelletier JG, Moisan JT. Smoking cessation among hospitalized patient: A quasi-experimental study in Quebec. *Canadian Journal of Public Health* 1998;**89**:264–9.

Quist-Paulsen 2003 *{published data only}*

Brown DW. Nurse-led intervention increases smoking cessation among people with coronary heart disease. *Evidence Based Healthcare* 2004;**8**:128–30.

Quist-Paulsen P, Bakke PS, Gallefoss F. Does smoking cessation improve quality of life in patients with coronary heart disease?. *Scandinavian Cardiovascular Journal* 2006;**40**(1):11–6.

Quist-Paulsen P, Bakke PS, Gallefoss F. Predictors of smoking cessation in patients admitted for acute coronary heart disease. *European Journal of Cardiovascular Prevention & Rehabilitation* 2005;**12**(5):472–7.

* Quist-Paulsen P, Gallefoss F. Randomised controlled trial of smoking cessation intervention after admission for coronary heart disease. *BMJ* 2003;**327**(7426):1254–7.

Quist-Paulsen P, Lydersen S, Bakke PS, Gallefoss F. Cost effectiveness of a smoking cessation program in patients admitted for coronary heart disease. *European Journal of Cardiovascular Prevention & Rehabilitation* 2006;**13**(2):274–80.

Reid 2003 *{published data only}*

Reid R, Pipe A, Higginson L, Johnson K, D'Angelo MS, Cooke D, et al.Stepped care approach to smoking cessation in patients hospitalized for coronary artery disease. *Journal of Cardiopulmonary Rehabilitation* 2003;**23**(3):176–82.

Rigotti 1994 *{published data only}*

* Rigotti NA, McKool KM, Shiffman S. Predictors of smoking cessation after coronary artery bypass graft surgery. Results of a randomized trial with 5-year follow-up. *Annals of Internal Medicine* 1994;**120**(4):287–93. [MEDLINE: 94121392]

Rigotti 1997 *{published data only}*

* Rigotti NA, Arnsten JH, McKool KM, Wood Reid KM, Pasternak RC, Singer DE. Efficacy of a smoking cessation program for hospital patients. *Archives of Internal Medicine* 1997;**157**(22): 2653–60. [MEDLINE: 1998189721]

Rigotti 2006 *{published data only}*

* Rigotti NA, Thorndike AN, Regan S, McKool K, Pasternak RC, Chang Y, et al.Bupropion for smokers hospitalized with acute cardiovascular disease. *American Journal of Medicine* 2006;**119**(12): 1080–7.

Thorndike A, Rigotti N, Regan S, Pasternak R, McKool K, Emmons K, Singer D. Depression and relapse to smoking in patients hospitalized with acute cardiovascular disease [POS3-094]. Society for Research on Nicotine and Tobacco 11th Annual Meeting, 20-23 March; Prague, Czech Republic. 2005:137.

Simon 1997 *{published data only}*

* Simon JA, Solkowitz SN, Carmody TP, Browner WS. Smoking cessation after surgery - A randomized trial. *Archives of Internal Medicine* 1997;**157**:1371–6. [MEDLINE: 1997344630]

Simon 2003 *{published data only}*

Simon JA, Carmody TP, Hudes ES, Snyder E, Murray J. Intensive smoking cessation counseling versus minimal counseling among hospitalized smokers treated with transdermal nicotine replacement: a randomized trial. *American Journal of Medicine* 2003;**114**(7):555–62.

Stevens 1993 *{published data only}*

* Stevens VJ, Glasgow RE, Hollis JF, Lichtenstein E, Vogt TM. A smoking-cessation intervention for hospital patients. *Medical Care* 1993;**31**(1):65–72. [MEDLINE: 93108828]

Stevens 2000 *{published data only}*

Allaway L, Stevens VJ. Respiratory care practitioners can provide effective smoking-cessation counseling to hospitalized smokers. *Respiratory Care* 1996;**41**(11):1026–9.

* Stevens VJ, Glasgow RE, Hollis JF, Mount K. Implementation and effectiveness of a brief smoking-cessation intervention for hospital patients. *Medical Care* 2000;**38**(5):451–9.

Taylor 1990 *{published data only}*

* Taylor CB, Houston-Miller NH, Killen JD, DeBusk RF. Smoking cessation after acute myocardial infarction: Effects of a nurse-managed intervention. *Annals of Internal Medicine* 1990;**113**: 118–23. [MEDLINE: 90297441]

Vial 2002 *{published data only}*

Vial RJ, Jones TE, Ruffin RE, Gilbert AL. Smoking cessation program using nicotine patches linking hospital to the community. *Journal of Pharmacy Practice and Research* 2002;**32**(1):57–62.

References to studies excluded from this review

Agewall 2001 *{published data only}*

Agewall S, Fagerberg B, Berglund G, Schmidt C, Wendelhag I, Wikstrand J. Multiple risk intervention trial in high risk hypertensive men: comparison of ultrasound intima-media thickness and clinical outcome during 6 years of follow-up. *Journal of Internal Medicine* 2001;**249**(4):305–14.

Allen 1998 *{published data only}*

* Allen B, Pederson LL, Leonard EH. Effectiveness of physicians-in-training counseling for smoking cessation in African Americans. *Journal of the National Medical Association* 1998;**90**:597–604. [MEDLINE: 1999020565]

Asfar 2005 *{published data only}*

Asfar T, Ward KD, Vander Weg MW, Hammal F, Eissenberg T, Maziak W. Characteristics of completers and dropouts in Syria's first smoking cessation trial [POS2-132]. Society for Research on Nicotine and Tobacco 11th Annual Meeting, 20-23 March 2005; Prague, Czech Republic. 2005:110.

Becker 2003 *{published data only}*

Becker BM, Bock BC, Partridge R. Smoking cessation interventions in the emergency department for smokers with chest pain. *Academic Emergency Medicine* 2003;**10**(5):507.

Bize 2006 *{published data only}*

Bize R, Stoianov R, Ruffieux C, Ghali W, Paccaud F, Cornuz J. Effectiveness of a low-intensity smoking cessation intervention for hospitalized patients. *European Journal of Cancer Prevention* 2006; **15**(5):464–70.

Blom 2005 *{published data only}*

Blom RA, Mulder M, van Spiegel PI, Christenhusz LCA. Determinants of successful quitting in patients with COPD [POS3-088]. Society for Research on Nicotine and Tobacco 11th Annual Meeting. 20-23 March; Prague, Czech Republic. 2005:135.

BTS 1983 *{published data only}*

* British Thoracic Society. Comparison of four methods of smoking withdrawal in patients with smoking related diseases. *British Medical Journal* 1983;**286**:595–7.

British Thoracic Society. Smoking withdrawal in hospital patients: factors associated with outcome. *Thorax* 1984;**39**:651–6.

Burt 1974 *{published data only}*

* Burt A, Illingworth D, Shaw T, Thornley P, White P, Turner R. Stopping smoking after myocardial infarction. *Lancet* 1974;**1** (7582):304–6.

Chan 2003 *{published data only}*

Chan SSC, Chan SC, Lam TH, Lau C-P. The effectiveness of a stage-matched smoking cessation intervention to cardiac patients: Preliminary results of a randomized controlled trial (POS3-97). Society for Research on Nicotine and Tobacco 9th Annual Meeting February 19-22 New Orleans, Louisiana Rapid Communications Posters. 2003.

Choo 2004 *{published data only}*

Choo YM, Ong KC, Lee WK. Effectiveness of a smoking cessation program among hospitalized patients in Singapore. *Chest* 2004;**126** (4):713S.

Colby 1998 *{published data only}*

* Colby SM, Monti PM, Barnett NP, Rohsenow DJ, Weissman K, Spirito A, et al.Brief motivational interviewing in a hospital setting for adolescent smoking: a preliminary study. *Journal of Consulting and Clinical Psychology* 1998;**66**(3):574–8. [MEDLINE: 98306868]

Cole 2001 *{published data only}*

Cole TK. Smoking cessation in the hospitalized patient using the transtheoretical model of behavior change. *Heart & Lung* 2001;**30** (2):148–58.

Dale 1995 *{published data only}*

* Dale LC, Hurt RD, Offord KP, Lawson GM, Croghan IT, Schroeder DR. High-dose nicotine patch therapy - percentage of replacement and smoking cessation. *JAMA* 1995;**274**(17):1353–8. [MEDLINE: 1996102382]

Davies 2005 *{published data only}*

Davies SL, Kohler CL, Fish L, Taylor BE, Foster GE, Annang L. Evaluation of an intervention for hospitalized African American smokers. *American Journal of Health Behavior* 2005;**29**(3):228–39.

Elsony 2005 *{published data only}*

Elsony A, Salieh M, Elhaj H, Adam K. Brief smoking cessation intervention with tuberculosis patients in Sudan [PA2-5]. Society for Research on Nicotine and Tobacco 11th Annual Meeting, 20-23 March 2005; Prague, Czech Republic. 2005:22.

Emmons 2000 *{published data only}*

Emmons KM, Goldstein MG, Roberts M, Cargill B, Sherman CB, Millman R, et al.The use of nicotine replacement therapy during hospitalization. *Annals of Behavioral Medicine* 2000;**22**(4):325–9.

Fung 2005 *{published data only}*

Fung PR, Snape-Jenkinson SL, Godfrey MT, Love KW, Zimmerman PV, Yang IA, et al.Effectiveness of hospital-based smoking cessation. *Chest* 2005;**128**(1):216–23.

Galvin 2001 *{published data only}*

Galvin K, Webb C, Hillier V. Assessing the impact of a nurse-led health education intervention for people with peripheral vascular disease who smoke: the use of physiological markers, nicotine dependence and withdrawal. *International Journal of Nursing Studies* 2001;**38**(1):91–105.

Gariti 2002 *{published data only}*

Gariti P, Alterman A, Mulvaney F, Mechanic K, Dhopesh V, Yu E, et al.Nicotine intervention during detoxification and treatment for other substance use. *American Journal of Drug and Alcohol Abuse* 2002;**28**(4):673–81.

Gritz 1993 *{published data only}*

* Gritz ER, Carr CR, Rapkin D, Abemayor E, Chang LJ, Wong WK, et al.Predictors of long-term smoking cessation in head and neck cancer patients. *Cancer Epidemiology, Biomarkers & Prevention* 1993;**2**(3):261–70. [MEDLINE: 93306182]

Gritz ER, Ward PH, Beumer J, Carr CR, Rapkin DA. Increasing adherence to a provider-implemented smoking cessation intervention for head and neck cancer patients. In: Association of Community Cancer Centers, editor(s). *Advances in Cancer Control: Screening and Prevention*. New York: Wiley-Liss, 1990:83–93.

Hand 2002 *{published data only}*

Hand S, Edwards S, Campbell IA, Cannings R. Controlled trial of three weeks nicotine replacement treatment in hospital patients also given advice and support. *Thorax* 2002;**57**(8):715–8.

Hilleman 2004 *{published data only}*

Hilleman DE, Mohiuddin SM, Packard KA. Comparison of conservative and aggressive smoking cessation treatment strategies following coronary artery bypass graft surgery. *Chest* 2004;**125**(2): 435–8.

Jeong 2002 *{published data only}*

Jeong HS, Chae JS, Moon JS, Yoo YS. An individualized teaching program for atherosclerotic risk factor reduction in patients with myocardial infarction. *Yonsei Medical Journal* 2002;**43**(1):93–100.

Johnson 1999 *{published data only}*

* Johnson JL, Budz B, Mackay M, Miller C. Evaluation of a nurse-delivered smoking cessation intervention for hospitalized patients with cardiac disease. *Heart & Lung* 1999;**28**(1):55–64.

Jones 2001 *{published data only}*

Jones C, Griffiths RD, Skirrow P, Humphris G. Smoking cessation through comprehensive critical care. *Intensive Care Medicine* 2001; **27**(9):1547–9.

Joseph 2004 *{published data only}*

Joseph A, Lexau B, Willenbring M, Nugent S, Nelson D. Factors associated with readiness to stop smoking among patients in treatment for alcohol use disorder. *American Journal on Addictions* 2004;**13**(4):405–17.

Joseph 2005 *{published data only}*

* Joseph A, Hecht S, Murphy S, Gross M, Lando H, Bliss R, et al.A randomized controlled trial of smoking reduction in heart disease patients. *Nicotine & Tobacco Research* 2005;**7**(4):687.

Joseph A, Hecht S, Murphy S, Gross M, Lando H, Bliss R, et al.A randomized controlled trial of smoking reduction in heart disease patients [PA2-4]. Society for Research on Nicotine and Tobacco 11th Annual Meeting, 20-23 March 2005; Prague, Czech Republic. 2005:22.

Kalman 2001 *{published data only}*

Kalman D, Hayes K, Colby SM, Eaton CA, Rohsenow DJ, Monti PM. Concurrent versus delayed smoking cessation treatment for

persons in early alcohol recovery - A pilot study. *Journal of Substance Abuse Treatment* 2001;**20**(3):233–8.

Lacasse 2005 *{unpublished data only}*
Lacasse Y, Lamontagne R, Martin S, Arsenault M. Randomized trial of a smoking cessation intervention in patients hospitalized in a cardio-respiratory institute. *Chest* 2005;**128**(4 (Suppl)):204S.

Lisspers 1999 *{published data only}*
Lisspers J, Sundin O, HofmanBang C, Nordlander R, Nygren A, Ryden L, et al.Behavioral effects of a comprehensive, multifactorial program for lifestyle change after percutaneous transluminal coronary angioplasty: a prospective, randomized, controlled study. *Journal of Psychosomatic Research* 1999;**46**:143–54.

McHugh 2001 *{published data only}*
McHugh F, Lindsay GM, Hanlon P, Hutton I, Brown MR, Morrison C, et al.Nurse-led shared care for patients on the waiting list for coronary artery bypass surgery: a randomised controlled trial. *Heart* 2001;**86**:317–23.

Meenan 1998 *{published data only}*
* Meenan RT, Stevens VJ, Hornbrook MC, La Chance PA, Glasgow RE, Hollis JF, et al.Cost-effectiveness of a hospital-based smoking cessation intervention. *Medical Care* 1998;**36**(5):670–8. [MEDLINE: 1998255497]

Moller 2002 *{published data only}*
Moller AM, Villebro N, Pedersen T, Tonnesen H. Effect of preoperative smoking intervention on postoperative complications: a randomised clinical trial. *Lancet* 2002;**359**(9301):114–7.

Ong 2005 *{published data only}*
Ong KC, Cheong GN, Prabhakaran GL, Earnest A. Predictors of success in smoking cessation among hospitalized patients. *Respirology* 2005;**10**(1):63–9.

Ranote 2003 *{unpublished data only}*
Ranote P, Smith M, Smith S, Ballance K, Miles J. Effects of an immediate smoking cessation programme on long-term quit rates in patients admitted to acute medical wards of a UK general hospital [abstract]. American Thoracic Society 99th International Conference. 2003:A027.

Ratner 2004 *{published data only}*
Ratner PA, Johnson JL, Richardson CG, Bottorff JL, Moffat B, Mackay M, et al.Efficacy of a smoking-cessation intervention for elective-surgical patients. *Research in Nursing and Health* 2004;**27**(3):148–61.

Reid 2006 *{published data only}*
Reid RD, Pipe AL, Quinlan B. Promoting smoking cessation during hospitalization for coronary artery disease. *Canadian Journal of Cardiology* 2006;**22**:775–80.

Richman 2000 *{published data only}*
Richman PB, Dinowitz S, Nashed AH, Eskin B, Sylvan E, Allegra C, et al.The emergency department as a potential site for smoking cessation intervention: A randomized, controlled trial. *Academic Emergency Medicine* 2000;**7**(4):348–53.

Rissel 2000 *{published data only}*
Rissel C, Salmon A, Hughes AM. Evaluation of a (pilot) stage-tailored brief smoking cessation intervention among hospital patients presenting to a hospital pre-admission clinic. *Australian Health Review* 2000;**23**(3):83–93.

Schmitz 1999 *{published data only}*
* Schmitz JM, Spiga R, Rhoades HM, Fuentes F, Grabowski J. Smoking cessation in women with cardiac risk: a comparative study of two theoretically based therapies. *Nicotine & Tobacco Research* 1999;**1**:87–94.

Smith 2002 *{published data only}*
Smith PM, Reilly KR, Houston-Miller N, DeBusk RF, Taylor CB. Application of a nurse-managed inpatient smoking cessation program. *Nicotine & Tobacco Research* 2002;**4**(2):211–22.

Strecher 1985 *{published data only}*
* Strecher VJ, Becker MH, Kirscht JP, Eraker SA, Graham-Tomasi RP. Evaluation of a minimal-contact smoking cessation program in a health care setting. *Patient Education and Counselling* 1985;**7**:395–407.

Takahashi 2006 *{published data only}*
Takahashi K, Sako H, Sasa H, Sako H, Iwata M, Hashimoto I, et al.A pilot study on inducement of smoking cessation by a simple 5A (asking, advice, assess, assist, and arrange) approach at outpatient clinics. *Asian Pacific Journal of Cancer Prevention* 2006;**7**(1):131–5.

Taylor 2005 *{published data only}*
Taylor CB, Miller NH, Cameron RP, Fagans EW, Das S. Dissemination of an effective inpatient tobacco use cessation program. *Nicotine & Tobacco Research* 2005;**7**:129–37.

Wakefield 2004 *{published data only}*
Wakefield M, Olver I, Whitford H, Rosenfeld E. Motivational interviewing as a smoking cessation intervention for patients with cancer: randomized controlled trial. *Nursing Research* 2004;**53**(6):396–405.

Warner 2005 *{published data only}*
Warner DO, Patten CA, Ames SC, Offord KP, Schroeder DR. Effect of nicotine replacement therapy on stress and smoking behavior in surgical patients. *Anesthesiology* 2005;**102**(6):1138–46.

Wewers 1994 *{published data only}*
* Wewers ME, Bowen JM, Stanislaw AE, Desimone VB. A nurse-delivered smoking cessation intervention among hospitalized postoperative patients--influence of a smoking- related diagnosis: a pilot study. *Heart & Lung* 1994;**23**:151–6. [MEDLINE: 94266626]

Wolfenden 2005 *{published data only}*
Wolfenden L, Wiggers J, Knight J, Campbell E, Rissel C, Kerridge R, et al.A programme for reducing smoking in pre-operative surgical patients: randomised controlled trial. *Anaesthesia* 2005;**60**(2):172–9.

References to studies awaiting assessment

Caruthers 2006 *{unpublished data only}*
Caruthers D, Perkins K, Sereika S, Albrecht S, Dunbar-Jacob J. Enhancing tobacco abstinence following hospitalization (POS1-59). Society for Research on Nicotine and Tobacco 12th Annual Meeting February 15-18, Orlando, Florida. 2006.

Kroeger 2004 *{published data only}*
Kroeger C, Metz K, Buhler A. Smoking cessation in patients treated in rehabilitation hospitals. *Suchtmedizin in Forschung und Praxis* 2004;**6**(1):61–6.

Additional references

Cochrane Handbook

Higgins JPT, Green S, editors. Cochrane Handbook for Systematic Reviews of Interventions 4.2.6 [updated September 2006]. http://www.cochrane.org/resources/handbook/hbook.htm (accessed 18th April 2007) 2006.

Higgins 2003

Higgins JP, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analyses. *BMJ* 2003;**7414**:557–60.

Hughes 2007

Hughes JR, Stead LF, Lancaster T. Antidepressants for smoking cessation. *Cochrane Database of Systematic Reviews* 2007, Issue 1. [DOI: 10.1002/14651858.CD000031]

Ockene 1992

Ockene JK, Kristeller J, Goldberg R, Ockene IS, Merriam P, Barrett S, et al.Smoking cessation and severity of disease: The coronary artery smoking intervention study. *Health Psychology* 1992;**11**: 119–26.

Schulz 1995

Schulz KF, Chalmers I, Hayes RJ, Altman DG. Empirical evidence of bias: Dimensions of methodological quality associated with estimates of treatment effects in controlled trials. *JAMA* 1995;**273**: 408–12.

Silagy 2004a

Silagy C, Stead LF. Physician advice for smoking cessation. *Cochrane Database of Systematic Reviews* 2004, Issue 4. [DOI: 10.1002/14651858.CD000165]

Silagy 2004b

Silagy C, Lancaster T, Stead L, Mant D, Fowler G. Nicotine replacement therapy for smoking cessation. *Cochrane Database of Systematic Reviews* 2004, Issue 3. [DOI: 10.1002/14651858.CD000146]

Yusuf 1985

Yusuf S, Peto R, Lewis J, Collins R, Sleight P. Beta blockade during and after myocardial infarction: An overview of the randomized trials. *Progress in Cardiovascular Diseases* 1985;**27**(5):335–71.

References to other published versions of this review

Munafo 2001

Munafo M, Rigotti N, Lancaster T, Stead L, Murphy M. Interventions for smoking cessation in hospitalised patients: a systematic review. *Thorax* 2001;**56**:656–63.

Rigotti 2001

Rigotti NA, Munafo MR, Murphy MF, Stead LF. Interventions for smoking cessation in hospitalised patients. *Cochrane Database of Systematic Reviews* 2001, Issue 2. [DOI: 10.1002/14651858.CD001837]

Rigotti 2003

Rigotti NA, Munafo MR, Murphy MF, Stead LF. Interventions for smoking cessation in hospitalised patients. *Cochrane Database of Systematic Reviews* 2003, Issue 1. [DOI: 10.1002/14651858.CD001837]

* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[ordered by study ID]*

Bolman 2002

Methods	Country: Netherlands Recruitment: Cardiac ward patients in 11 hospitals Selection: All eligible patients asked to participate by ward nurses. Randomization: By hospital, 4/11 selected condition (exclusion of these did not change results). Possibility of recruitment bias cannot be excluded although control ward nurses supposed to be blind to condition
Participants	Participants: 789 smokers who had smoked in previous week. 25 deaths, 38 refusals, 64 missing baseline data excluded from analysis denominator. Number smoked: not stated. Age: 56 yrs average. Therapists: Physician, nurse.
Interventions	1. Intervention (5 hospitals): Cardiologist advice, 15-30 min counselling from ward nurse. Follow up: Cardiologist prompted to advise at 4-6 wk clinic but no counselling provided by team. Self-help materials. No pharmacotherapy. [Intensity 2] 2. Control: Usual care NRT: No.
Outcomes	Abstinence: Sustained at 12m Validation: None. Died: 25 at 12m
Notes	Randomized by hospital but not fully randomized, 4 of 11 hospitals self-selected intervention group. Included in CVD subcategory Numbers in meta-analysis adjusted to approximate the OR reported from a logistic regression analysis on continuous abstinence (OR 1.17, 90% CI 0.85 to 1.61)

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Campbell 1991

Methods	Country: UK Recruitment: Inpatients with smoking-related diseases Selected: Invited to participate. Randomization: Method not stated
Participants	Participants: 212 current smokers. Number smoked: not stated. Age: not stated.

Campbell 1991 (*Continued*)

	Most had heart or lung disease. Therapists: Physician and non-specialist counsellor.
Interventions	1. Intervention: Physician advice, inpatient counselling (1x, total not stated, type not stated). NRT (gum, dose 2-4 mg, for 3m) Follow up (5x at 2, 3, 5 wks, 3m, 6m in clinic by counsellor) 2. Control: Other (as above, placebo NRT gum) [Intensity 4 for both arms] NRT: Yes
Outcomes	Abstinence: Sustained abstinence at 6m, 12m. Validation: Expired air CO. Died: None reported.
Notes	Not included in analysis by counselling intensity because arms differed only by use of NRT Heart disease, lung disease and other given separately in analysis by diagnosis.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Campbell 1996

Methods	Country: UK Recruitment: Inpatients with respiratory or cardiovascular disease Selected: Prepared to make quit attempt Randomization: Method not stated
Participants	Participants: 62 current smokers. Number smoked: not stated. Age: not stated. Approx. 75% had respiratory disease. Therapists: Physician and non-specialist counsellor.
Interventions	1. Intervention: Physician advice. Counselling (1x, total 30-60 mins, type information). NRT (patch, dose 17.5-35 mg, for 12 wks). Follow up (4x at 2, 4, 8, 12 wks in clinic by counsellor) 2. Control: Other (as above, placebo NRT patch) [Intensity 4 for both arms] NRT: Yes
Outcomes	Abstinence: Sustained abstinence at 3, 6, 12m. Validation: Expired air CO. Died: None reported.
Notes	Only data on inpatients extracted from study. Included in respiratory disease subcategory.

Risk of bias

Item	Authors' judgement	Description

Campbell 1996 (*Continued*)

Allocation concealment?	Unclear	B - Unclear

CASIS 1992

Methods	Country: USA Recruitment: Inpatients with coronary artery stenosis confirmed by catheterisation. Selected: Invited to participate. Randomization: Method not stated.
Participants	Participants: 267 current smokers or recent quitters (50%, defined as at least 5 cig/day at any time in previous 2m). Number smoked: 25 cig/day. Age: 53 yrs average. 78 had acute MI, 21 recent MI, 152 other symptoms. Therapists: Masters level health educators.
Interventions	1. Intervention: Counselling (2x, total 40 mins, type not stated). Self-help materials, relaxation tapes. Follow up (4x at 1, 3 wks and 3m if quit or 2,4m if did not quit, by telephone) [Intensity 4] 2. Control: Advice only NRT: No
Outcomes	Abstinence: Sustained abstinence at 6m, 12m Validation: Expired air CO. Died: None reported.
Notes	Patients admitted with MI more likely to be quitters at 6m (74%). Evidence of interaction between intervention and illness. Included in CVD subcategory

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Chouinard 2005

Methods	Country: Canada Recruitment: Inpatients with cardiovascular disease (MI, angina, CHF) or PVD Selected: Not by motivation Randomization: In blocks of 3-6, sealed envelope
Participants	Participants: 168 past-month smokers. Number smoked: not stated. Age: 56 yrs av. Therapist: nurse

Chouinard 2005 (*Continued*)

Interventions	1. Intervention 1: Counselling by research nurse (1x, 10-60 mins, av. 40 min, tailored to stage of change), 23% used pharmacotherapy. [Intensity 2] 2. Intervention 2: As 1 plus telephone follow up, 6 calls over 2m post-discharge [Intensity 4] 3. Control: cessation advice NRT: Yes (partial)
Outcomes	Abstinence: Sustained abstinence at 2 & 6 months Validation: Urine cotinine or expired air CO Died: 3 in 1. 1 in 2. 0 in 3.
Notes	Two interventions compared separately to control in intensity subgroups Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Croghan 2005

Methods	Country: USA Recruitment: Inpatients having surgical resection of lung or oesophageal cancers Selected: unclear Randomization: Method not stated
Participants	Participants: 30 smokers admitted for surgery for newly diagnosed lung or oesophageal cancer. Number smoked: not stated. Age: not stated. Therapist: doctor, nurse and trained smoking counsellor
Interventions	1. Intervention: Physician advice from thoracic surgeons and study nurses. Counselling (1x 45 min. Stage of change assessed, individualized pharmacotherapy) [Intensity 2] 2. Control: Physician advice only NRT: Yes
Outcomes	Abstinence: 7-day PP at 6m Validation: expired air CO or saliva tobacco alkaloid Died: 1 in 6m
Notes	

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

De Busk 1994

Methods	Country: USA Recruitment: Inpatients with acute MI. Selected: Invited to participate if prepared to make a quit attempt Randomization: Method not stated.
Participants	Participants: 252 current smokers or recent quitters (proportion not stated, defined as any tobacco use in previous 6m). Number smoked: not stated. Age: 57 yrs av. First year after MI. Therapists: Physician and nurse.
Interventions	1. Intervention: Physician advice; Counselling (1x, total not stated, type not stated); NRT ('reserved for highly-addicted patients'); Other (self-help materials, relaxation tapes); Follow up (8x at 48 hr, 1 wk, and every month for 6m by telephone) [Intensity 4] 2. Control: Advice only NRT: Yes (partial)
Outcomes	Abstinence: Sustained abstinence at 6m, 12m. Validation: Expired air CO and plasma cotinine. Died: None reported.
Notes	Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Dornelas 2000

Methods	Country: USA Recruitment: Inpatients with acute MI. Selected: Invited to participate. Randomization: Number drawn from envelope
Participants	Participants: 100 current smokers. Number smoked: 29 cig/day. Age: 54 yrs av. Therapists: Psychologist.
Interventions	1. Intervention: Counselling (1x, total 20 mins, type behavioural); Follow up (7x at <1, 4, 8, 12, 16, 20, 26 wk by telephone) [Intensity 4] 2. Control: Advice only NRT: No

Dornelas 2000 (*Continued*)

Outcomes	Abstinence: PP at 12m. Validation: Significant other Died: 5 at 12m.
Notes	Validation by significant other only in 70% of cases. Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Feeney 2001

Methods	Country: Australia Recruitment: Inpatients admitted for acute MI to coronary care unit of 1 hospital Selected: Invited to participate. Randomization: sealed envelopes
Participants	Participants: 198 current smokers (smoked in past week). Number smoked: not stated. Age: 54 yrs av. Therapists: Physician and nurse.
Interventions	1. Intervention: Physician advice to quit, nurse counselling (time not specified, type cognitive/ behavioural) ; Follow up (8x at 1,2,3,4 wks and 2,3,6,12m by telephone) [Intensity 4] 2. Control: In hospital: same as intervention (physician advice to quit, nurse counselling); follow-up counselling available but no proactive contact; [Intensity 2] NRT: No
Outcomes	Abstinence: Sustained abstinence at 1m,3m, 12m. Validation: Urinary cotinine (limit not stated) Died: 9 at 12m.
Notes	Very large treatment effect (31/92 vs 1/97) but risk of bias due to higher loss to follow up in control group. Excluded from meta-analyses because of heterogeneity.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Froelicher 2004

Methods	Country: USA Recruitment: Inpatients with CVD or PVD admitted to 10 hospitals Selected: Willing to make quit attempt Randomization: stratified by hospital
Participants	Participants: 277 current smokers or recent quitters (smoked in past month), willing to make serious quit attempt at discharge. Gender: All females. Number smoked: 20 cig/day. Age: 61 yrs av. Therapists: Physician and nurse.
Interventions	1. Intervention: Physician advice to quit, nurse counselling (30-45 mins, type cognitive/behavioural and relapse prevention); Follow up (5x at 2,7,21,28,90 days by telephone (5-10 min/call) [Intensity 4] 2. Control: modified usual care (physician advice + booklet) NRT: Patch or gum offered to selected women after discharge who had relapsed and wanted to try to quit (pharmacotherapy used by 20% of intervention and 23% of control group).
Outcomes	Abstinence: 7-day PP at 12m. Validation: Saliva cotinine < 14 ng/ml OR family/friend verification Died: 11 at 12m.
Notes	Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Hajek 2002

Methods	Country: UK Recruitment: Inpatients with acute MI. Selected: Invited to participate. Randomization: serially numbered opaque sealed envelopes
Participants	Participants: 540 current smokers. Number smoked: 23 cig/day. Age: 56 yrs av. Therapists: cardiac rehab nurse.
Interventions	1. Intervention: Nurse advice. Counselling (1x, total 20-30 min). Self-help materials. [Intensity 2] 2. Control: Brief advice and booklet NRT: No
Outcomes	Abstinence: PP at 12m, with visit to self-reported non-smoker. Validation: Expired air CO and salivary cotinine.

Hajek 2002 (*Continued*)

	Died: 35 at 12m.	
Notes	Included in CVD subcategory	
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Hasuo 2004

Methods	Country: Japan Recruitment: Inpatients (all diagnoses) to 1 hospital Selected: Intending to be quit on day of discharge Randomization: By hospital clerk using computer program; stratified by smoking status, FTND, and self-efficacy	
Participants	Participants: 120 current smokers or recent quitters (smoked in past month) Diagnoses include cancer (n=37), cardiac (n=57) Number smoked: not stated. Age: not stated. Therapists: Nurse.	
Interventions	1. Intervention: nurse counselling (3 x 20 min sessions). Follow up (3x at 7, 21, 42 days by telephone) (5 min/call) [intensity 4] 2. Control: In hospital: same as intervention (nurse sessions, 3 x 20 min each) but no follow-up contact [Intensity 2] NRT: No	
Outcomes	Abstinence: Abstinence at 12m (type not stated). Validation: urinary cotinine at 12m (not clear whether results are self-report or cotinine-validated) Died: 6 at 12m.	
Notes		
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Hennrikus 2005

Methods	Country: USA Recruitment: Inpatients (all diagnoses) admitted to 4 hospitals Selected: Invited to participate. Randomization: by research assistant from a list of randomly ordered assignments, but blinding at time of enrolment not specified
Participants	Participants: 2095 current smokers (smoked in past week and considered self to be regular smoker in month before admission). Number smoked: not stated. Age: 47 yrs av. Therapists: Physician and nurse.
Interventions	1. Intervention: Physician advice to quit (60 seconds) + smoking cessation booklet + additional mailed booklet after discharge. [Intensity 1] 2. Intervention: Physician advice to quit (60 seconds) + nurse counselling (motivational interviewing and relapse prevention) for 20 min. av (note: 43% of counselling sessions conducted after discharge by telephone rather than at bedside). Follow up: 3-6 phone calls over 6m (10 min/call median). [Intensity 4] 3. Control: modified usual care: smoking cessation booklet in hospital NRT: No
Outcomes	Abstinence: 7-day PP at 12m. Validation: Saliva cotinine (<15 ng/ml) Died: 78 at 12m.
Notes	High and differential levels of refusal to provide validation/mis-reporting

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Lewis 1998

Methods	Country: USA Recruitment: Inpatients excluding certain cardiac conditions. Selected: Prepared to make quit attempt. Randomization: Computer-generated code.
Participants	Participants: 185 current smokers. Number smoked: 24 cig/day. Age: 43 yrs av. 12 ICD-9 diagnostic categories. Therapists: Physician and nurse.
Interventions	1. Intervention: Physician advice. Counselling (1x, total 2-3 mins, type information). NRT (patch, dose 22mg, for 3 wks + 11 mg, for 3 wks). Self-help materials. Follow up (4x at 1,3,6 wks, 6m by telephone). [Intensity 4]

Lewis 1998 (*Continued*)

	2. Intervention: Physician advice. Counselling (1x, total 2-3 mins, type information). Placebo patch. Self-help materials. Follow up (4x at 1,3,6 wks, 6m by telephone). [Intensity 4] 3. Control: Advice only NRT: Yes
Outcomes	Abstinence: PP at 6m. Validation: Expired air CO. Died: None reported.
Notes	1 vs 2 for effect of NRT. 1+2 vs 3 for behavioural counselling intervention analysis. Highest quit rates found in patients with respiratory disease.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Miller 1997

Methods	Country: USA Recruitment: Inpatients excluding obstetric and psychiatric patients. Selected: Prepared to make quit attempt, those wishing to do so alone excluded. Randomization: Sealed envelope.
Participants	Participants: 1942 current smokers. Number smoked: 20 cig/day. Age: 51 yrs av. 32% with cardiovascular, 12% pulmonary diagnosis. Therapists: Physician and nurse counsellor.
Interventions	1. Intervention: Physician advice. Counselling (1x, total 30 mins, type behavioural). Self-help materials, relaxation tapes, video. Follow up (4x at 48hr, 1, 3 wks, 3m by telephone) [Intensity 4] 2. Intervention: Physician advice. Counselling (1x, total 30 mins, type behavioural). Self-help materials, relaxation tapes, video. Follow up (1x at 48 hr by telephone) [Intensity 3] 3. Control: Advice only NRT: No
Outcomes	Abstinence: Sustained abstinence at 3, 6 & 12 months. Validation: Plasma cotinine or family member corroboration. Died: 82 at 12 mo.
Notes	1 vs 3 in intensive comparison, 2 vs 3 in minimal comparison 12 months abstinence (PP) 1+2 vs 3 separately for cardiovascular, pulmonary and other diagnosis.

Risk of bias

Item	Authors' judgement	Description

Miller 1997 (*Continued*)

Allocation concealment?	Yes	A - Adequate

Mohiuddin 2007

Methods	Country: USA Recruitment: Inpatients with diagnosis of acute coronary syndrome (including MI) or decompensated CHF, admitted to CCU of 1 hospital Selected: Invited to participate. Randomization: method not stated
Participants	Participants: 209 current smokers who had smoked for 5+ yrs, FTND>7. Number smoked: 24 cig/day. Age: 55 yrs av. Therapists: Physician and trained tobacco counsellor or nurse.
Interventions	1. Intervention: Counselling (30 mins, type not specified) . Self-help booklet. Free NRT and/or bupropion. Follow up: weekly group meetings (60 min session for up to 3m) with trained tobacco counsellor (content: behavioural counselling, social support, relaxation training, risk factor management). [Intensity 4] 2. Control: same inpatient component as intervention group: counselling (30 mins, type not specified). Self-help booklet. Free NRT and/or bupropion. No follow up offered. [Intensity 2] NRT: NRT or bupropion offered on individualized basis to both groups
Outcomes	Abstinence: Sustained abstinence at 3m, 6m, 12m. (note: sustained abstinence to 24m reported but not used in pooling) Validation: CO Died: 15 at 12m (12 control, 3 intervention).
Notes	1 vs 2 in intensity 4 subgroup. Same in-hospital intervention; differed in follow-up component only. Included in CVD subcategory

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Molyneux 2003

Methods	Country: UK Recruitment: Medical and surgical inpatients admitted to 1 hospital Selected: Invited to participate. Randomization: blocks of 9, method not stated and concealment not described
Participants	Participants: 274 current smokers (smoked in past month). Number smoked: 17 cig/day. Age: 50 yrs av. Therapists: Physician or nurse.

Molyneux 2003 (*Continued*)

Interventions	1. Intervention: brief counselling + booklet, no NRT. No follow up. [Intensity 2] 2. Intervention: brief counselling (20 mins) + booklet + offer of open label NRT x 6 wks (choice of gum, patch, inhalator, lozenge, nasal spray); 96% used some NRT. No follow up. [Intensity 2] 3. Control: usual care NRT: Yes
Outcomes	Abstinence: Sustained abstinence at 3m, 12m. Validation: CO <10 ppm at 12m. Died: not stated (therefore, deaths not excluded from pooled analysis).
Notes	1+2 vs 3 for intensity 2 comparison, 2 vs 1v for NRT comparison

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Nagle 2005

Methods	Country: Australia Recruitment: Inpatients (all diagnoses) admitted to 1 teaching hospital (excluded intensive care units) Selected: Invited to participate. Randomization: stratified by smoking status in past month, blocks of 20, using handheld computer with random number programme
Participants	Participants: 1422 current smokers or quitters (smoked in past 12m). Number smoked: not stated. Age: not stated. Therapists: nurse.
Interventions	1. Intervention: Nurse counselling (2 x 10 min sessions, type: withdrawal symptom management, coping skills) + booklet + offer of NRT in hospital and for 5 days post-discharge (3% received in hospital). Follow up: none. [Intensity 2] 2. Control: modified usual care (Physician advice + booklet) NRT: Yes (partial)
Outcomes	Abstinence: 7-day PP at 12m. (Continuous self-reported abstinence also given) Validation: Saliva cotinine <=15 ng/ml. Died: 28 at 12m.
Notes	Study includes recent quitters (smoked in past year but not in past month); results not stratified by baseline smoking status.

Risk of bias

Item	Authors' judgement	Description

Nagle 2005 (*Continued*)

Allocation concealment?	Yes	A - Adequate

Ortigosa 2000

Methods	Country: Spain Recruitment: Inpatients with acute MI. Selected: Invited to participate. Randomization: Method not stated.
Participants	Participants: 90 current smokers. Number smoked: 25 cig/day. Age: 57 yrs av Therapists: Physician.
Interventions	1. Intervention: Physician advice. Follow up (3x at 2,3,4 wks by telephone). [Intensity 3] 2. Control: Usual care NRT: No
Outcomes	Abstinence: PP at 12m. Validation: Expired air CO. Died: 3 at 12m.
Notes	Intervention not delivered by specialist counsellor. Included in CVD subcategory

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	B - Unclear

Pedersen 2005

Methods	Country: Denmark Recruitment: Inpatients with cardiac disease Selected: Invited to participate. Randomization: sealed envelopes
Participants	Participants: 105 current smokers (not defined). Number smoked: not stated. Age: not stated. Therapists: not stated
Interventions	1. Intervention: usual hospital protocol: advice to quit + information about NRT + NRT available. Follow up: visits 5 times after discharge (30 min/meeting); [Intensity 4] 2. Control: usual care: advice to quit + information about NRT + NRT available. NRT: Yes (partial)

Pedersen 2005 (*Continued*)

Outcomes	Abstinence: Abstinence (probably PP) at 12m. Validation: none. Died: not stated.
Notes	Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Pederson 1991

Methods	Country: USA Recruitment: Inpatients with COPD. Selected: Invited to participate. Randomization: Method not stated.
Participants	Participants: 74 current smokers. Number smoked: 25 cig/day. Age: 53 yrs av. 43% chronic bronchitis, 57% emphysema. Therapists: Non-specialist trained in counselling.
Interventions	1. Intervention: Physician advice (prior to admission). Counselling (3-9x, total 45-160 mins, type information). Self-help materials. No follow up. [Intensity 2] 2. Control: Advice only NRT: No
Outcomes	Abstinence: PP at 6m. Validation: Serum COHb (in sample). Died: 8 at 6m.
Notes	8 deaths excluded, 8 lost to follow up included.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Pelletier 1998

Methods	Country: Canada Recruitment: Inpatients with acute MI. Selected: Invited to participate. Randomization: Quasi-experimental allocation by hospital (one experimental and two control)
Participants	Participants: 504 current smokers. Number smoked: not stated. Age: not stated. Therapists: Nurse.
Interventions	1. Intervention: Physician advice. Self-help materials. [Intensity 2] 2. Control: Usual care NRT: No.
Outcomes	Abstinence: self-reported PP at 12m Validation: None. Died: Not stated.
Notes	Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Quist-Paulsen 2003

Methods	Country: Norway Recruitment: Inpatients admitted to cardiac ward of 1 general hospital (Diagnoses: MI, unstable angina, post-CABG care) Selected: Invited to participate. Randomization: Serially numbered sealed envelopes
Participants	Participants: 240 current smokers (smoked daily before symptoms began). Number smoked: 15 cig/day. Age: 57 yrs av. Therapists: Nurse.
Interventions	1. Intervention: Nurse counselling (1-2 times, time not specified, type: fear arousal, advice on using NRT); Follow up (5x at 2,7,21, days, 3m, 5m) by telephone, clinic visit to cardiac nurse at 6w); NRT: Gum or patch encouraged for subjects with strong urges to smoke in hospital. [Intensity 4] 2. Control: usual care (advice to quit + booklet) NRT: Yes
Outcomes	Abstinence: PP at 12m. Validation: Urine cotinine <2.0 mmol/mol creatinine. Died: 5 at 12m.

Quist-Paulsen 2003 (*Continued*)

Notes	Included in CVD subcategory	
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Reid 2003

Methods	Country: Canada Recruitment: Inpatients with MI, CABG, coronary angioplasty, coronary angiography admitted to 1 cardiac hospital Selected: Motivated to quit Randomization: stratified by diagnosis on admission, degree of nicotine dependence, random numbers table, concealed until after initial counselling	
Participants	Participants: 254 current smokers (smoked in month before admission) Number smoked: not stated. Age: 54 yrs av. Therapists: Nurse.	
Interventions	1. Intervention: Brief nurse counselling at bedside (5-10 mins) + booklet . Follow up: nurse call at 4 wks; if smoking, offered 3 x 20 min in-person counselling sessions (wks 4,8,12) and NRT patch recommended for 8 wks. [Intensity 4] 2. Control: Brief nurse counselling (5-10 mins) + self-help booklet (same in hospital as intervention group) NRT: Yes	
Outcomes	Abstinence: 7-day PP at 12m. Validation: Random sample of 25 self-reported non-smokers asked for CO validation; 91% validated, similar in both arms. Results not adjusted for this. Died: 2 at 12m.	
Notes	Included in CVD subcategory	
Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Rigotti 1994

Methods	Country: USA Recruitment: Inpatients scheduled for CABS. Selected: Invited to participate. Randomization: Method not stated.
Participants	Participants: 87 current smokers or recent quitters (38%, defined as at least 1 pack/cigs in previous 6m). Number smoked: 33 cig/day. Age: 58 yrs av. 82% of all CABG surgery. Therapists: Nurse.
Interventions	1. Intervention: Counselling (3x, total 60 mins, type behavioural). Self-help materials, video. Follow up (1x at 1 wk by telephone). [Intensity 3] 2. Control: Advice only NRT: No
Outcomes	Abstinence: Sustained abstinence at 4m, 8m, 12m. Validation: Salivary cotinine. Died: 7 at 12m.
Notes	Abstinence rates include smokers who had quit prior to surgery. Included in CVD subcategory

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Rigotti 1997

Methods	Country: USA Recruitment: Inpatients in medical or surgical services. Selected: Invited to participate. Randomization: Method not stated.
Participants	Participants: 615 current smokers or recent quitters (proportion not stated, defined as at least 1 cig in previous month). Number smoked: 24 cig/day. Age: 48 yrs av. 23% had cardiac or pulmonary diagnosis. Therapists: Research assistant and nurse.
Interventions	1. Intervention: Physician advice (prompt on chart). Counselling (1x, total 15 mins, type behavioural). Self-help materials. Follow-up (1-3x at 1-3 wks by telephone); [Intensity 3] 2. Control: Usual care NRT: 'some' (around 4%).

Rigotti 1997 (*Continued*)

Outcomes	Abstinence: PP at 6m. Validation: Salivary cotinine. Died: 35 at 12m.
Notes	Randomization by eligibility, then listwise recruitment. 50% of patients could recall being given physician advice.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Rigotti 2006

Methods	Country: USA Recruitment: Inpatients with cardiovascular disease (MI, unstable angina, CHF) or PVD admitted to 5 hospitals. Selected: Invited to participate. Randomization: computer-generated, enrolment staff blind
Participants	Participants: 254 current smokers (smoked in past month) and willing to consider smoking cessation at discharge (no commitment required). Number smoked: 23/21 cig/day. Age: 56 yrs av. Therapists: Nurse.
Interventions	1. Intervention: Bupropion SR 300 mg/day x 12 wks, started in hospital. nurse counselling (30-45 min, type cognitive/behavioural and relapse prevention) in hospital + booklet + follow-up telephone calls (10 min/call) 5x at 2,7,21 days, 2m, 3m. Total counselling time: 85-90 mins. 2. Control: As above, but placebo pill NRT: No
Outcomes	Abstinence: Continuous abstinence at 2,4,12, 52 wks. Validation: Saliva cotinine at 12 and 52 wks, CO at 2 and 4 wks. Died: 2 at 12m.
Notes	Used for bupropion comparison and CV diagnosis, not for comparison of counselling intensity because both groups had same counselling.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Simon 1997

Methods	Country: USA Recruitment: Inpatients undergoing non-cardiac surgery. Selected: Prepared to make quit attempt. Randomization: Sealed envelope.
Participants	Participants: 299 current smokers. Number smoked: 20 cig/day. Age: 54 yrs av. Most cardiovascular or respiratory disease. Therapists: Public health educator.
Interventions	1. Intervention: Inpatient counselling (1x, total 30-60 mins, type behavioural). Self-help materials, video. NRT if no contraindications (gum, dose not stated, for 3m). Follow up (5x at 1-3 wks, 2m, 3m by telephone). [Intensity 4] 2. Control: Advice only NRT: Yes
Outcomes	Abstinence: PP at 12m Validation: Serum or salivary cotinine or corroboration by significant other. Died: 25 at 12m.
Notes	Approx 65% intervention and 17% control used NRT. Not associated with quitting in either group.

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	A - Adequate

Simon 2003

Methods	Country: USA Recruitment: Inpatients (all diagnoses) admitted to 1 hospital for military veterans. Selected: Invited to participate. Randomization: computer algorithm, no information on concealment
Participants	Participants: 223 current smokers (smoked >=20 cigarettes in wk before admission), contemplation or action stage of change, able to use NRT. Number smoked: 23 cig/day. Age: 55 yrs av. Therapists: Nurse or health educator.
Interventions	1. Intervention: Nurse or health educator counselling (30-60 mins; type cognitive/behavioural) + booklet + NRT patches x 8 wks. Follow up: 5x at 1,3 wks and 1m, 2m, 3m (<30 min/call); [Intensity 4] 2. Control: brief counselling (10 mins) + booklet + NRT patches x 8 wks. No follow-up contact. NRT: Yes

Simon 2003 (*Continued*)

Outcomes	Abstinence: 7-day PP at 12m. Validation: Saliva cotinine <15 ng/ml OR spousal corroboration. Died: 14 at 12m.
Notes	Study tests marginal efficacy of counselling in setting of NRT

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Stevens 1993

Methods	Country: USA Recruitment: Inpatients with stay >36 hrs excluding postpartum and psychiatric patients. Selected: Invited to participate. Randomization: Not random (alternated between hospitals on monthly basis).
Participants	Participants: 1119 current smokers or recent quitters (5%, defined as smoking regularly at any time in previous 3m). Number smoked: 20 cig/day. Age: 44 yrs av. 17% cardiovascular or respiratory diagnosis. Therapists: Masters level cessation counsellors.
Interventions	1. Intervention: Counselling (1x, total 20 mins, type behavioural). Self-help materials, video. Follow up (1-2x at 1-3 wks by telephone); [Intensity 3] 2. Control: Usual care NRT: No
Outcomes	Abstinence: Sustained abstinence at 3m, 12m. Validation: None (low success in obtaining cotinine returns). Died: None reported.
Notes	No significant baseline differences between patient characteristics in intervention and control.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Stevens 2000

Methods	Country: USA Recruitment: Inpatients with stay >36 hours excluding postpartum and psychiatric patients. Selected: Invited to participate. Randomization: Not random (alternated between hospitals on monthly basis).
Participants	Participants: 1173 current smokers or recent quitters (proportion not stated, defined as smoking regularly at any time in previous 3m). Numbers smoked: 19 cig/day. Age: 47 yrs av. Therapists: Respiratory therapist.
Interventions	1. Intervention: Counselling (1x, total 20 mins, type behavioural). Self-help materials, video. Follow up (1x at 1 wk by telephone); [Intensity 3] 2. Control: Usual care NRT: No
Outcomes	Abstinence: Sustained abstinence at 6m, 12m Validation: None. Died: None reported.
Notes	Only 68% of intervention group actually offered intervention.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Taylor 1990

Methods	Country: USA Recruitment: Inpatients with acute MI. Selected: Invited to participate if prepared to make a quit attempt Randomization: Sealed envelope.
Participants	Participants: 173 current smokers (within last 6m). Number smoked: 25 cig/day. Age: 58 yrs av. 10% previous MI. Therapists: Nurse.
Interventions	1. Intervention: Counselling (1x, total not stated, type behavioural), Self-help materials, relaxation tapes. NRT (gum 'available', dose not stated, period not stated). Follow up (6-7x at 1-3 wks, every month for 4m by telephone); [Intensity 4] 2. Control: Usual care. NRT: Yes (partial)

Taylor 1990 (*Continued*)

Outcomes	Abstinence: Sustained abstinence at 3m, 12m. Validation: Serum thiocyanate, expired air CO. Died: 7 at 12m.
Notes	Higher loss to follow up in control group increases apparent effect of intervention when using ITT approach, so denominators in MA based on numbers followed up. NRT gum prescribed to 5 patients.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Vial 2002

Methods	Country: Australia Recruitment: Inpatients (medical and surgical wards) of 1 teaching hospital Selected: Willing to stop smoking Randomization: blocks of 10, computer-generated random numbers, after enrolment
Participants	Participants: 102 current smokers (>= 10 cig/day) Number smoked: not stated. Age: not stated. Therapists: Pharmacist.
Interventions	1. Intervention: Pharmacist consultation about NRT use (30-45 mins)+ booklet + up to 16 wks patches at half-price. Follow-up: weekly visits x <=16 to obtain patches from hospital pharmacist. [Intensity 4] 2. Intervention as above, but follow-up patches supplied by community-based pharmacist 3. Control: usual care: advice to quit + booklet NRT: Yes
Outcomes	Abstinence: Sustained abstinence at 3m, 6m, 12m. Validation: CO test 'whenever possible' - frequency not stated Died: not stated
Notes	Smoking cessation counselling not clearly done (pharmacist consultation about NRT) ; deletion of study does not change results. 1&2 compared to 3 in both the intensity analysis and the NRT efficacy analysis.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	A - Adequate

Intensity of intervention: 1. Single contact in hospital lasting <= 15 mins, no follow-up support. 2. One or more contacts in hospital lasting in total > 15 mins, no follow-up support. 3. Any hospital contact plus follow-up <=1 month. 4. Any hospital contact plus follow-up > 1 month.
av: average
CABG/S: coronary artery bypass graft/surgery
CCU: coronary care unit
CHF: congestive heart failure
CI: confidence interval
CO: carbon monoxide
COPD: Chronic Obstructive Pulmonary Disease
CVD: cardiovascular disease
FTND: Fagerstrom Test for Nicotine Dependence
m: month(s)
MI: myocardial infarction
NRT: nicotine replacement therapy
OR: odds ratio
PP: point prevalence
PVD: peripheral vascular disease

Characteristics of excluded studies *[ordered by study ID]*

Agewall 2001	Multifactorial intervention. No smoking cessation outcomes reported.
Allen 1998	Intervention not delivered in inpatient setting.
Asfar 2005	Intervention not delivered in inpatient setting.
Becker 2003	Participants admitted to observation unit for less than 24 hour hospital stay. Insufficient data.
Bize 2006	Not randomized (uses historical controls).
Blom 2005	Intervention not delivered in inpatient setting.
BTS 1983	Included both inpatient and outpatient data (results for inpatients alone not available).
Burt 1974	Not randomized.
Chan 2003	Intervention not delivered in inpatient setting.
Choo 2004	Short follow up (1m).
Colby 1998	Short follow up (3m). Enrolled only adolescents.
Cole 2001	Review article (no new data).
Dale 1995	Intervention not delivered in inpatient setting (some participants admitted to inpatient unit for smoking intervention).

(*Continued*)

Davies 2005	Insufficient data on cessation outcome.
Elsony 2005	Intervention not delivered in inpatient setting.
Emmons 2000	Baseline and pharmacy data from a trial. Main outcomes not reported.
Fung 2005	Not randomized.
Galvin 2001	Intervention not delivered in inpatient setting.
Gariti 2002	Participants were inpatients in a substance abuse treatment unit.
Gritz 1993	Intervention not delivered in inpatient setting (only recruitment carried out in hospital setting).
Hand 2002	Included both inpatient and outpatient data (results for inpatients alone not available).
Hilleman 2004	Not randomized.
Jeong 2002	Multifactorial intervention with little smoking cessation content.
Johnson 1999	Not randomized.
Jones 2001	Intervention delivered after discharge from ITU.
Joseph 2004	Participants inpatients for substance abuse treatment.
Joseph 2005	Intervention goal smoking reduction, not cessation (enrolled only smokers who do not plan to quit).
Kalman 2001	Participants inpatients for alcohol dependence treatment.
Lacasse 2005	Abstract only. Insufficient data.
Lisspers 1999	Intervention delivered after discharge following PTCA
McHugh 2001	Multicomponent intervention delivered prior to hospitalisation for CABG.
Meenan 1998	Not randomised.
Moller 2002	Intervention delivered prior to hospital admission.
Ong 2005	Not an RCT.
Ranote 2003	Not an RCT (quasi-experimental design). Abstract only. Insufficient data.
Ratner 2004	Intervention delivered prior to hospital admission.
Reid 2006	Not an RCT (uncontrolled cohort study).

(*Continued*)

Richman 2000	Patients not admitted to hospital, follow up 3m.
Rissel 2000	Intervention delivered to outpatients. Not randomized.
Schmitz 1999	No control / usual care group.
Smith 2002	Not an RCT (evaluates real world effect of intervention used in De Taylor 1990, Busk 1994 and Miller 1997).
Strecher 1985	Not randomized.
Takahashi 2006	Intervention not delivered in inpatient setting
Taylor 2005	Not an RCT (observational study only).
Wakefield 2004	Intervention not delivered in inpatient setting
Warner 2005	Intervention not delivered in inpatient setting (prior to hospital admission).
Wewers 1994	Short follow up (5 wks).
Wolfenden 2005	Intervention not delivered in inpatient setting (begun pre-operatively).

ITU: Intensive Therapy Unit
CABG: coronary artery bypass graft
m: month(s)
PTCA: percutaneous transluminal coronary angioplasty

DATA AND ANALYSES

Comparison 1. Intervention v Control, by intensity of counselling intervention

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Quit at longest follow-up (6+ months)	29		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 Intensity 1	1	1351	Odds Ratio (M-H, Fixed, 95% CI)	1.16 [0.80, 1.67]
1.2 Intensity 2	8	3617	Odds Ratio (M-H, Fixed, 95% CI)	1.08 [0.89, 1.29]
1.3 Intensity 3	6	4476	Odds Ratio (M-H, Fixed, 95% CI)	1.09 [0.91, 1.30]
1.4 Intensity 4	17	5608	Odds Ratio (M-H, Fixed, 95% CI)	1.65 [1.44, 1.90]

Comparison 2. Intervention v Control, by intervention intensity within diagnostic subgroups

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 All hospital patients, unselected by diagnosis	11		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 intensity 1	1	1351	Odds Ratio (M-H, Fixed, 95% CI)	1.16 [0.80, 1.67]
1.2 Intensity 2	2	1668	Odds Ratio (M-H, Fixed, 95% CI)	0.90 [0.62, 1.30]
1.3 Intensity 3	4	4309	Odds Ratio (M-H, Fixed, 95% CI)	1.12 [0.93, 1.34]
1.4 Intensity 4	6	3393	Odds Ratio (M-H, Fixed, 95% CI)	1.43 [1.17, 1.75]
2 Patients with cardiovascular disease	18		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
2.1 Intensity 2	4	1853	Odds Ratio (M-H, Fixed, 95% CI)	1.14 [0.92, 1.43]
2.2 Intensity 3	3	615	Odds Ratio (M-H, Fixed, 95% CI)	1.07 [0.74, 1.55]
2.3 Intensity 4	11	2408	Odds Ratio (M-H, Fixed, 95% CI)	1.81 [1.53, 2.15]
2.4 Nicotine replacement therapy	1	85	Odds Ratio (M-H, Fixed, 95% CI)	1.25 [0.50, 3.13]
2.5 Bupropion	1	246	Odds Ratio (M-H, Fixed, 95% CI)	1.56 [0.79, 3.06]
3 Patients with respiratory disease	4		Odds Ratio (M-H, Fixed, 95% CI)	Totals not selected

Comparison 3. Intervention v Control, trials of pharmacotherapy (pharmacotherapy systematically varied by group)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Quit at longest follow-up (6+ months)	6		Odds Ratio (M-H, Fixed, 95% CI)	Subtotals only
1.1 NRT v Placebo or no NRT	5	644	Odds Ratio (M-H, Fixed, 95% CI)	1.47 [0.92, 2.35]
1.2 Bupropion vs Placebo	1	246	Odds Ratio (M-H, Fixed, 95% CI)	1.56 [0.79, 3.06]

Analysis 1.1. Comparison 1 Intervention v Control, by intensity of counselling intervention, Outcome 1 Quit at longest follow-up (6+ months).

Review: Interventions for smoking cessation in hospitalised patients

Comparison: 1 Intervention v Control, by intensity of counselling intervention

Outcome: 1 Quit at longest follow-up (6+ months)

Study or subgroup	Intervention n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
1 Intensity 1					
Hennrikus 2005	68/678	59/673		100.0 %	1.16 [0.80, 1.67]
Subtotal (95% CI)	**678**	**673**		**100.0 %**	**1.16 [0.80, 1.67]**
Total events: 68 (Intervention), 59 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.79 (P = 0.43)					
2 Intensity 2					
Bolman 2002	103/334	110/401		32.0 %	1.18 [0.86, 1.62]
Chouinard 2005	13/53	7/56		2.4 %	2.28 [0.83, 6.24]
Croghan 2005	11/19	8/11		2.0 %	0.52 [0.10, 2.58]
Hajek 2002	94/254	102/251		29.9 %	0.86 [0.60, 1.23]
Molyneux 2003	14/182	7/92		4.0 %	1.01 [0.39, 2.60]
Nagle 2005	48/698	54/696		23.3 %	0.88 [0.59, 1.31]
Pederson 1991	10/35	6/31		2.1 %	1.67 [0.53, 5.28]
Pelletier 1998	63/412	7/92		4.5 %	2.19 [0.97, 4.96]
Subtotal (95% CI)	**1987**	**1630**		**100.0 %**	**1.08 [0.89, 1.29]**
Total events: 356 (Intervention), 301 (Control)					

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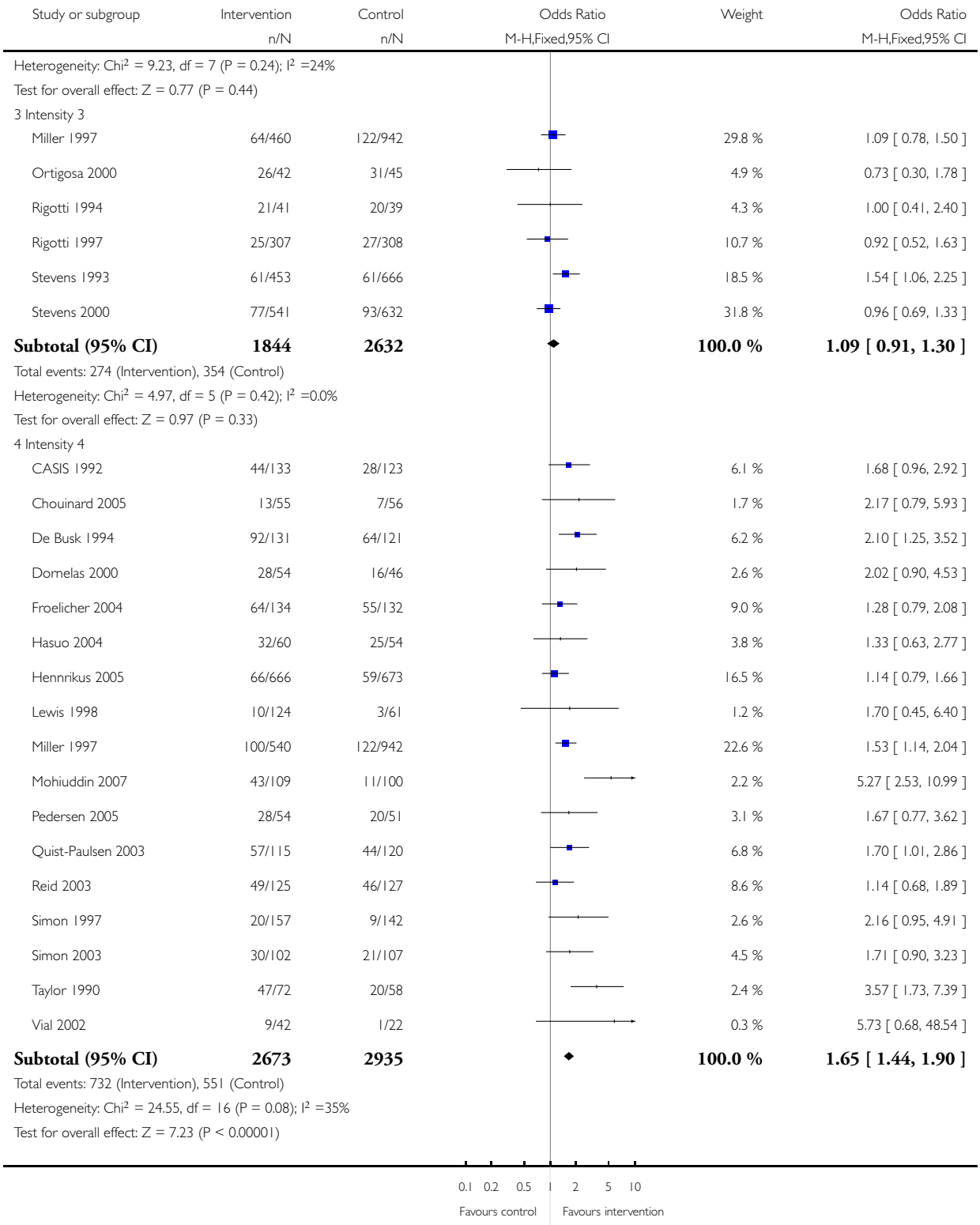

Analysis 2.1. Comparison 2 Intervention v Control, by intervention intensity within diagnostic subgroups, Outcome 1 All hospital patients, unselected by diagnosis.

Review: Interventions for smoking cessation in hospitalised patients

Comparison: 2 Intervention v Control, by intervention intensity within diagnostic subgroups

Outcome: 1 All hospital patients, unselected by diagnosis

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
1 intensity 1					
Hennrikus 2005	68/678	59/673		100.0 %	1.16 [0.80, 1.67]
Subtotal (95% CI)	**678**	**673**		**100.0 %**	**1.16 [0.80, 1.67]**
Total events: 68 (Treatment), 59 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.79 (P = 0.43)					
2 Intensity 2					
Molyneux 2003	14/182	7/92		14.6 %	1.01 [0.39, 2.60]
Nagle 2005	48/698	54/696		85.4 %	0.88 [0.59, 1.31]
Subtotal (95% CI)	**880**	**788**		**100.0 %**	**0.90 [0.62, 1.30]**
Total events: 62 (Treatment), 61 (Control)					
Heterogeneity: Chi^2 = 0.07, df = 1 (P = 0.79); I^2 =0.0%					
Test for overall effect: Z = 0.57 (P = 0.57)					
3 Intensity 3					
Miller 1997	64/460	122/942		32.8 %	1.09 [0.78, 1.50]
Rigotti 1997	25/307	27/308		11.8 %	0.92 [0.52, 1.63]
Stevens 1993	61/453	61/666		20.4 %	1.54 [1.06, 2.25]
Stevens 2000	77/541	93/632		35.0 %	0.96 [0.69, 1.33]
Subtotal (95% CI)	**1761**	**2548**		**100.0 %**	**1.12 [0.93, 1.34]**
Total events: 227 (Treatment), 303 (Control)					
Heterogeneity: Chi^2 = 4.10, df = 3 (P = 0.25); I^2 =27%					
Test for overall effect: Z = 1.16 (P = 0.24)					
4 Intensity 4					
Hasuo 2004	32/60	25/54		7.8 %	1.33 [0.63, 2.77]
Hennrikus 2005	66/666	59/673		33.7 %	1.14 [0.79, 1.66]
Lewis 1998	10/124	3/61		2.4 %	1.70 [0.45, 6.40]
Miller 1997	100/540	122/942		46.2 %	1.53 [1.14, 2.04]
Simon 2003	30/102	21/107		9.2 %	1.71 [0.90, 3.23]

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Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Vial 2002	9/42	1/22		0.7 %	5.73 [0.68, 48.54]
Subtotal (95% CI)	**1534**	**1859**		**100.0 %**	**1.43 [1.17, 1.75]**
Total events: 247 (Treatment), 231 (Control)					
Heterogeneity: Chi^2 = 3.62, df = 5 (P = 0.61); I^2 =0.0%					
Test for overall effect: Z = 3.48 (P = 0.00050)					

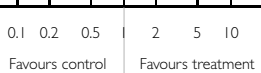
Analysis 2.2. Comparison 2 Intervention v Control, by intervention intensity within diagnostic subgroups, Outcome 2 Patients with cardiovascular disease.

Review: Interventions for smoking cessation in hospitalised patients

Comparison: 2 Intervention v Control, by intervention intensity within diagnostic subgroups

Outcome: 2 Patients with cardiovascular disease

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
1 Intensity 2					
Bolman 2002	103/334	110/401		46.5 %	1.18 [0.86, 1.62]
Chouinard 2005	13/53	7/56		3.5 %	2.28 [0.83, 6.24]
Hajek 2002	94/254	102/251		43.5 %	0.86 [0.60, 1.23]
Pelletier 1998	63/412	7/92		6.5 %	2.19 [0.97, 4.96]
Subtotal (95% CI)	**1053**	**800**		**100.0 %**	**1.14 [0.92, 1.43]**
Total events: 273 (Treatment), 226 (Control)					
Heterogeneity: Chi^2 = 6.73, df = 3 (P = 0.08); I^2 =55%					
Test for overall effect: Z = 1.20 (P = 0.23)					
2 Intensity 3					
Miller 1997	38/138	74/310		60.7 %	1.21 [0.77, 1.91]
Ortigosa 2000	26/42	31/45		20.9 %	0.73 [0.30, 1.78]
Rigotti 1994	21/41	20/39		18.4 %	1.00 [0.41, 2.40]
Subtotal (95% CI)	**221**	**394**		**100.0 %**	**1.07 [0.74, 1.55]**
Total events: 85 (Treatment), 125 (Control)					
Heterogeneity: Chi^2 = 1.01, df = 2 (P = 0.60); I^2 =0.0%					
Test for overall effect: Z = 0.37 (P = 0.71)					



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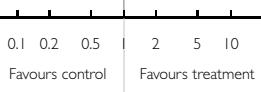
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
3 Intensity 4					
CASIS 1992	44/133	28/123		10.1 %	1.68 [0.96, 2.92]
Chouinard 2005	13/55	7/56		2.8 %	2.17 [0.79, 5.93]
De Busk 1994	92/131	64/121		10.3 %	2.10 [1.25, 3.52]
Dornelas 2000	28/54	16/46		4.3 %	2.02 [0.90, 4.53]
Froelicher 2004	64/134	55/132		15.1 %	1.28 [0.79, 2.08]
Miller 1997	62/182	74/310		18.8 %	1.65 [1.10, 2.46]
Mohiuddin 2007	43/109	11/100		3.6 %	5.27 [2.53, 10.99]
Pedersen 2005	28/54	20/51		5.2 %	1.67 [0.77, 3.62]
Quist-Paulsen 2003	57/115	44/120		11.3 %	1.70 [1.01, 2.86]
Reid 2003	49/125	46/127		14.5 %	1.14 [0.68, 1.89]
Taylor 1990	47/72	20/58		4.0 %	3.57 [1.73, 7.39]
Subtotal (95% CI)	**1164**	**1244**		**100.0 %**	**1.81 [1.53, 2.15]**
Total events: 527 (Treatment), 385 (Control)					
Heterogeneity: Chi^2 = 17.57, df = 10 (P = 0.06); I^2 =43%					
Test for overall effect: Z = 6.77 (P < 0.00001)					
4 Nicotine replacement therapy					
Campbell 1991	15/44	12/41		100.0 %	1.25 [0.50, 3.13]
Subtotal (95% CI)	**44**	**41**		**100.0 %**	**1.25 [0.50, 3.13]**
Total events: 15 (Treatment), 12 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.48 (P = 0.63)					
5 Bupropion					
Rigotti 2006	25/124	17/122		100.0 %	1.56 [0.79, 3.06]
Subtotal (95% CI)	**124**	**122**		**100.0 %**	**1.56 [0.79, 3.06]**
Total events: 25 (Treatment), 17 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.29 (P = 0.20)					



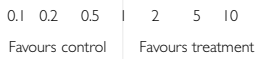
Analysis 2.3. Comparison 2 Intervention v Control, by intervention intensity within diagnostic subgroups, Outcome 3 Patients with respiratory disease.

Review: Interventions for smoking cessation in hospitalised patients

Comparison: 2 Intervention v Control, by intervention intensity within diagnostic subgroups

Outcome: 3 Patients with respiratory disease

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Odds Ratio M-H,Fixed,95% CI
Campbell 1991	6/56	8/55		0.71 [0.23, 2.18]
Campbell 1996	8/30	3/32		3.52 [0.83, 14.81]
Miller 1997	34/113	40/113		0.79 [0.45, 1.37]
Pederson 1991	10/35	57/231		1.22 [0.55, 2.70]



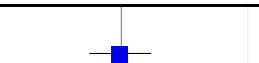
Analysis 3.1. Comparison 3 Intervention v Control, trials of pharmacotherapy (pharmacotherapy systematically varied by group), Outcome 1 Quit at longest follow-up (6+ months).

Review: Interventions for smoking cessation in hospitalised patients

Comparison: 3 Intervention v Control, trials of pharmacotherapy (pharmacotherapy systematically varied by group)

Outcome: 1 Quit at longest follow-up (6+ months)

Study or subgroup	Intervention n/N	Control n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
1 NRT v Placebo or no NRT					
Campbell 1991	21/107	21/105		58.0 %	0.98 [0.50, 1.92]
Campbell 1996	8/30	3/32		7.2 %	3.52 [0.83, 14.81]
Lewis 1998	4/62	6/62		19.1 %	0.64 [0.17, 2.40]
Molyneux 2003	10/91	4/91		12.1 %	2.69 [0.81, 8.90]
Vial 2002	9/42	1/22		3.5 %	5.73 [0.68, 48.54]
Subtotal (95% CI)	**332**	**312**		**100.0 %**	**1.47 [0.92, 2.35]**
Total events: 52 (Intervention), 35 (Control)					
Heterogeneity: Chi^2 = 6.86, df = 4 (P = 0.14); I^2 =42%					
Test for overall effect: Z = 1.62 (P = 0.11)					



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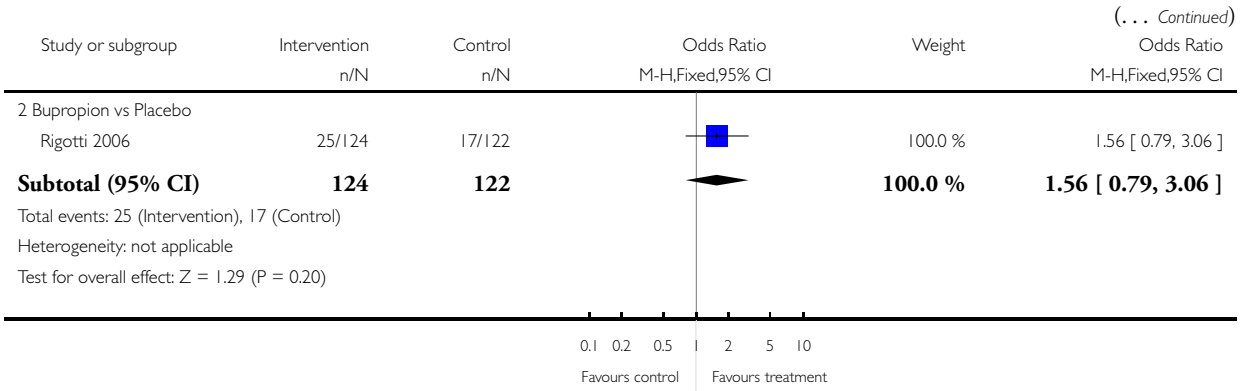

APPENDICES

Appendix 1. Glossary of tobacco-specific terms

Term	Definition
Abstinence	A period of being quit, i.e. stopping the use of cigarettes or other tobacco products, May be defined in various ways; see also: point prevalence abstinence; prolonged abstinence; continuous/sustained abstinence
Biochemical verification	Also called 'biochemical validation' or 'biochemical confirmation': A procedure for checking a tobacco user's report that he or she has not smoked or used tobacco. It can be measured by testing levels of nicotine or cotinine or other chemicals in blood, urine, or saliva, or by measuring levels of carbon monoxide in exhaled breath or in blood.
Bupropion	A pharmaceutical drug originally developed as an antidepressant, but now also licensed for smoking cessation; trade names Zyban, Wellbutrin (when prescribed as an antidepressant)
Carbon monoxide (CO)	A colourless, odourless highly poisonous gas found in tobacco smoke and in the lungs of people who have recently smoked, or (in smaller amounts) in people who have been exposed to tobacco smoke. May be used for biochemical verification of abstinence.
Cessation	Also called 'quitting' The goal of treatment to help people achieve abstinence from smoking or other tobacco use, also used to describe the process of changing the behaviour
Continuous abstinence	Also called 'sustained abstinence' A measure of cessation often used in clinical trials involving avoidance of all tobacco use since the quit day until the time the assessment is made. The definition occasionally

(*Continued*)

	allows for lapses. This is the most rigorous measure of abstinence
'Cold Turkey'	Quitting abruptly, and/or quitting without behavioural or pharmaceutical support.
Craving	A very intense urge or desire [to smoke]. See: Shiffman et al 'Recommendations for the assessment of tobacco craving and withdrawal in smoking cessation trials' Nicotine & Tobacco Research 2004: 6(4): 599-614
Dopamine	A neurotransmitter in the brain which regulates mood, attention, pleasure, reward, motivation and movement
Efficacy	Also called 'treatment effect' or 'effect size': The difference in outcome between the experimental and control groups
Harm reduction	Strategies to reduce harm caused by continued tobacco/nicotine use, such as reducing the number of cigarettes smoked, or switching to different brands or products, e.g. potentially reduced exposure products (PREPs), smokeless tobacco.
Lapse/slip	Terms sometimes used for a return to tobacco use after a period of abstinence. A lapse or slip might be defined as a puff or two on a cigarette. This may proceed to relapse, or abstinence may be regained. Some definitions of continuous, sustained or prolonged abstinence require complete abstinence, but some allow for a limited number or duration of slips. People who lapse are very likely to relapse, but some treatments may have their effect by helping people recover from a lapse.
nAChR	[neural nicotinic acetylcholine receptors]: Areas in the brain which are thought to respond to nicotine, forming the basis of nicotine addiction by stimulating the overflow of dopamine
Nicotine	An alkaloid derived from tobacco, responsible for the psychoactive and addictive effects of smoking.
Nicotine Replacement Therapy (NRT)	A smoking cessation treatment in which nicotine from tobacco is replaced for a limited period by pharmaceutical nicotine. This reduces the craving and withdrawal experienced during the initial period of abstinence while users are learning to be tobacco-free The nicotine dose can be taken through the skin, using patches, by inhaling a spray, or by mouth using gum or lozenges.
Outcome	Often used to describe the result being measured in trials that is of relevance to the review. For example smoking cessation is the outcome used in reviews of ways to help smokers quit. The exact outcome in terms of the definition of abstinence and the length of time that has elapsed since the quit attempt was made may vary from trial to trial.
Pharmacotherapy	A treatment using pharmaceutical drugs, e.g. NRT, bupropion
Point prevalence abstinence (PPA)	A measure of cessation based on behaviour at a particular point in time, or during a relatively brief specified period, e.g. 24 hours, 7 days. It may include a mixture of recent and long-term quitters. cf. prolonged abstinence, continuous abstinence

(*Continued*)

Prolonged abstinence	A measure of cessation which typically allows a 'grace period' following the quit date (usually of about two weeks), to allow for slips/lapses during the first few days when the effect of treatment may still be emerging. See: Hughes et al 'Measures of abstinence in clinical trials: issues and recommendations'; Nicotine & Tobacco Research, 2003: 5 (1); 13-25
Relapse	A return to regular smoking after a period of abstinence
Secondhand smoke	Also called passive smoking or environmental tobacco smoke [ETS] A mixture of smoke exhaled by smokers and smoke released from smouldering cigarettes, cigars, pipes, bidis, etc. The smoke mixture contains gases and particulates, including nicotine, carcinogens and toxins.
Self-efficacy	The belief that one will be able to change one's behaviour, e.g. to quit smoking
SPC [Summary of Product Characteristics]	Advice from the manufacturers of a drug, agreed with the relevant licensing authority, to enable health professionals to prescribe and use the treatment safely and effectively.
Tapering	A gradual decrease in dose at the end of treatment, as an alternative to abruptly stopping treatment
Titration	A technique of dosing at low levels at the beginning of treatment, and gradually increasing to full dose over a few days, to allow the body to get used to the drug. It is designed to limit side effects.
Withdrawal	A variety of behavioural, affective, cognitive and physiological symptoms, usually transient, which occur after use of an addictive drug is reduced or stopped. See: Shiffman et al 'Recommendations for the assessment of tobacco craving and withdrawal in smoking cessation trials' Nicotine & Tobacco Research 2004: 6(4): 599-614

WHAT'S NEW

Last assessed as up-to-date: 19 May 2007.

1 August 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 4, 1999

Review first published: Issue 2, 2001

20 May 2007	New citation required but conclusions have not changed	Updated for issue 3, 2007. Sixteen new trials added to the seventeen trials previously included. Most of the new trials tested intensive counselling interventions. Three of the new trials tested pharmacotherapy (nicotine replacement or bupropion) as an adjunct to behavioral counselling.
26 August 2002	New citation required but conclusions have not changed	Updated for issue 1, 2003. Two new trials were included, both of a moderately intensive intervention conducted during the hospital stay

CONTRIBUTIONS OF AUTHORS

NR and MM extracted data for the 2007 update, with input from LS. NR wrote the update, with input from MM and LS. All authors were involved in the conception, data extraction and writing of the original review.

DECLARATIONS OF INTEREST

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INDEX TERMS

Medical Subject Headings (MeSH)

*Hospitalization; Patient Education as Topic; Randomized Controlled Trials as Topic; Sensitivity and Specificity; Smoking [prevention & control]; Smoking Cessation [*methods]

MeSH check words

Humans