Workplace interventions for smoking cessation (Review)

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[Intervention Review]

Workplace interventions for smoking cessation

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Editorial group: Cochrane Tobacco Addiction Group.
Publication status and date: New search for studies and content updated (no change to conclusions), published in Issue 4, 2008.
Review content assessed as up-to-date: 23 April 2008.

Citation: Cahill K, Moher M, Lancaster T. Workplace interventions for smoking cessation. *Cochrane Database of Systematic Reviews* 2008, Issue 4. Art. No.: CD003440. DOI: 10.1002/14651858.CD003440.pub3.

ABSTRACT

Background

The workplace has potential as a setting through which large groups of people can be reached to encourage smoking cessation.

Objectives

To categorize workplace interventions for smoking cessation tested in controlled studies and to determine the extent to which they help workers to stop smoking or to reduce tobacco consumption.

Search strategy

We searched the Cochrane Tobacco Addiction Group Specialized Register in April 2008, MEDLINE (1966 - April 2008), EMBASE (1985 - Feb 2008) and PsycINFO (to March 2008). We searched abstracts from international conferences on tobacco and the bibliographies of identified studies and reviews for additional references.

Selection criteria

We selected interventions conducted in the workplace to promote smoking cessation. We included only randomized and quasi-randomized controlled trials allocating individuals, workplaces or companies to intervention or control conditions.

Data collection and analysis

Information relating to the characteristics and content of all kinds of interventions, participants, outcomes and methods of the study was abstracted by one author and checked by another. Because of heterogeneity in the design and content of the included studies, we did not attempt formal meta-analysis, and evaluated the studies using qualitative narrative synthesis.

Main results

We include 51 studies covering 53 interventions in this updated review. We found 37 studies of workplace interventions aimed at individual workers, covering group therapy, individual counselling, self-help materials, nicotine replacement therapy and social support. The results were consistent with those found in other settings. Group programmes, individual counselling and nicotine replacement therapy increased cessation rates in comparison to no treatment or minimal intervention controls. Self-help materials were less effective. We also found 16 studies testing interventions applied to the workplace as a whole. There was a lack of evidence that comprehensive programmes reduced the prevalence of smoking. Incentive schemes increased attempts to stop smoking, though there was less evidence that they increased the rate of actual quitting.

Authors' conclusions

1. We found strong evidence that interventions directed towards individual smokers increase the likelihood of quitting smoking. These include individual and group counselling and pharmacological treatment to overcome nicotine addiction. All these interventions show similar effects whether offered in the workplace or elsewhere. Self-help interventions and social support are less effective. Although people taking up these interventions are more likely to stop, the absolute numbers who quit are low.

2. There was limited evidence that participation in programmes can be increased by competitions and incentives organized by the employer.

3. We failed to detect an effect of comprehensive programmes in reducing the prevalence of smoking.

PLAIN LANGUAGE SUMMARY

Is the workplace an effective setting for people to stop smoking

Proven stop-smoking methods, like group therapy, individual counselling and nicotine replacement therapy, are equally effective when offered in the workplace. The evidence is less clear for self-help methods. Social and environmental support, competitions and incentives, and comprehensive programmes do not show a clear benefit in helping smokers to quit at work.

BACKGROUND

Most adults spend about a third of their day in a workplace environment. The workplace is therefore a setting through which large groups of smokers can potentially be reached by health promotion (Gruman 1993).

There are several advantages to the traditional workplace as a setting for smoking cessation. First, it provides access to a large number of people who make up a relatively stable population. Second, it has the potential for higher participation rates than non-workplace environments. Third, it may encourage sustained peer group support and positive peer pressure. Fourth, it provides a particular opportunity to target young men, who traditionally have low general practitioner consultation rates and are thus less likely to benefit from opportunistic health promotion activity in primary care. Fifth, occupational health staff may be on hand to give professional support, and sixth, the employee generally is not required to travel to the programme or to dedicate their own personal time to it. However, all these assumptions are based on a model of the workplace that is rapidly changing.

In the USA, as of 2003 77% of indoor workers reported that their workplace had some kind of restrictive policy prohibiting smoking, compared with 47% in 1992/3. However, the proportion of workers covered varied between occupations, with 83% of white-collar workers protected, compared with 63% of blue-collar workers (MMWR 2008). Most U.S. states now have at least restrictive smoking laws in place for private workplaces, government buildings and restaurants, with only eight states by December 2007 having no such restrictions. Legislative support for companies that wish to help their employees to stop smoking is complemented by widely-available guidance on the rationale and the best methods for helping smokers to quit, at both the individual and institutional level (CDC 1997).

In the UK, Jamrozik 2005 estimated that 617 premature deaths per year could be attributed to workplace smoking, compared with an estimated 235 deaths from industrial accidents. The situation is changing, however, as legislation is more widely introduced and implemented to protect the health of workers by creating smoke-free worksites and public places. National smoke-free policies introduced in the UK in 2006-7 are complemented by government guidelines on how to implement the policies and how best to assist employees with smoking cessation during this process (NICE 2007). Recommendations include summaries of interventions of proven efficacy, and encouragement for employers conducting smoking cessation programmes within working hours.

The cost-effectiveness of such implementation has also been tested (NICE 2006).

OBJECTIVES

The specific objectives of this updated review were:

1. To categorize and evaluate workplace interventions aimed at helping individuals to stop smoking.

2. To collect and evaluate data on costs and cost effectiveness associated with workplace interventions.

METHODS

Criteria for considering studies for this review

Types of studies

We include randomized and quasi-randomized controlled trials, allocating individuals, workplaces or companies to intervention or control conditions.

Types of participants

Adults over 18 years of age, in employment, who smoked.

Types of interventions

In earlier versions of this review, we divided the interventions into those aimed at helping individual smokers to quit, and those aimed at the workplace as a whole, including bans and restrictions. The latter group will now be covered by a forthcoming review, and we no longer include them in this review.
For this updated review, the studies aim mainly to assess the effects of cessation programmes for individual workers who smoke. They test a range of interventions, including individual and group counselling, self-help materials, pharmacological therapy, social and environmental support, incentives and comprehensive occupational health programmes. They are usually aimed at individuals who seek help rather than at the workforce as a whole.

Types of outcome measures

The main outcome was employee smoking behaviour (cessation rates for programmes, workplace prevalence data), preferably sustained cessation for at least six months. Studies with less than six months follow up were excluded.

Search methods for identification of studies

We searched the Cochrane Tobacco Addiction Review Group Specialized Register, which includes studies identified by systematic electronic searches of multiple databases, handsearching of specialist journals and conference proceedings, and grey literature (i.e. conference proceedings and unpublished reports not normally covered by most electronic indexing systems). We also conducted ad hoc searches of MEDLINE, EMBASE and PsycINFO. The searches were conducted in April 2008. The search strategies are listed in Appendix 1. The results of these searches were cross-checked against references in the identified papers and previous reviews and meta-analyses.
We also contacted authors of studies for additional information where necessary.

Data collection and analysis

There were four stages in the review process:
Stage 1: One author pre-screened reports for relevance, i.e. studies that might be included, or for useful background.
Stage 2: Two authors independently assessed the relevant studies for inclusion. Discrepancies were resolved by discussion. We noted reasons for the non-inclusion of studies.
Stage 3: One author extracted data and a second author checked them. Where possible, data on quit rates were abstracted using the number randomized as the denominator, making the assumption that those lost to follow up (or not reported) continued to smoke. This stage included an evaluation of quality, to assess whether the studies were randomized, whether the concealment of allocation in the randomization process was adequate, the adequacy of follow up of participants, and whether outcome assessment was verified by biochemical measurement.
Stage 4: Because of the considerable heterogeneity in the type of interventions classified as workplace, we did not attempt meta-analysis, but have synthesized the data through qualitative narrative review. However, we display the unpooled data as illustrative forest plots (Analyses 2 and 3). In the previous update of this review, these plots displayed the odds ratio for each study shown, but we have substituted the risk ratio for greater clarity.
We have included a glossary of tobacco-related terms (Appendix 2).

RESULTS

Description of studies

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

We found 51 studies (53 intervention reports) meeting the inclusion criteria. Detailed information about each is shown in the table Characteristics of included studies. We assigned the individual studies to one or more of the categories of intervention.

A number of studies evaluated interventions aimed at the individual, usually without any attempt to target or modify the workplace as a whole. The types of intervention were diverse, including intensive behavioural interventions, self-help materials, pharmacological treatments, and social support.

Other studies included environmental support for not smoking, incentives for not smoking, and multicomponent programmes aimed at improving employees' health, including smoking cessation.

1. **Intensive behavioural interventions:** GROUPS:

We found twelve randomized controlled trials that reported 6- to 24-month quit rates for individuals receiving behavioural interventions (Glasgow 1984; Frank 1986; DePaul 1987; Klesges 1987; Omenn 1988; DePaul 1989; Sorensen 1993; DePaul 1994; Razavi 1999; Shimizu 1999; Schröter 2006; Gunes 2007). A variety of approaches were tested, so that few trials are directly comparable with one another. Some of these studies compared an intensive intervention, typically including group support meetings, with a less intensive intervention such as provision of self-help materials, or with a waiting list control. Some compared variations of group programmes, or the additional impact of incentives.

Three studies evaluated ways to improve the results of group programmes:

Glasgow 1984 compared three versions of a controlled smoking programme in 36 employees: abrupt reduction, gradual reduction, or gradual reduction plus feedback on nicotine consumption with one pre- and two post-tests. Smoking reduction was defined as an outcome for this study, targeting nicotine content (brand smoked), number of cigarettes smoked daily, and percentage of each cigarette smoked. Participants could choose either cessation or reduction as their desired outcome. The participation rate was not reported, though an 8% attrition rate was reported.

Frank 1986 assigned 63 participants to one of three treatments: four hypnotic sessions with a booster, two hypnotic sessions, or two hypnotic and two behavioural sessions with a booster. A follow-up group of 15 later recruits received four hypnotic sessions and a booster session. The participation rate was not reported. The study lacked a no-treatment control group.

Klesges 1987 tested the effect of competitions on cessation rates in 136 smokers from eight workplaces. The workplace was the unit of randomization (cluster randomized) but with individuals as the unit of analysis. The participation rate was not reported but was estimated at 28% across all eight participating workplaces. The drop-out rate from treatment was 7% overall, with no difference across conditions.

Three large randomized studies which evaluated workplace cessation support groups used as a supplement to a mass media programme and self-help materials were conducted by Jason and colleagues at De Paul University (DePaul 1987; DePaul 1989; DePaul 1994). DePaul 1987 randomized workplaces to self-help materials in conjunction with televised cessation programmes versus the same materials and programmes plus group or individual counselling at the workplace. In the second study (DePaul 1989), the basic design was enhanced with monthly booster sessions, and with successful quitters and up to five of their family and co-workers entered in a lottery at the end of the intervention period and at one year follow up. The third study (DePaul 1994) compared three interventions; self help alone, self help with incentive payments for days abstinent, and intensive group support with incentive payments, cognitive behavioural strategies and maintenance manuals.

Omenn 1988 recruited smokers at a single workplace. Participants with a preference for a group format were randomized to one of two smoking cessation programmes (Multiple Component Programme or Relapse Prevention Programme) or to a self help only condition (*American Cancer Society Quitter's Guide*). Those not interested in group support were randomized to a manual-based version of the same Multiple Component Programme or Relapse Prevention Programme, or the same Guide. The participation rate was 11%.

Sorensen 1993 examined the effectiveness of a multi-component smoking cessation programme. The three-month intervention included consultation for employers on the adoption of a non-smoking policy (90-minute consultation), training for nonsmokers (one-hour class) to provide assistance to smokers attempting to quit, and cessation classes for smokers (three one-hour behavioural cessation classes). Eight workplaces were randomized to two groups (intervention/no intervention) with one and two post-tests. Although the workplace was the unit of randomization, analyses were conducted using the individual as the unit of analysis. The participation rate was reported as 12% of smokers and 3.7% of nonsmokers. The attrition rate was not reported.

Razavi 1999 randomized 344 abstainers (98.6% of those eligible) who had completed a non-randomized cessation programme, to test the efficacy of two relapse prevention programmes. Participants were assigned to a psychologist-run support group (PG), or an ex-smoker-run support group (SG) or a no formal support group (NG), and were assessed at 12 months. Participants in the PG and SG groups attended monthly meetings, where cessation support was given, and weight, blood pressure, pulse and concomitant medical problems were monitored. At the end of nine months, participants completed a Brief Symptoms Inventory and a Life Events Scale. All participants at three months were followed up until 12 months post-treatment.

Schröter 2006 also offered a relapse prevention programme in four German workplaces, compared with a standard behavioural programme. Nicotine replacement therapy was also provided if requested. Sessions rather than individuals were randomized, and the programme lasted eight weeks, with follow up at one year.

A Japanese study (Shimizu 1999) examined the effectiveness of a multi-component smoking cessation programme (intensive education, group lectures and individual counselling) compared to a waiting list control group of smokers. The participation rate was not reported.

Gunes 2007, set in a Turkish textile factory, primarily measured movement through stages of change in two matched cohorts of male smokers. The intervention group received a three-week behavioural programme based on the American Lung Association's 'Seven Steps to a Smoke-Free Life'. Smoking status was assessed at the six-month follow up.

2. **Intensive behavioural interventions:** INDIVIDUAL COUNSELLING

We found nine studies that investigated individual counselling, in most cases given by a physician (Kornitzer 1980; Cambien 1981; Li 1984; Gomel 1993a; Kadowaki 2000; Lang 2000), in Terazawa 2001 and Tanaka 2006 by trained nursing staff, and in Sorensen 2007 as phone- and mail-based tailored advice from the trial research team.

In the Belgian Heart Disease Prevention Project, Kornitzer 1980 cluster randomized 30 paired Belgian factories to intervention or control conditions, with all male workers aged 40 to 59 eligible to take part. All intervention participants were screened for cardiovascular risk factors (blood pressure, serum cholesterol, weight, smoking and physical activity), and were given written advice to reduce their risks. The screening results were also passed on to participants' family and workplace doctors. The two deciles with the highest risk score were ranked as the high risk group, and additionally received six-monthly physician advice and testing. At the environmental level, anti-smoking posters were regularly displayed, and each intervention factory held a conference on the dangers of tobacco use. A five per cent sample of the intervention group were re-assessed annually. In the 15 control factories a random 10% sample were fully assessed at baseline, and then followed throughout the trial. Within that group a 20% high risk group was identified and compared throughout with their intervention counterparts. The participation rate was 83.7% (n = 16,230).

Two years post-intervention, Cambien 1981 followed up the first 1292 participants in a cluster-randomized controlled trial, the Paris Cardiovascular Risk Factor Prevention Trial, conducted in 160 sections of a civil service administration. They measured the effects of physician advice, information leaflets and physical monitoring on diet, alcohol and cigarette consumption in young men (25 to 35 years of age). The intervention participants received either three or four tailored counselling sessions, depending on whether their baseline assessment showed them to be at low or at high risk of coronary disease. The control group received only baseline and follow-up assessments.

Li 1984 studied asbestos-exposed smoking men undergoing screening in a mandated programme for naval shipyard workers. The workers were categorized as having normal or abnormal pulmonary status on the basis of a chest X-ray and pulmonary function tests. They were then randomly assigned within pulmonary function test categories to receive either a simple warning or three to five minutes of behavioural cessation counselling from the physician who gave them the results of their pulmonary tests. The participation rate is reported as 84.6%. The study did not have a no-treatment control group.

Gomel 1993a randomized 28 Sydney (Australia) ambulance stations to four intervention groups (without a no-treatment control), in an attempt to reduce cardiovascular risk factors. The HRA (Health Risk Assessment) group received measurements and risk assessments, including body mass index, blood pressure, cholesterol, smoking status, percentage of body fat and aerobic capacity. Those assessed as being at high risk were referred to their own family physician, but received no direct support from the intervention programme. The RFE (Risk Factor Education) group received a similar assessment, but were given standard advice, through written and video material. The BC (Behavioural Counselling) group, after the standard assessment, were offered up to six counselling sessions in risk reduction, together with a manual on behaviour change. The fourth group (BCI, Behavioural Counselling and Incentives) received the same programme as the BC group, together with an incentive scheme which gave individuals the chance to win A$40 for achieving risk reduction targets at three and six months, plus a prize of $A1000 for the station which achieved the highest percentage of successful participants at six-month follow up. The participation rate was 88% (431 participants, including 128 smokers).

Kadowaki 2000 evaluated the effectiveness of a smoking cessation intervention in all male smokers in a radiator manufacturing factory (in Japan). Participants in the intervention group received individual counselling by a doctor, and those who signed a Smoking Cessation Declaration underwent a five-month intervention. Subjects in the control group received equivalent delayed intervention after four months. Randomization was by individual smoker.

Lang 2000 compared the effects of a workplace intervention by the occupational physician, offering simple advice on smoking cessation for five to ten minutes, with a more active strategy of advice including a quit date and extra support. For both strategies, the medical team was composed of a physician and whenever possible a nurse, who would reinforce the physician's advice. Both the randomization and the analysis were by workplace.

Terazawa 2001 randomized 228 smokers presenting for routine occupational health checks in a Japanese factory; 117 were allocated to the intervention condition, and 111 to the control. All participants completed a baseline questionnaire and had carbon monoxide (CO) and urinary metabolites measured to verify their level of smoking. Intervention group smokers also received a 15 to 20 minute counselling session from a nurse trained in cessation methods, and those who were prepared to set a quit date received four follow-up phone calls to support their quit attempt. Control subjects received the baseline screening and usual care. All participants were re-assessed at six and twelve months follow up.

The HIPOP-OHP Study (Tanaka 2006) was a Japanese multi-component intervention to reduce cardiovascular risk factors, including smoking, in six intervention sites matched to six control sites. The study concentrated mostly on blue-collar workers. The six-week cessation programme was offered five times over 36 months, and included information brochures on stages of change, four counselling sessions and NRT if requested. It was integrated with an intra-site publicity campaign (posters, newsletters, web site), designation of smoking areas, and an award for successful abstainers. Participants were assessed at 12, 24 and 36 months. The participation rate was 9% of smokers across the six sites.

The Tools for Health study (Sorensen 2007) targeted American construction workers, on the basis that they represented a transient population who tended not to benefit from workplace occupational health provision. Six hundred and seventy-four workers, contacted through their trade union, completed a baseline survey on their smoking and their consumption of fruit and vegetables. The intervention consisted of tailored phone-based counselling (up to four calls over three months), mailed tailored feedback, six targeted mailings of educational materials, and NRT for those who requested it. At six months, 582 participants (including 188 smokers) completed the follow-up survey, giving an attrition rate of 13.6%.

3. **Self-help interventions**

We found nine studies that examined self-help interventions (Jeffery 1988; Omenn 1988; Sutton 1988a; Sutton 1988b; Sutton 1988c; Sutton 1988d; Burling 1989; Burling 2000; Campbell 2002). A variety of approaches were tested and included a computerized nicotine fading intervention (Burling 1989), computer-tailored advice magazines (Campbell 2002), short videos (Sutton 1988a; Sutton 1988b; Sutton 1988c; Sutton 1988d), self-help manuals (Jeffery 1988) and multiple component or relapse prevention written materials (Omenn 1988).

Jeffery 1988 evaluated the impact of reduction versus smoking cessation goals in a smoking cessation programme in 59 volunteer smokers that included financial contracts, organized through payroll deduction, and twice-weekly group treatment sessions. Participants were provided with the Quit and Win self-instructional materials, developed by the Minnesota Heart Health Program. The participation rate was 2%.

Omenn 1988 offered multi-component cessation and relapse prevention programmes as both group and self-help interventions, and is detailed in the group behaviour section above.

Sutton (Sutton 1988a; Sutton 1988b; Sutton 1988c; Sutton 1988d), in a series of four randomized controlled studies in four UK companies, evaluated a minimal smoking intervention programme based on the use of motivational videotapes. In the videotape studies groups of smokers (n = 603) were randomly assigned to watch one of several different videotapes. They were followed up along with non-participants (n = 1015) at three months and again at one year.

Burling 1989 provided an individualized nicotine fading schedule based on data which participants entered daily into a computer, as an addition to pamphlets, a help line and a draw. The participation rate was not reported. The study lacked a no treatment control group, and no attrition rate was reported. Burling 2000 also evaluated an internet-based interactive programme to aid preparation, quitting and relapse prevention.

The Health Works for Women trial (Campbell 2002) developed a two-pronged approach to helping rural blue-collar women workers to improve their diet and physical activity levels, and to stop smoking. The programme was a combination of tailored 'magazines' at baseline and at six months, personalized for the characteristics and preferences of each participant, and social support at work from volunteer 'natural helpers'. The smoking intervention was incompletely delivered, however, as no lay helpers were willing to be trained to deliver the personal support. The control group received a minimal intervention (one personalized magazine) at six months, with no offer of social support. Randomization was by worksite. The participation rate was 73% at baseline.

4. **Pharmacological therapy**

Five studies investigated pharmacological therapy in the workplace (Kornitzer 1987; Sutton 1987; Sutton 1988e; Kornitzer 1995; Rodriguez 2003). Four other included studies (Razavi 1999; Schröter 2006; Tanaka 2006; Sorensen 2007) also included NRT as part of their intervention, but not as the component being tested.

In a randomized study conducted by Kornitzer (Kornitzer 1987) a 2 mg dose of nicotine gum was compared with a 4 mg dose in smokers of at least 15 cigarettes a day. Packs of nicotine gum were free on demand, after a 15-minute counselling session. Intervention during the one-year follow-up period was minimal. Kornitzer 1995 evaluated the effects of adding nicotine gum to smokers already using the nicotine patch in a double-blind placebo-controlled randomized trial. The effect of the nicotine patch against placebo patch in both groups receiving placebo nicotine gum was also assessed.

Sutton 1987 evaluated the effectiveness of a brief treatment for smoking using nicotine chewing gum in a large retailing company in London, UK. The study was randomized with a two-group pre-test/post-test design. In total 270 of 334 cigarette smokers who expressed interest were invited to take part in the programme, which consisted of two individual consultations two weeks apart and a prescription for 2 mg Nicorette gum with recommendations for its use. The remaining 64 smokers constituted a no-intervention control group.

Sutton 1988e evaluated the effect of offering brief individual treatment based on nicotine chewing gum to a randomly chosen sample in one company (n = 161) still smoking at the three-month follow up to a previous video intervention (Sutton 1988d). The treatment course was administered by occupational health nurses and consisted of four short consultations over a 12-week period.

Rodriguez 2003 delivered a combined intervention of individual

structured counselling with nicotine patches in an open (non-blinded) randomized controlled trial conducted in three Spanish worksites. Intervention participants (115 people) were graded by Fagerstrom score and treated with appropriate levels of nicotine replacement therapy for up to 12 weeks. Progress, withdrawal symptoms and adverse events were monitored over the 12-month trial period. Control group smokers (103 people) received brief, sporadic and unstructured advice, usually at their annual occupational health check.

5. **Social support for not smoking**

Two studies evaluated social support as an increment to other cessation strategies (Malott 1984; Glasgow 1986). Social support, in this context, refers to the support of a 'significant other', for example a spouse, a workmate or a close friend.

Malott 1984 randomly assigned 24 smokers to controlled smoking or a controlled smoking plus partner support intervention. Both studies defined smoking reduction as one of their outcomes, targeting nicotine content (brand smoked), number of cigarettes smoked daily, and percentage of each cigarette smoked. Participants could choose either cessation or reduction as their desired outcome. The participation rate was not reported.

Glasgow 1986 recruited 29 smokers who were assigned to small groups and were then randomly allocated to a basic programme or basic programme plus social support. The participation rate was not reported.

6. **Environmental support for not smoking**

We found three studies that reported environmental or institutional support programmes (Dawley 1991; Erfurt 1991; Hymowitz 1991). Tanaka 2006 also included environmental components, as one part of a complex intervention programme (see Individual Counselling for details).

Dawley 1991 evaluated a small study of workplace smoking control in two comparable oil refineries with 30 smokers. One company was randomly assigned to an environmental programme of smoking control, discouragement, and cessation (14 smokers) while the other company received only a smoking cessation programme (16 smokers). Humorous anti-smoking posters emphasizing the benefits of quitting smoking were distributed throughout the intervention workplace and were changed every two weeks. Three weeks after the initiation of the smoking discouragement programme at one refinery, a group smoking cessation programme was begun at both plants. The participation rate was not reported.

Erfurt 1991 compared the effects of four interventions: (1) wellness screening, (2) wellness screening plus health education, (3) 1 and 2, plus follow-up counselling, and (4) 1, 2 and 3 plus peer support groups, buddy systems, health promotion classes, and plant-wide activities.

Hymowitz 1991 evaluated the effect of an enriched environment on the impact of a group quit smoking programme in six workplaces. Two hundred and fifty-two smokers participated in the group quit smoking programmes; 131 at the full programme sites (group plus physician counselling plus workplace health promotion) and 121 at the group-only sites (group cessation programme). The participation rate was not reported.

7. **Incentives**

We found five studies of incentives with comparison groups and quit rates (Rand 1989; Windsor 1988; Glasgow 1993; Gomel 1993a; Hennrikus 2002) . A number of other included studies (Klesges 1987; Jeffery 1988; DePaul 1989; DePaul 1994; Sutton 1988a to Sutton 1988d; Tanaka 2006) used incentives as an aid to cessation or reduction, but not as the intervention being tested.

Rand 1989 examined the relative contribution of a contingent payment (up to US$200) and workplace CO monitoring to the long-term maintenance of smoking abstinence. Forty-seven hospital employees who had abstained from smoking for five days were randomly assigned to one of three follow-up groups: contingent payment and frequent monitoring (n = 17), non-contingent payment with frequent monitoring (n = 16), or contingent payment with infrequent monitoring (n = 14).

Windsor 1988 studied the incremental effectiveness of a skill training with social support enhancement and monetary incentives to a self-help manual. The participants were randomized to four groups in a two by two factorial pre-test/post-test design. The monetary incentive was a US$25 payment to the employee after six weeks of abstinence. An additional US$25 incentive was awarded at the end of six months abstinence.

Glasgow 1993 evaluated the impact of a year-long incentive-based workplace cessation programme (the HIP program). Nineteen workplaces were randomized to incentive or no incentive conditions. Smokers were paid US$10 each time they were confirmed abstinent by CO validation at monthly meetings over the year-long programme. In addition, each month at each workplace abstinent smokers were also eligible to win a lottery prize (which ranged from US$5 to US$20) and grand prize lotteries during the final month of the programme. All identified smokers in the workplace were considered as participants for the study, whether or not they participated in the intervention. Analyses were conducted at both the workplace and individual level and using both self-reported and biochemically validated cessation as endpoints. There was a participation rate of 23% in the incentive group.

Gomel 1993a, in a cluster-randomized study of 28 Australian ambulance stations, included an incentives component in its four-way comparison study to reduce cardiovascular risk factors. This trial is described above, under the individual counselling section.

The SUCCESS Project (Hennrikus 2002) compared three programme options (telephone counselling, group sessions, or a choice of either), each offered with and without incentives for recruitment and cessation. Four workplaces were assigned to each of the six options, and were surveyed at baseline, and again at 12 and 24 months. Incentive site smokers were paid for signing up to a programme (US$10), for completing it (US$20) and for 30 days

abstinence (US$20). Successful quitters were entered into a prize draw, to win up to US$500. A sample of quitters at 24 months were also paid US$25 if they supplied saliva for cotinine measurement.

8. **Comprehensive workplace programmes**

Eight studies evaluated comprehensive workplace programmes (Shi 1992; Glasgow 1995; Sorensen 1996; Sorensen 1998; Willemsen 1998; Emmons 1999; Nilsson 2001; Sorensen 2002). The HealthWise Stepped Intervention Study (Shi 1992) allocated nine North Californian worksites belonging to Pacific Gas & Electric to four intervention levels. The seven sites allocated to levels 1 to 3 were randomly assigned, while the two smallest sites were allocated to Intervention level 4, in order to minimize the running costs of the trial. The trial lacked a no-treatment control site. The interventions ranged incrementally from Health Risk Assessments (HRAs) at the start and finish of the trial with a bimonthly health newsletter at Level 1, through the addition of a Health Resource Centre and self-care books at Level 2 sites, behavioural workshops and a social support team at Level 3, to an environmental smoking policy and a case management programme for the high risk group (the 15% with the highest overall risk score) at Level 4. Outcomes were measured by cross-sectional HRAs at baseline and at two-year follow up. The participation rate was 69% at baseline and 48% at follow up.

The 'Take Heart' study (Glasgow 1995) evaluated the short-term effects of a low-intensity heart disease risk reduction programme. Twenty-six workplaces with between 125 and 750 employees were randomly assigned to early or delayed intervention. Early intervention consisted of an 18-month multi-faceted programme that featured an employee steering committee and a menu approach to intervention activities tailored to each site.

The Working Well Trial (Sorensen 1996) used a randomized matched pair design, with the workplace as the unit of assignment and analysis in 108 workplaces, with an average of 316 workers per site. The intervention targeted individuals and the workplace environment, and included dietary habits (all four study centres) as well as smoking (three of the four centres). Each centre also addressed one additional risk factor; these included occupational exposure to carcinogens, exercise, cancer screening and smokeless tobacco.

Nested within the Working Well Trial, and based at the Massachusets study centre, was the WellWorks Study (Sorensen 1998), a randomized matched pair trial in 24 workplaces. The two-year intervention, aimed at changing dietary and smoking habits, integrated health promotion and health protection through joint worker-management participation in programme planning and implementation, consultation on workplace changes, and educational programmes targeting health behaviour change, including smoking cessation. This study particularly addressed differences in behaviour change between white-collar and blue-collar workers.

Based on the WellWorks Study, WellWorks-2 (Sorensen 2002) was a block-randomized controlled trial of 15 workplaces, all handling hazardous chemicals. The intervention and aims of the study were very similar to the original WellWorks Project, being primarily health promotion and protection, but follow up was only to six months. Like its parent project, WellWorks-2 targeted differences between white- and blue-collar workers, and concentrated on smoking and nutrition; an additional outcome of interest in this study was changes in perceived hazard exposure.

A Dutch study (Willemsen 1998) compared a comprehensive intervention of self-help manuals, group courses, a mass media campaign, and smoking policies with a minimal intervention of self-help manuals only. Eight workplaces (four matched pairs) participated in the study. The 'bogus pipeline' procedure was used to improve the validity of self reports of smoking status. This means that subjects are informed that their self reports can be biochemically verified, although the test is not necessarily performed. Respondents who claimed they were nonsmokers at the 14-month follow up were asked to co-operate with biochemical validation of their smoking status.

Another study within the Working Well Trial was the Working Healthy Project (Emmons 1999). The Brown University study centre developed an extended programme within its 26 worksites (reduced eventually to 22), similar in aims and scope to the parent trial but including physical activity as a target objective, and following a cohort rather than assessment by cross-sectional surveys. The control sites received a minimal self-help programme of two smoking cessation courses and one each of nutrition and exercise, for those sites that wished to implement them.

A Swedish study (Nilsson 2001) reported the effects of a long-term comprehensive programme of lifestyle interventions, including smoking cessation, to reduce risk factors for cardiovascular disease. This randomized controlled trial for at-risk public sector employees also targeted body mass index, diastolic blood pressure, heart rate, low-density lipoprotein and cholesterol. The intervention group received individual counselling as well as 16 annual group sessions, using lectures, discussions, videos and outdoor activities; the control group received standard oral and written advice about cardiovascular risk reduction at the beginning of the trial, and nothing subsequently. Smoking point prevalence was assessed at 12 and at 18 months follow up.

Risk of bias in included studies

Some randomized studies aim to intervene with the workplace as a whole. They use a cluster-randomized design, allocating entire workplaces to conditions. Such studies should be analyzed at the level of the cluster rather than the individual. When workplaces are the unit of allocation, but results are presented for individual quitters the assumption that outcomes are independent is violated, since people in the same site may be more like one another than expected by chance. If the analysis ignores the clustering, the confidence intervals are likely to be too narrow (Bland 1997). The ef-

fect is greater if there are a small number of large clusters. Cluster-randomized studies with individual outcomes also present problems related to the choice of an appropriate denominator. The number of smokers who attend group meetings or use self-help materials is considerably smaller than the total number of smokers in a workplace. In cluster-randomized studies the denominator chosen for the analysis may be all smokers, smokers who express interest in treatment, or those who attend sessions. If the intervention involves individual cessation treatment, then trials focus on the outcome in the group of attenders. If the intervention includes other changes to the workplace environment, for example the introduction of restrictions on smoking, it is reasonable to assess the impact on the smoking workforce as a whole.

Six of the included studies (12%) reported randomization procedures in sufficient detail to be rated as adequate for their attempts to control selection bias. The majority of included studies (74%) either did not describe how randomization was performed or reported in insufficient detail to determine whether a satisfactory attempt to control selection bias had been made. Seven studies (14%) either failed to randomize appropriately or did not use a randomized trial design at all (rated at high risk of selection bias). In one study (Kornitzer 1987) blinding was broken at three months and subjects were free to choose the level of treatment they preferred; in another two studies (Sutton 1987; Sutton 1988e) a few control group subjects were allowed to move into the intervention group; one study (Li 1984) modified its randomization procedure partway through the study, and Shi 1992 allocated the two smallest of nine worksites to the most expensive intervention in order to keep trial costs down. Schröter 2006 compromised the distinction between the experimental and control group interventions, by applying 'rescue' relapse prevention techniques to members of the standard behavioural group when necessary.

Two Japanese studies (Shimizu 1999; Terazawa 2001) are included on the basis of data derived from the abstracts alone.

The 'gold standard' outcome for smoking cessation studies is biochemical validation of self-reported cessation (i.e. testing of saliva, blood, urine samples or exhaled breath for evidence of recent smoking). This generally results in lower rates of cessation, due not only to people misreporting their smoking, but also to relapsing, or refusing to provide samples for other reasons. Using validation may not change the relative effect of the intervention, since similar levels of misreporting are likely to be seen in the control condition as well, unless no intervention at all is provided to the control. Of the 50 studies in which intervention was provided to individuals, 36 (72%) used some form or combination of biochemical verification procedures for at least one follow-up point. These included butt counts, carbon monoxide ((CO) in 49% of the included studies), salivary thiocyanate and urinary, blood or salivary cotinine.

Participation rate:

In assessing the potential impact of workplace interventions it is important to know the proportion of smokers who can be recruited to different types of intervention, whilst recognizing that some barriers to recruitment to trials may not be relevant to real settings. In some of the studies included here the use of a workplace population would appear to have been largely a matter of convenience for ease of recruitment. These studies have typically not reported on the proportion of the smoking workforce who participated. Where studies have calculated the participation rate we have recorded this in the Characteristics of included studies table. The participation rates in the studies included here ranged from 9% to 88%.

GROUP 1: INTERVENTIONS AIMED AT THE INDIVIDUAL TO PROMOTE SMOKING CESSATION

1. **Intensive behavioural interventions:** GROUPS

Only two of this group of trials described the method of randomization in sufficient detail to exclude the possibility of allocation bias. In one study (Omenn 1988) allocation was based on randomized assignment lists, while the other (Razavi 1999) used random numbers concealed by a label. Five studies (Klesges 1987; DePaul 1987; DePaul 1989; Sorensen 1993; DePaul 1994) used cluster randomization. All of the trials except Schröter 2006 and Gunes 2007 used biochemical validation of self-reported smoking status. Four studies (DePaul 1987; Omenn 1988; DePaul 1989; DePaul 1994) used saliva cotinine and one study (Sorensen 1993) collected saliva cotinine for 52% of their sample but these were not used. One study (Frank 1986) used saliva thiocyanate and one (Klesges 1987) used both saliva thiocyanate and expired air carbon monoxide. Two studies (Glasgow 1984; Shimizu 1999) used expired air CO alone, and one study (Razavi 1999) used a combination of expired CO and urinary cotinine, but also reported unvalidated rates for comparison.

2. **Intensive behavioural interventions**: INDIVIDUAL COUNSELLING

Only one of the nine studies in this group (Kadowaki 2000) adequately described the method of randomization. Four trials (Cambien 1981; Kornitzer 1980; Gomel 1993a; Lang 2000) used cluster randomization. Tanaka 2006 was unable to randomize the worksites successfully, and followed a matched pairs design, controlling for baseline differences in their analyses. Four studies used CO assessment for validation of self-reported cessation, with Lang 2000 using partial validation, as several workplace physicians had no access to a carbon monoxide monitor. Gomel 1993a used serum cotinine to validate smoking status at all assessment points. Kornitzer 1980, Tanaka 2006 and Sorensen 2007 relied upon self report, without any biochemical validation.

3. **Self-help interventions**

Among this group of studies (Jeffery 1988; Omenn 1988; Sutton 1988a; Sutton 1988b; Sutton 1988c; Sutton 1988d; Burling 1989; Burling 2000; Campbell 2002), only one (Omenn 1988) described the method of randomization. All except Campbell 2002 validated their cessation rates, with seven studies using expired air CO, and Omenn 1988 using saliva thiocyanate.

4. **Pharmacological therapy**

Two studies described adequate randomization procedures for a placebo-controlled double-blind trial (Kornitzer 1995) and an open-label randomized controlled trial (Rodriguez 2003) The remaining three studies either allowed movement between the intervention and control groups (Sutton 1987; Sutton 1988e) or broke the blinding partway through the trial (Kornitzer 1987). All five studies validated self reports of cessation. Four (Kornitzer 1995; Rodriguez 2003; Sutton 1987; Sutton 1988e) used expired air CO to verify smoking status, while Kornitzer 1987 tested serum cotinine and carboxyhaemoglobin in a random sample of 69% of the participants.

5. **Social support for not smoking**

Neither study (Malott 1984; Glasgow 1986) gave randomization details or participation rates. Self-reported cessation was validated in both studies using expired air CO and quantity of cigarette butts. The Glasgow study also monitored saliva cotinine.

6. **Environmental support for not smoking**

All three studies in this group employed a clustered design. Two of them (Dawley 1991; Hymowitz 1991) analyzed by individual, while the third (Erfurt 1991) used the workplace as the unit of analysis There was no biochemical validation of self-reported cessation in Erfurt 1991. Dawley 1991 reported validation by urinary cotinine and Hymowitz 1991 by expired air CO.

7. **Incentives**

Details of Gomel 1993a are reported under the Individual Counselling heading.

Windsor 1988 described randomization using a computer-generated assignment system in numbered envelopes. Glasgow 1993 was described as cluster-randomized with both the workplace and the individual used as the units of analysis. Rand 1989 gave no details of randomization. The SUCCESS Project (Hennrikus 2002) was described as a 3x2 factorial study, with workplaces randomly assigned to the six treatment options, but stratified by gender and education level. No details of randomization were offered. All four studies reported biochemical validation, using saliva thiocyanate (Windsor 1988; Hennrikus 2002), or carbon monoxide (Rand 1989) and carbon monoxide plus cotinine (Glasgow 1993).

5. **Comprehensive approach**

There were no details of randomization given. Six studies employed a cluster-randomized design, while Nilsson 2001 aggregated its participants from four public sector workplaces within the same district. Non-validated self-reported smoking cessation was recorded in six studies. and saliva cotinine validation in Willemsen 1998.

Effects of interventions

Because of the heterogeneity of the design of the included studies, we did not perform meta-analyses in this review, but we have included graphical representations (forest plots) of many of the study outcomes, grouped by type of intervention. Where there was more than one intervention arm, we have compared the control group (minimal or no intervention) with the next simplest treatment. Although this may occasionally underestimate the trial's true efficacy over multiple interventions, we avoid the risks of overstating the effect of the treatment or of tipping a result into significance by forcing a binary comparison that does not reflect the true findings of the trial. Studies treated selectively in this way include DePaul 1994, Erfurt 1991, Glasgow 1984, Kornitzer 1995, Omenn 1988, Rand 1989, Razavi 1999, Sutton 1988a, Sutton 1988b, Sutton 1988c, Sutton 1988d, and Windsor 1988. We have not presented the comprehensive programme studies, as there were insufficient extractable data. Plottable data were also not available for Campbell 2002, Frank 1986, Hennrikus 2002, Kornitzer 1980 or Sorensen 1993.

We have also produced a Results table (Analysis 1.1), which gives details of types of participants, follow up, smoking outcomes and validation of cessation.

GROUP I: INTERVENTIONS AIMED AT THE INDIVIDUAL TO PROMOTE SMOKING CESSATION

1. **Intensive behavioural intervention**: GROUPS

Glasgow 1984 showed that at six months one-third of participants in the gradual condition were abstinent compared to no participants in the abrupt condition. However, in this small sample the result was not statistically significant. This study also targeted smoking reduction as a valid outcome, and 47% of participants stated that they wished to reduce their consumption. Reducers were found to have been successful for each of the target behaviours as they addressed them, without compensatory increases in the other two behaviours. Achieved reductions were statistically significant (P values from 0.001 to < 0.02). Mean reduction in nicotine content was 50%, in percentage of each cigarette smoked 34% and in number of cigarettes smoked 28%. Carbon monoxide (CO) levels were 28% lower on average, suggesting that participants were not compensating for the behavioural changes. All but one subject improved on at least two measures, and 46% on all four variables. At six-month follow up, reducers maintained all the changes except for percentage of the cigarette smoked, with both abrupt and gradual plus feedback subjects relapsing on this measure ($P < 0.05$).

Frank 1986, testing combinations of behavioural support and hypnotic sessions, showed no long-term differences between any treatment variants.

Among the three De Paul studies testing support groups linked to mass media programmes, two of (DePaul 1989; DePaul 1994) showed a benefit of the additional support groups. At 12 months, point prevalence for the Group participants (DePaul 1989) was 26%, compared with 16% for Non-Group participants ($P < 0.06$), with sustained abstinence rates of 11% and 3% respectively (P

< 0.05). In DePaul 1994 at 12 months, the Self Help participants achieved a sustained abstinence rate of 5.1%, the Incentives participants 11%, and the Group participants 31.2% (P < 0.01). Omenn 1988 and DePaul 1987 showed non-significant trends towards higher quit rates for groups than for self-help controls. The three Group arms of the Omenn study achieved 12-month validated quit rates of 16%, 18% and 8% (NS), while the self-help arms achieved 9%, 11% and 6% respectively (NS). The initial De Paul study (DePaul 1987) achieved 12-month sustained cessation rates of 6% for the Group participants versus 2% for the self-help participants (NS), with both arms achieving 19% point prevalence rate.

Three studies tested relapse prevention interventions.

Klesges 1987, testing both a relapse prevention component and a competition in a factorial design, failed to detect evidence for a long-term benefit of either. At the immediate post-test, the competition intervention resulted in higher quit rates (39% versus 16%, P < 0.004) but these differences were minimal at six months (12% versus 11%, NS). The six-month differences for relapse prevention were in the expected direction but not statistically significant (15% versus 8%), although the competition appeared to increase short-term quit rates.

A Belgian relapse prevention study (Razavi 1999) found differences between psychologist-supported quitters (43.7% still abstinent at 12 months), ex-smoker-supported quitters (37.5%) and no formal support quitters (35.5%), but these did not reach statistical significance.

Schröter 2006 found that participants in the standard behavioural (SB) programme were more successful than those who received relapse prevention (RP) support (21.1% continuously abstinent at 12 months versus 12.2%). They speculated that this unexpected finding might be attributable to the emphasis in the RP group on the likelihood of failure, but also noted that SB participants had received relapse prevention 'rescue' support when necessary, which may have compromised the separation between the two interventions.

Sorensen 1993 demonstrated that at six-month follow up, 12% of smokers in the intervention group reported quitting, compared to 9% in the control group (P < 0.05), with cessation predicted by co-worker requests not to smoke.

A small study (Shimizu 1999) of a multi-component programme including group and individual counselling did not detect a statistically significant difference, with quit rates of 19% in the intervention group and 7% in the control group.

Gunes 2007 reported a non-significant difference in the six-month quit rate between the intervention and control groups (6% versus 2%, P = 0.14). The primary outcome of interest for this study was movement through stages of change, and for this measure the intervention group achieved significantly lower numbers in 'precontemplation' and higher numbers in the 'preparation' stages at six months, but this did not translate into higher quit rates within the time scale of the trial.

2. **Intensive behavioural interventions**: INDIVIDUAL COUNSELLING

Kornitzer 1980 detected a decline in smoking prevalence of 18.7% in the high risk intervention group at two years follow up, compared with a 12.2% drop in the high risk control group (P < 0.05). A five per cent sample of all the intervention participants demonstrated a prevalence decline of 12.5% over two years, which was very close to the 10% sample control group's decline of 12.6% (NS). The authors speculate that the lack of face-to-face counselling (available only to the high risk intervention group) may have been a significant factor in the failure of the anti-smoking campaign. Stepwise multiple discriminant function analysis among the high risk groups identified fewer cigarettes smoked at baseline, more previous quit attempts and the residential area of the country as significant predictors of quitting among the intervention group, and higher education and more previous quit attempts among the controls. The significant differences between intervention and control high risk groups gradually disappeared over the subsequnet four years of the study, due to a combination of less intensive intervention activity and a spontaneous rise in the control group's quit rate in line with secular trends.

Cambien 1981 found that at two-year follow up 21.4% (65/304) of smokers in the intervention group had quit, compared with 13.4% (41/306) in the control group. Although the descriptive Forest plot suggests that this result was statistically significant, the authors report that it was not. The result does not take account of the 195 participants lost to follow up, and the authors observe that those lost to follow up from the intervention group were significantly heavier smokers than the follow up attenders (P < 0.01) or the control participants.

Li 1984 found that at 11 months smokers given behavioural counselling from a physician were more likely to remain abstinent (8.4%) than those with a minimal warning (3.6%, P < 0.05). Prolonged abstinence rates did not differ between participants with abnormal lung function tests (3.7%) and normal lung function tests (5.9%).

Gomel 1993a did not find significant differences in continuous abstinence rates between any of the four groups (HRA, RFE, BC and BCI) at six or twelve months. However, when the authors pooled the HRA group with RFE (n = 68 smokers) and BC group with BCI (n = 60 smokers) to test the efficacy of the counselling component, they detected statistically significant differences in abstinence rates. At six months, the combined HRA/RFE group had a continuous abstinence rate of 1%, compared with 10% for the BC/BCI pooled group (Fisher's Exact Test P = 0.05); 12-month rates were 0% and 7% respectively (P = 0.05). Incentives appeared to have no effect, or possibly a negative impact, with 3/30 smokers continuously abstinent at 12 months in the BC (counselling only) group compared with 1/30 in the BCI (counselling plus incentives) group, but this difference did not achieve statistical signifcance. The authors report that contamination between the intervention groups and low participation rates among the RFE stations meant

that the effect size of the whole trial may have been compromized. Kadowaki 2000 found cessation rates of 12.9% and 3.1% in the intervention and control groups respectively (P = 0.003). Among those who succeeded in quitting 48.6% maintained cessation at 18-month follow up. Overall the cessation rate was 8.4% after 22 months and the prevalence of male smokers had decreased from 62.9 to 56.7% (P = 0.038).

Lang 2000 found point prevalence quit rates of 18.4% in the intensive group compared to 13.5% in the minimal intervention group at one year (P = 0.03). Self-reported sustained cessation of six months and more was reported in 6.1% of the intervention group compared with 4.6% of the comparison group (P = 0.26).

Terazawa 2001 detected a point prevalence cessation rate of 11.1% (13/117) at 12 months in the intervention group, compared with 1.8% (2/111) in the control group. Twelve-month continuous abstinence rates were 6.8% (8/117) and 0.9% (1/111) respectively (Fisher's Exact 2-tailed Test P = 0.04 [our calculation]). Only 25 of the 117 counselled smokers in the intervention group agreed to make a quit attempt and would therefore have received the four follow-up phone calls.

The HIPOP-OHP study (Tanaka 2006) detected a steady rise in quit rates in both the intervention and control worksites over the 36-month assessment period. They report final quit rates of 12.1% in the intervention sites versus 9.4% for the controls (P = 0.021), but this is based on those who responded at both baseline and at final follow up. An intention-to-treat analysis yields quit rates of 8.9% and 7.0% respectively (P = 0.046 [our calculation]).

Sorensen 2007 detected a significant increase in the six-month quit rate in the intervention group compared with the controls (19% versus 8%, P = 0.03). This analysis was restricted to the 188 smokers who completed both the baseline and follow-up surveys, although the authors reported that an intention-to-treat (ITT) analysis also found a statistically significant benefit of the intervention. The ITT data were 19 quitters from 125 baseline smokers in the intervention group (15%), compared with 7 quitters from 106 baseline smokers in the control group (7%, P = 0.04).

3. **Self-help programmes**

Computerized interventions

In Burling 1989 the individualized nicotine fading computer group had a six-month quit rate twice that of the contest group (21.4% versus 11.5%), but this result was not statistically significant. A small pilot study (Burling 2000) failed to detect a statistically significant difference in quit rates between the American Lung Association programme and an internet-based programme. The intervention arm of the Health Works for Women trial (Campbell 2002) had a higher smoking prevalence at baseline (30%) than the control arm (22%), but only 9% of the intervention participants (26% of the current smokers) chose to concentrate their efforts on quitting. Both groups reduced their prevalence rate by about 3% at 18 months follow up. The intervention for smokers was incomplete, as no lay helpers were willing to be trained to support the smokers trying to quit. It is therefore not possible to draw any meaningful inferences from the lack of a detectable difference between the two arms of the trial.

Video studies

The four studies of minimal video interventions with control groups (Sutton 1988a; Sutton 1988b; Sutton 1988c; Sutton 1988d) failed to detect a difference in validated abstinence rates between the video groups, although the second study (Sutton 1988b) detected a difference between the video groups and the non-participant group (P < 0.05) This study, however, included younger smokers who smoked more heavily than participants in the other three studies. Another finding of the first of the studies (Sutton 1988a) was of more smokers trying to stop in the intervention group than in the control group (P < 0.05), but in that study the 'control' video concerned seatbelts, whereas the 'control' videos in the other three studies all related in some way to tobacco.

Other self-help studies

In Jeffery 1988, which evaluated the impact of reduction versus smoking cessation goals, both treatment groups achieved approximately the same effect of about 50% cessation at six months and 12% at one year. In Omenn 1988, employees with a preference for self-help rather than group programmes showed no statistically significant difference in quit rates between the three types of self-help manual.

4. **Pharmacological therapy**

Kornitzer 1987 found that at three months 36.2% of the 2 mg nicotine gum group reported they had stopped smoking, against 44.8% in the 4 mg group (non-significant difference). At one year in the 2 mg and 4 mg groups respectively 22.3% and 32.2% reported smoking abstinence (non-significant difference). An intention-to-treat analysis of these data would yield cessation rates of 20.8% (21/101) for the 2 mg group and 24.5% (24/98) for the 4 mg group. The only statistically significant result was within the subgroup of more heavily addicted smokers (Fagerstrom score greater than 5); the 4 mg group achieved a quit rate of 32.9% (24/73) compared with the 2 mg group's rate of 18.5% (16/86, P < 0.05), but this does not include those smokers who dropped out between randomization and follow up.

Sutton 1987 reported one-year continuous abstinence rates of 12% among those allocated to nicotine gum and 2% among the control group (no P value given). If an intention-to-treat analysis (i.e. based on all randomized participants) is performed on these data, the quit rate drops to 7.8% for the intervention group at 12 months.

Sutton (Sutton 1988e) reported validated one-year abstinence rates of 22% in those receiving nicotine gum compared with 2% in the control group (P < 0.001). An intention-to-treat analysis of these data would yield an intervention quit rate of 10.1% (8/79). The more rigorous 'complete' abstinence rates (i.e. no smoking of any kind up to follow-up assessment) are 6.3% (5/79) for the intervention group and 2.4% (2/82) for the controls.

In Kornitzer 1995 the three treatment groups (Group 1: active nicotine patch and active gum; Group 2: active nicotine patch and

placebo gum; Group 3: placebo patch and placebo gum) achieved 12 month abstinence rates in Group 1, 2 and 3 of 18.1%, 12.7% and 13.3% respectively (P = 0.19). Odds ratios (OR) comparing Groups 1 and 2 at 12 months (OR 1.47, confidence interval (CI) 0.76 to 2.78, P = 0.125), and comparing Groups 2 and 3 (OR 0.96, no further details) were not significant. Time to relapse was longer in Group 1 compared with the other two groups (P = 0.04).
Rodriguez 2003 detected a 12 month CO-validated continuous abstinence rate of 20.2% (23/114) in the intervention group, compared with 8.7% (9/103) among the controls. This gave an OR of 2.58 (95% CI 1.13 to 5.90, P = 0.025). These results are based on an intention-to-treat analysis, except for one death in the intervention group.

5. **Social support for not smoking**

Two studies of social support (Malott 1984; Glasgow 1986) found no difference with the addition of this component to a basic programme of group counselling and support. Both studies also defined smoking reduction as an outcome of interest, in which participants could choose to attempt either complete cessation or reduction of smoking. In the earlier study (Malott 1984) the authors note that among non-abstainers, at six months follow up the Controlled Smoking (CS) Group daily consumption of nicotine was 0.52 mg compared with Controlled Smoking+Partner Support (CS+PS) Group's consumption of 0.45 mg. Average number of cigarettes per day at six months follow up was CS:21.5, compared with CS+PS: 20.1. In both conditions, participants relapsed on number of cigarettes smoked (P < 0.05). In addition, CS participants relapsed on nicotine content (P < 0.05), and CS+PS relapsed on percentage of cigarette smoked (P < 0.01). Neither group relapsed on CO levels, and non-abstinent smokers in both groups were smoking less at follow up than they had been before treatment.
In Glasgow 1986 no outcome differences were detected between the two groups of reducers (Basic Programme [BP] and Basic Programme + Social Support [BP+SS]). Both groups at six months had achieved reductions in nicotine (BP: 0.90 to 0.49; BP+SS: 0.78 to 0.49, P < 0.05 for both). Number of cigarettes per day was reduced in both groups (BP: 20.5 to 18.3; BP+SS: 27.7 to 24.4), but was statistically significantly higher than at immediate post-test. The same pattern applied to percentage of each cigarette smoked, although the BP+SS group six-month rate was still lower (P < 0.05) than pre-test levels (BP: 83.3 to 74.8; BP+SS: 89.0 to 81.2). Carbon monoxide levels followed the same pattern, while saliva thiocyanate levels were higher at six-month follow up than at baseline. As with cessation, this study offered no evidence that social support enhanced sustained reduction.

GROUP 2: WORKSITE-BASED INTERVENTIONS

6. **Environmental support for not smoking**

In Dawley 1991 at five months the abstinence rate at the environmental intervention site was twice that of the cessation-only site (43% versus 21%, no P value given).
Erfurt 1991 compared the effects of four interventions: (1) wellness screening; (2) wellness screening plus health education; (3) as 2, plus follow-up counselling; and (4) as 3, plus peer support groups, buddy systems, health promotion classes, and plant-wide activities. In each group there was a reduction in the prevalence of smoking over three years, and the smoking prevalence at three years was lower for interventions 3 and 4 compared with interventions 1 and 2 (P < 0.01), although this difference depended on combining the 1985 smokers with the then ex-smokers. Interventions 3 and 4 recorded slightly higher quit rates (20.3% and 18.9% respectively) than interventions 1 and 2 (17.1% and 17.6% respectively) among employees who were smoking at baseline, but the difference was not statistically significant, and may have been compromised by differences in baseline.
Hymowitz 1991 failed to detect an effect of environmental support. Twelve-month quit rates were 22% for physician counselling and group support alone, and 18% for the same support with an 'enriched milieu'.

7. **Incentives**

Windsor 1988 failed to detect an effect of monetary incentives on quit rates, with 6/95 achieving continuous cessation in the self-help group at 12 months compared with 5/95 in the self help plus incentives group. The corresponding rates for the counselling groups were 18/94 and 9/94. If anything, the incentive component appeared to have a negative impact. The authors therefore collapsed the incentive and no-incentive groups together in the analysis to test the efficacy of adding counselling and social support to self-help materials. This comparison yielded a cessation rate of 5.8% (11/190) at 12 months for the combined self-help groups, compared with 14.4% (27/188) for the self help with counselling and social support combined groups (P < 0.001).
Rand 1989 found that contingent payments delayed but did not necessarily prevent relapse to smoking. The study failed to detect an effect on relapse of monitoring and feedback of carbon monoxide rates.
Glasgow 1993 failed to detect a difference between incentive and no-incentive conditions across 19 workplaces. There were no statistically significant differences in self-reported cessation rates at one year (12.9% for incentives versus 12% for control) or at two years (18% for incentives versus 15.5% for control).
The SUCCESS Project (Hennrikus 2002) found that programme recruitment was higher in the incentive sites (22% vs 12%, P = 0.0054), but that this did not translate to higher cessation rates. Although the authors suggest that telephone counselling appeared to be at least as effective as group programmes, the two types of support seem to have been offered at different levels of intensity, with dropouts from group programmes not followed up, while telephone counsellors routinely made ten contact attempts per session plus messages or letters to their participants.
Gomel 1993a failed to detect an effect of either individual or group incentives at 12 months follow up. Detailed outcomes for this trial are covered under the Individual Counselling heading.
The effectiveness of incentives and competitions as an aid to smok-

ing cessation in any setting is covered in another Cochrane review (Cahill 2008).

8. **Comprehensive programmes**

The HealthWise Stepped Intervention Study (Shi 1992) noted a decline in smoking prevalence at two-year follow up in all four intervention levels (nine worksites). Smoking reduced in Level 1 sites by 34%, from 18% to 12%, in Level 2 sites by 18%, from 17% to 14%, in Level 3 sites by 35%, from 24% to 15%, and in Level 4 sites by 44%, from 14% to 8%. All differences were statistically significant at $P < 0.01$ level, except for the Level 2 decline which was significant at the 0.1 level. Outcomes were measured by cross-sectional surveys rather than cohort analysis, with relatively low participation rates of 69% at baseline and 48% at follow up.

The 'Take Heart' study (Glasgow 1995) reported that the early and delayed intervention groups did not differ on changes in smoking rates, dietary intake or cholesterol levels. Despite documented implementation of the intervention, there were no short-term improvements beyond secular trends also observed in control workplaces. Glasgow 1997 also reported the results of 'Take Heart II' which was non-randomized but with a matched quasi-experimental study design similar to the first 'Take Heart' trial, plus updated menu and added guidance for employee steering committees and implementation. The authors reported that there were no statistically significant differences in smoking prevalence and smoking cessation between intervention and control workplaces.

The Working Well Trial (Sorensen 1996) reported a non-significant 1.53% difference between intervention and control workplaces in six-month smoking cessation rates. Smoking prevalence declined in intervention sites (from 24.5% to 21.2%) and in control sites (from 25.8% to 21.8%) (NS).

The WellWorks Study (Sorensen 1998), nested within the Working Well Trial, was a randomized controlled trial, with similar aims to its parent trial, but combining health promotion and health protection interventions, and also targeting outcome differences by job category. Six-month smoking abstinence rates were 15% in the intervention workplaces, and 9% in the control workplaces ($P = 0.123$). We have not used the first analyses for this study, published in 1996, since these did not include results from the control workplaces.

The WellWorks-2 Trial (Sorensen 2002) did not detect a significant difference in point prevalence rates at six months between intervention and control workplaces (reductions of 4.1% and 1.6% respectively). Cohort analysis failed to detect an effect in overall quit rates between intervention (11.3%) and control workplaces (7.5%, OR 1.57, $P = 0.17$).

Willemsen 1998 failed to detect an effect of a comprehensive programme. The six-month sustained abstinence rates were 8% in the comprehensive workplaces and 7% in the minimal-treatment workplaces. Among the medium to heavy smokers, prolonged abstinence rates were 9% for the comprehensive programme and 4% for the minimal programme.

At three-year follow up, the Working Healthy Project (Emmons 1999) did not detect significant differences between either the seven-day point prevalence quit rates (intervention 25.6% versus control 21.8%) or the six-month continuous abstinence quit rates (intervention 8.0% versus control 8.1%).

The Swedish trial of cardiovascular risk reduction (Nilsson 2001) detected a decline in smoking prevalence in the intervention group from 65% to 37% at 12 months, compared with a non-significant decline in the control group from 65% to 63%. Prevalence at 18 months was 40% for the intervention group and 59% for the control group, and this difference influenced the decrease in the mean risk score from 10.3 (SD 1.5) to 9.0 (SD 2.2, $P = 0.042$).

Economic analysis

There is limited literature on the costs of implementing workplace smoking control programmes. Only five of the studies identified for this review (Windsor 1988; DePaul 1989; Erfurt 1991; DePaul 1994; Tanaka 2006) reported cost data. All except the Japanese HIPOP-OHP study were conducted in the USA.

Windsor 1988 found that material costs to deliver the programme plus lost employee time to participate produced a total programme cost of approximately US$50 per employee. The cost to implement the programme for combined groups 1 (brief advice and self-help materials) and 3 (as 1 with monetary awards) was approximately US$9,500 (US$50 x 190 per combined intervention group). The estimated savings to the University for Groups 1 and 3 with a 5.8% quit rate (9 employee quitters at US$1,000) was about US$9,000. From a cost to benefit ratio perspective the estimated savings observed from combined groups 2 (as 1 with self help, further counselling, buddy selection and contract) and 4 (as 2 with monetary rewards for cessation) was the same as for groups 1 and 3 (US$9,500). The observed quit rate of 15% (27 employee quitters at US$1,000) produced an estimated saving of approximately US$27,000. The researchers suggested that reducing the estimated savings by 50% (for example, US$500 per employee per year instead of US$1,000) still led to estimated savings of US$13,500, 40% above the estimated cost of US$9,500. The cost to benefit ratio for the most effective methods (groups 2 and 4) was approximately 2 to 1.

DePaul 1989 showed that in the Group condition (media, self-help manuals, groups and incentives) 44 participants had quit at the 12-month follow up and for the Non-group condition 26 had quit smoking. Incentives and supplies cost approximately US$21,000 for the Group intervention, so each Group quitter cost US$477. Supplies for the Non-group cost about US$2,000, so each quitter cost US$77.

Erfurt 1991 found that the annual direct cost per employee for post-screening interventions was US$2.97 for site 1 (control site), US$17.68 for site 2 (health education), US$30.96 for site 3 (health education plus follow-up counselling), and US$38.31 for site 4 (health education, follow-up counselling plus plant organization for health promotion). For engaging employees into treatment or programme participation, sites 3 and 4 were approximately 10 times more cost-effective than site 2. Also, for reducing risks and

relapse prevention, sites 3 and 4 were five to six times more cost-effective than site 2. At sites 3 and 4 the total direct cost per percentage of risks reduced and relapse prevented was less than one dollar (US$0.67 and US$0.74, respectively) per employee per year.

The last of the DePaul studies, DePaul 1994, summarized the cost implications of all three De Paul studies. The total cost for each intervention was Self-help US$4717, Incentives US$6992 and Group US$26,867. Costs per quitter (12 month point prevalence to continuous quit rate) were Self-help: US$225 - 1179; Incentives: US$250 - 699; Group US$455 - 790. The cost of the programme offered to the public (50,000 self-help manuals and newspaper supplements) was US$62,500. If 5% to 15% of the recipients of self-help materials could quit smoking, the cost would range from US$8 to US$25 per quitter. With the television series costing about US$20,000, if only 5% of smokers who watched it managed to quit, the cost per quitter would be US$3.

The HIPOP-OHP Study (Tanaka 2006) calculated that the intervention delivered 36.3 additional quitters, in a period when intervention and control sites all reported a steady rise in the cessation rate. Based on materials and opportunity costs, each quitter was estimated to have cost ¥70,080 (95% CI ¥32,800 to ¥532,200). This converts to US$610 at October 2005 rates. The authors report that this is comparable with the cost per quitter in companies with a smoke-free policy (US$799), and lower than the cost of a smoker who quits without NRT through primary care or smoking specialist services (US$2100 to 7900).

Absenteeism

One study of a comprehensive lifestyle intervention (Nilsson 2001) reported on mean number of sick days over the last four months of the first year of the trial. Mean sick days taken by the intervention group fell from 6.0 to 2.9 (P = 0.03), while the mean sick days taken by the control group for that period rose from 4.5 to 7.4 (P = 0.04). However, smoking was only one of several behaviours targeted in this trial, and the contribution of reduced smoking prevalence to absentee rates could not be separately estimated.

DISCUSSION

Workplace interventions are heterogeneous. Although the workplace may offer particular opportunities for recruitment to programmes, many of the interventions tested in workplace studies are not specific to this setting. This is particularly true of interventions aimed at helping individuals to stop smoking. The effects of smoke-free policies and restrictions within the workplace will be covered in a forthcoming new review.

It is inappropriate to draw conclusions about the effectiveness of such interventions on the basis only of studies conducted in the workplace. In drawing conclusions about the effectiveness of these interventions we have therefore placed the findings of the workplace studies in the context of what is known from systematic reviews that include non-workplace studies. Although the results of some of the individual studies considered in this review have inconclusive findings, most are consistent with the findings from systematic reviews. We can therefore conclude that there is strong evidence that there is an effect of group therapy, of individual counselling, and of pharmacological treatments. The Cochrane review of group therapy (Stead 2005) concluded that such programmes increase the likelihood of quitting, approximately doubling the odds of quitting in workplaces and other settings (odds ratio (OR) 1.97, 95% confidence interval (CI) 1.57 to 2.48 compared with self help). Only four included studies are common to that review and the present one (DePaul 1987; DePaul 1989; DePaul 1994; Omenn 1988), making the two bodies of evidence relatively independent of each other. The Cochrane review of individual counselling (Lancaster 2005a) identified 11 trials in workplaces and other settings, with only one study (Windsor 1988) in common with this review. The OR for successful smoking cessation was 1.62 (95% CI 1.35 to 1.94). We failed to find evidence that more intensive counselling was more effective than brief counselling (OR 0.98, 95% CI 0.51 to 1.56). In addition, there was no evidence of a difference in effect between individual counselling and group therapy (OR 1.33, 95% CI 0.83 to 2.13). However, even in workplace settings, recruitment to counselling is often low (Eriksen 1998; Tanaka 2006). Thus the effects seen in trials often produce small numbers of quitters in absolute terms; for example, a doubled quit rate of 1% is still only 2%.

There is limited evidence from this review that cessation programmes aimed at the individual are more effective when combined with an institutional approach which provides environmental support for stopping smoking. Although there is a strong theoretical rationale for approaches that integrate smoking cessation with comprehensive health promotion and protection programmes in the workplace, formal studies of such approaches have failed to show that they significantly decrease overall prevalence of smoking.

We found 15 previous literature reviews on workplace cessation programmes published between 1980 and 2006 (Danaher 1980; Orleans 1982; Windsor 1984; Hallett 1986; Bibeau 1988; Klesges 1988; Fisher 1990; Fielding 1991; Eriksen 1998; Peersman 1998; Brownson 2002; Fichtenberg 2002; Janer 2002; Smedslund 2004; Albertsen 2006). Of these, seven have been systematic in their search of the literature, three offering a formal meta-analysis (Fisher 1990; Fichtenberg 2002; Smedslund 2004) and the other four a narrative-based review (Eriksen 1998; Peersman 1998; Janer 2002; Albertsen 2006).

A particular attraction of the workplace is that it provides a route of access for communicating about smoking and offering help to stop. However, participation rates are often low. A number of studies considered methods for increasing participation. This review

found limited evidence that participation in programmes can be increased by competitions and incentives organized by the employer (see also Cahill 2008). One limitation of the existing evidence is that most studies were conducted in stable workplace settings which are becoming less common, as workers are increasingly mobile (for example, in the construction and transport industries) or on short-term contracts (as in many modern service industries). The assumption that the workplace is a good place for recruitment can only be made for certain types of workplace.

In addition to effectiveness, it is clearly important for employers to consider the economic aspects of introducing smoking programmes in their workplaces. These issues are infrequently addressed in the studies included in this review, and those studies which do discuss the economic implications are difficult to compare. The absolute figures quoted vary across time and across countries, and the methods of calculating costs differ from one study to the next. Some studies calculate a cost per quitter from among the smokers only, while others use the entire workforce as the denominator. These approaches also take no account of smokers who are not enrolled in the programme, but who are nonetheless reached and affected by the programme's publicity, or by friends and family who participate. Given that the quitters among them may have been influenced by the presence of the programme, they might reasonably be counted among the programme's successes. Furthermore, it is inappropriate to base the calculations simply on the programme costs, without reference to other direct costs such as occupied space that could have been used differently, donated or discounted time and resources, and avoidance of future healthcare expenditure on continuing smokers. Some studies risk an oversimplified approach to the analysis, calculating the costs per quitter in the intervention group without reference to the costs per quitter in the control or pre-policy group. The intervention costs should be reckoned as incremental to those incurred by the control group, which can be seen as demonstrating the background or placebo rate.

The results of cost-effectiveness studies depend on the economic perspective adopted, and a number of viewpoints may be valid. A cost analysis could assess effectiveness from the point of view of the individual worker (which will vary by their smoking status), the institution, the health service providers, the community, or the budget-holders (Drummond 1997). For example, employers who directly fund employee health insurance may look favourably on long-term reduction in their costs that might result from a successful smoking cessation programme. The perspective of employers operating in countries where the state is the main provider of health care will be very different. Cost-effectiveness analyses conducted in the USA (Warner 1996) therefore have limited applicability to other healthcare systems.

The effectiveness data in this review could be used to model cost-effectiveness, but this would require a model that took account of the particular circumstances of individual healthcare systems. Reduction in smoking may lead to economic benefits in terms of reduced absenteeism and increased productivity. However, the studies included in this review provided limited data on these outcomes, and are too diverse to allow firm inferences to be drawn.

AUTHORS' CONCLUSIONS

Implications for practice

The workplace is an environment in which employees may be offered smoking cessation services such as individual and group counselling, self-help treatments, pharmacological treatment and social support to overcome nicotine addiction. All of these have been tested in workplace settings, and the findings are consistent with those found in other settings. Although people taking up these interventions are more likely to stop, the absolute quit rate is low. Whether these are offered through the workplace or by referral to other agencies is likely to vary in different healthcare systems and with different methods of payment.

The potential advantage of the workplace is that more people can be reached and participation in cessation attempts is thereby increased. However, participation rates are usually low even within workplaces. There is limited evidence that participation in such programmes can be increased by competitions and incentives organized by the employer.

Although there is a strong theoretical rationale for approaches that integrate smoking cessation with comprehensive health promotion and protection programmes in the workplace, formal studies of such approaches have failed to show that they significantly decrease prevalence of smoking.

Implications for research

A particular finding of this review is the lack of data on economic aspects of workplace cessation programmes. Future studies should include measurement of direct and indirect costs, and if possible, economically relevant outcomes such as absenteeism and productivity.

ACKNOWLEDGEMENTS

We would like to thank Angela Harden for advice in the planning stage of the review, Rafael Perera for statistical support, Lindsay Stead for search strategies and for editorial guidance, Andrew Briggs for advice on the economic aspects, and Stephen Sutton, peer reviewers from the Department of Health and Malgorzata Bala for comments and suggestions. We also thank Glorian Sorensen for supplying additional data for the 2008 updated version of the review.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies *[author-defined order]*

Glasgow 1984

Methods	Country:USA Recruitment: telephone company employees Design: RCT, no details of randomization method
Participants	36 employees and spouses (25 women and 11 men) 69% female. Av. age: 37 Smoked: average of 18 yrs and on average 30 cpd Participation rate: not reported
Interventions	Group therapy Three groups: 1. abrupt reduction 2. gradual reduction 3. gradual reduction with feedback pre- and two post-tests; 7 weekly meetings with goals of 50% reduction per week in abrupt group; 25% per week in gradual group; 25% per week with graphs of daily nicotine intake for gradual/feedback group.
Outcomes	Self report of smoking status and consumption at 6m, with CO validation and cigarette butt weight.
Notes	Analyses were conducted on non-abstinent subjects at end of treatment, to assess reduction efficacy. Outcomes included changes in nicotine content (brand smoked), amount of cigarette smoked, and number of cigarettes smoked.

Risk of bias

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

Frank 1986

Methods	Country: USA Recruitment: University of Missouri employees Evaluation: determine the effects of various amounts of hypnosis and hypnosis plus behavioural sessions Design: RCT, no details of randomization method
Participants	63 smokers Female: 62% Median education: 16 yrs Median income: US$27,000 Participation rate: not reported
Interventions	In the initial study, 48 subjects of the total (N = 63) used, were assigned to one of three treatments: 1. four hypnotherapy (HYP) sessions + booster 2. 2 HYP sessions 3. 2 HYP + 2 behavioural sessions + booster.

Frank 1986 (*Continued*)

	A follow-up group was later recruited composed of 15 subjects who received 4 HYP + booster with less time between sessions.
Outcomes	Self-reported cessation at 3m and 6m, with saliva thiocyanate confirmation at 3m only.
Notes	

Risk of bias

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

Klesges 1987

Methods	Country: USA Recruitment: Employees from 4 worksites in Fargo, North Dakota and 4 in Eugene, Oregon Design: Cluster (worksite) randomization but individuals the unit of analysis. Two (competition/nocompetition) by two (relapse prevention training/no relapse prevention training) factorial design
Participants	Participants: 136 smokers from 8 worksites. Site size ranged from 50 - 380 Av. age: 38. av cpd: 28 Smoked: average 19 years Participation rate: not reported - estimated 28% across all sites
Interventions	Evaluates the incremental effectiveness of competition and relapse prevention training in the context of a multicomponent cessation programme Multicomponent cognitive behavioural programme for 6 weekly sessions; within-site competition with weekly feedback on a visible barometer and monetary prizes at programme completion and at 6m; relapse prevention booster sessions were held at 1m and 2m intervals following the programme.
Outcomes	Cessation at 6m Validation: CO and saliva thiocyanate
Notes	The competition incentive was conducted within each intervention worksite, rather than between the worksites. Other outcomes included relapse prevention, smoking reduction, nicotine levels (brands), % of cigarette smoked.

Risk of bias

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

DePaul 1987

Methods	Country: USA Recruitment: Employees at 43 worksites, recruited prior to a 3w television smoking cessation programme. Design: Cluster randomization by worksite, matched for size
Participants	233 smokers in 21 group discussion worksites, 192 in 22 non-group work sites. Groups led by trained employees Participation rate: not reported
Interventions	All participants were given self-help manuals by company co-ordinators and instructed to view the televized segments 1. Twice weekly group meetings 2. Self help alone
Outcomes	Abstinence at 12m (multiple PP) Partial validation by salivary cotinine or family/colleague report
Notes	

Risk of bias

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

Omenn 1988

Methods	Country: USA Recruitment: Single worksite (13,000 workers, 9 employers) Randomization: by nurses at aid stations using randomized assignment lists generated by research centre, within preference for format.
Participants	159 smokers (av. age 43, 66% male, av.cpd 25) with preference for group programme or no preference. 243 smokers with a preference for self help randomized to 3 different S-H programmes Groups lead by instructors trained in both programmes. Participation rate: 11%
Interventions	Group therapy preference: 1. Multiple Component programme. 3 sessions over 3w 2. Relapse Prevention programme. 6 sessions over 6w 3. Minimal Treatment programme. Self-help materials only. American Cancer Society's 22 page 'Quitter's Guide' 7-day plan. S-H preference: Same 3 programmes, all in manual form, with no group meetings.
Outcomes	Abstinence at 12m (single PP) Validation: saliva cotinine <= 35ng/ml

Omenn 1988 (*Continued*)

Notes	Group programmes were held away from worksite in non-work hours. 50% random sample of continuing smokers supplied salivary samples

Risk of bias

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

DePaul 1989

Methods	Country: USA Recruitment: Employees at 38 worksites, recruited prior to a 3w television smoking cessation programme. Design: Cluster randomization by worksite
Participants	419 smokers who participated in the worksite programmes, 206 Group, 213 No Group conditions. Participation rate: not reported
Interventions	1. 6 x twice-weekly group meetings to coincide with the 3w television series, then monthly meetings for a year. Abstinent smokers and 5 of their family and 5 co-workers entered for a lottery at the final group meeting and 12m follow up. 2. Self-help manuals only
Outcomes	Abstinence from end of programme to 24m Validation by saliva cotinine and co-worker or relative confirmation.
Notes	This study featured monthly booster sessions and monetary incentives for abstainers, as a development of the design of the first De Paul study

Risk of bias

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

Sorensen 1993

Methods	Country: USA Setting: 8 worksites in Bloomington, Minnesota Design: Cluster randomized trial.
Participants	Intervention worksites (I): 1885 workers, Comparison sites (C): 1479 workers. 39% smoked at baseline in I and 31% in C worksites Participation rate: 12% of smokers (range 8-29% by site); 3.7% of nonsmokers participated in classes to assist quitters.

Sorensen 1993 (*Continued*)

Interventions	The 3m intervention included consultation for employers on the adoption of a non-smoking policy, training for nonsmokers to provide assistance to smokers attempting to quit, and cessation classes for smokers
Outcomes	Quit rate, self-reported (an attempt was made to collect saliva samples for analysis for cotinine). Baseline survey of all employees was conducted 9m before intervention, companies then randomized, then 3m intervention period, 1m and 6m after the completion of intervention. Evaluation period: 6m
Notes	Analyses were by individuals for some outcomes, although randomization was by worksite. The study area had been an intervention site for the Minnesota Heart Health Program, and outcomes may not be generalizable. Other outcomes included nonsmokers' support for quit attempts, co-worker requests not to smoke, co-workers non-smoking, number of quit attempts.

Risk of bias

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

DePaul 1994

Methods	Country: USA Setting: 61 worksites Design: Cluster randomization by worksite
Participants	844 smokers recruited; 289 Self Help (SH), 281 Incentives (I), 283 Group (G). Av. age 38, Av cpd 21 72% female in SH, 58% female in I, 59% female in G Participation rate: 58% in SH, 59% in I, 55% in G
Interventions	Worksite interventions timed to coincide with a mass media intervention consisting of a week-long smoking cessation series on TV, and a complementary newspaper supplement. SH: Self-help manual (ALA Freedom from Smoking in 20 days) I: Self-help manual and incentive payment of US$1 for each day abstinent up to US$175 G: 6 group meetings over 3w followed by 14 booster meetings over 6m. Incentive payments. Handouts from same S-H manual. Maintenance manual (ALA A Lifetime of Freedom from Smoking)
Outcomes	Sustained abstinence at 12m Validation: CO < 9ppm. Saliva cotinine at 6m only
Notes	Discussion section includes some cost-benefit analysis.

Risk of bias

Item	Authors' judgement	Description

DePaul 1994 (*Continued*)

Allocation concealment?	Unclear	B - Unclear

Razavi 1999

Methods	Country: Belgium Recruitment: workplace volunteers in 32 companies Design: Open-label cessation phase, then RCT for relapse prevention, using random numbers and blinded list
Participants	344 quitters, abstinent for at least 1m at end of 3m X 7 cessation programme including group therapy and NRT. 38% female, av age 39.
Interventions	1. Relapse Prevention (RP). 10 sessions inc group discussion and role play led by professional counsellor 2. RP. 10 sessions of group discussion led by former smokers. 3. No RP
Outcomes	Abstinence for 9m from start of RP programme. Validation by expired CO < 10ppm and urinary cotinine <= 317ug/ml.(Rates for CO and self report alone also reported; higher than for doubly validated rates)
Notes	All participants for this study had achieved abstinence after a 3m group and NRT programme. This is a relapse prevention study, rather than cessation. Other outcomes include predictors of sustained abstinence, weight gain.

Risk of bias

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

Shimizu 1999

Methods	Country: Japan Setting: Omihachiman city office Design: RCT
Participants	53 volunteer smokers
Interventions	1. Intervention group received intensive education (i.e. the effect of smoking on health, the beneficial aspects of quitting smoking, how to stop smoking and how to deal with the withdrawal symptoms) for 5m, group lectures (twice) and individual counselling (three times). 2. Control group had no special treatment for 1st 5m
Outcomes	Self-reported and validated using expired air CO concentration.

Shimizu 1999 (*Continued*)

Notes	Other outcomes included predictors of cessation success. Data were derived from abstract only

Risk of bias

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

Schröter 2006

Methods	Country: Germany Setting: 4 worksites Design: RCT, sessions allocated randomly to standard behavioural (SB) or relapse prevention (RP) programmes
Participants	79 workers, mean age 40, 58% male, mean cpd 24, mean FTND score 5.
Interventions	6x90min sessions over 8 wks, group counselling + NRT if wanted. First 2 sessions same, then: 1. SB: psycho-educational, self-monitoring, environmental cue control, problem-solving, behavioural control strategies, operant conditioning, social support. 2. RP: functional analysis of high-risk situations, planning for them, coping strategies, self-monitoring, noting triggers.
Outcomes	Self-reported CA and PPA at 1m and 12m.
Notes	12m non-responders were phoned for smoking status. SB participants were given 'rescue' RP training when necessary, so separation of interventions not guaranteed. New for 2008 update.

Gunes 2007

Methods	Country: Turkey Setting: Textile factory in Malatya Design: matched controlled study, followed up at 6m
Participants	200 workers (425 smokers completed baseline questionnaire); 100 in each group, matched on age, education, working periods and amount smoked. Intervention and control groups worked different shifts. All male workforce, mean age 29.3, 81.7% married, 44.5% attended high school. Prevalence 65.9% smokers, 6.8% ex-smokers.
Interventions	3-wk 7-step programme, based on stages of change model, and ALA programme.
Outcomes	Primary outcome was movement through stages of change, but 6m cessation rate also reported. PPA self-report, no verification.
Notes	Reported as no attrition or losses to follow up. New for 2008 update.

Gunes 2007 (*Continued*)

Risk of bias		
Item	**Authors' judgement**	**Description**
Allocation concealment?	No	N/A

Kornitzer 1980

Methods	Country: Belgium Setting: 30 factories Design: Cluster-randomized matched pair design RCT. Randomization method not described.
Participants	Participants: 16,230 men aged 40-59 (83.7% of eligible men)
Interventions	1. Intervention: All screened for height, weight, cholesterol, smoking, BP, ECG, personality and psychological testing. Top 20% at risk counted as the 'high risk' group, who received 6-monthly individual physician counselling. Complete cessation was encouraged, but pipes or cigars allowed if necessary. Advice booklet also supplied. All smokers of 5 or more cpd received written advice to quit.. Environmental components included anti-smoking posters and a factory conference on dangers of tobacco. 2. Control: a 10% sample screened at baseline were followed up; the 20% of this sample with the highest risk score were also identified as the control 'high risk' subset, to be analyzed separately. The 'Design and Methodology' paper reports that all eligible men in the control factories all received an ECG, but this is not mentioned in later reports.
Outcomes	7-day PP at 2 yrs follow up. 5% sample of intervention group (327 men) were tested, + all of the original high-risk group (1268). The 10% random sample control subjects were reviewed after 2 yrs, including the 20% high risk subgroup (202 men). Self report only, without biochemical verification
Notes	This trial was added to the 2005 update This is the Belgian Heart Disease Prevention Project

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

Cambien 1981

Methods	Country: France Recruitment: Worksite volunteers in 160 sections of an administrative organization. Design Cluster-randomized controlled trial. Randomization method not described
Participants	3336 men aged 25-35 at baseline. 424 classified as at high risk of coronary disease, 868 at low risk. Mean cpd 8.9 intervention, 10.0 control

Cambien 1981 (*Continued*)

Interventions	1. High risk intervention subjects recalled at 6m, 12m, 24m, low risk at 12m, 24m. All intervention subjects measured blood sample, weight, BP, no. of cpd. Given tailored advice on diet, alcohol and smoking at each visit. 2. Controls received no counselling or measurement between baseline and follow up
Outcomes	Abstinence/reduction at 2 yrs. At 2yrs 568 (86%) of intervention group returned, and 529 (84%) of control group. Validation: Blood CO
Notes	This trial was added to the 2005 update 95 intervention subjects lost to follow up were heavier smokers (+4.4 cpd) vs 100 control subects lost to follow up (+0.4 cpd).

Risk of bias

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

Li 1984

Methods	Country: USA Setting: naval shipyard Recruitment: Smokers identified at worksite screening (unselected) Design: RCT, no details of method
Participants	871 male asbestos-exposed smokers Av cpd: 24-26
Interventions	1.Advice from occupational physician; minimal warning, results of pulmonary function tests, leaflets 2. As group 1 plus behavioural counselling
Outcomes	Sustained abstinence at 11m Validation: expired CO
Notes	Other outcomes included stratification by lung function, reduction by continuing smokers, predictors of successful quitting and characteristics of smokers refusing to participate in the study. Randomization ratio (method not explained) changed halfway through the study from 3:1 to 1:1. The study found wide variation in implementation of the study procedure by physicians

Risk of bias

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

Gomel 1993a

Methods	Country: Australia Setting: 28 Sydney ambulance stations Design: Cluster-randomized RCT. method of randomization not described.
Participants	431 participants (88%) in 28 stations. av age 32 yrs. 128 smokers, mean cpd 17.9.
Interventions	1. Health Risk Assessment (HRA): (10 stations, 40 smokers): Measurement of BMI, % body fat, BP, cholesterol, smoking status, aerobic capacity. Feedback given, with high risk people referred to family GP. This minimal 30 minute intervention was the control group. 2. Risk Factor Education (RFE): (8 stations, 28 smokers): Same measures as HRA, + advice through manual and videos in a 50 minute session. 3. Behavioural Counselling (BC): (6 stations, 30 smokers). Same as RFE group, + up to 6 counselling sessions (averaged 3) over 10w, + staged change manual. 4. Behavioural Counselling + Incentives (BCI): (4 stations, 30 smokers). As RFE, + manual and goal-setting and follow-up counselling (average 2 hrs). Also lottery draw for A$40 voucher if interim targets achieved, and final prize of A$1000 for highest achieving station at 6m.
Outcomes	Baseline, 3, 6 and 12m assessments. PP abstinence at 12m, validated by serum cotinine.
Notes	This trial was added to the 2005 update Fewer stations and participants were allocated to the more intensive interventions (BC and BCI) because of cost. Some contamination between conditions reported.

Risk of bias

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

Kadowaki 2000

Methods	Country: Japan Setting single factory, 542 employees Design: RCT, allocation by random number
Participants	263 male smokers Av. age 34, av cpd 19
Interventions	1. Physician advice, CO feedback, cessation contract, self-help materials. follow up over 5m. Smoking Cessation Marathon during month 4 2. Delayed intervention control
Outcomes	Abstinence for > 1m at 5m (also 12m follow up but by then control group also treated) Validation: CO < 9ppm, plus urine test at 12m

Kadowaki 2000 (*Continued*)

Notes	All male smokers (62.9%) were entered compulsorily into the trial. Female smokers (3.4%) were not included. Other outcomes included smoking reduction, willingness to quit and predictors of success.

Risk of bias

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

Lang 2000

Methods	Country: France Setting: Annual health check in one large gas and electric company Design: Cluster randomization by site physician, physician as unit of analysis
Participants	28 site physicians covering 1269 smokers and 2614 nonsmokers Av. age: 38, 82% male Av cpd: 14
Interventions	1. Low intensity intervention: Physician advice 5-10 mins incl. leaflets 2. High intensity: as 1. plus quit date, moral contract, follow-up phone call, and 2nd visit
Outcomes	Abstinence (self-reported) for at least 6m at 1 yr follow up Validation: CO measurement in subgroup
Notes	Other outcomes included BMI and depression score

Risk of bias

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

Terazawa 2001

Methods	Country: Japan Setting: Occupational health clinic Design: RCT; details of randomization not described
Participants	228 smokers, randomized to intervention (117) or control (111). Average age 39, av cpd 23; 50% had made previous quit attempts.
Interventions	Baseline questionnaire during routine health check up, with CO and urinary metabolites measured and reported back. 1. Intervention: Stage-matched counselling (15-20 mins) by trained nurses, + 4 follow-up phone calls for

Terazawa 2001 (*Continued*)

	those prepared to set a quit date. 2. Control: baseline questionnaire and usual care.
Outcomes	Continuous abstinence at 6m and 12m. Validated by CO ?
Notes	This trial was added to the 2005 update 25 smokers in the intervention group set a quit date and received the follow-up calls. Data were derived from abstract only

Risk of bias

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

Tanaka 2006

Methods	Country: Japan Setting: 12 companies (500-1000 employees each) Design: Matched pairs controlled study (randomization intended but not feasible).
Participants	Int/Cont: 1382/1736 current smokers, 94%/97.4% M, 92.9%/95.7% blue-collar workers, 66.1%/61.5% smoke >20 cpd. Significant differences between groups on age, gender, occupation type, cpd, controlled for in analysis. 71.6%/73.2% in precontemplation; 35.1%/34.5% had made at least one previous quit attempt.
Interventions	Intervention: 1. Posters, newsletters, website, advertising the cessation campaign and stages of change model. 2. Worksite smoking cessation programme, conducted by worksite nurse using research team materials, giving (a) 5 brochures on stages of change, (b) 4 counselling sessions + NRT if requested, (c) award to winner among abstainers. 6-wk programme, run 5 times over 36m. 3. Advice re secondhand smoke, and designation of smoking areas. 4. Regular site visits by member of research time. Control: Standard annual health checks. Participation rate was 9% across all sites.
Outcomes	Sustained 6m abstinence at 12m, 24m, 36m, not biochemically verified. Movement through stages of change, cost-benefit analysis.
Notes	New for 2008 update (previously an excluded study)

Sorensen 2007

Methods	Country: USA Setting: Phone-based and mailed info, targeted at members of LIUNA (construction workers union). Design: RCT, no details given
Participants	674 workers (354 intervention and 320 control*) completed baseline survey, and 582 (188 smokers [= current or quit within last 6m]) at 6m follow up. 94% male, mean age 40, smoking prevalence I:45%,

Sorensen 2007 (*Continued*)

	C:40%.
Interventions	3m programme to increase fruit & veg consumption and quit smoking. Intervention: (i) Phone-based counselling, up to 4 calls in 3m. (ii) Mailed tailored feedback. (iii) 6 mailings of targeted info. (iv) NRT if requested. Control: Nothing during programme, but all targeted written info at study end.
Outcomes	Self-reported 7-day PPA at 6m, no verification. Increased fruit & veg consumption.
Notes	Tools for Health programme; specifically targeted blue-collar workers. * data supplied by authors New for 2008 update.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	'survey respondents agreeing to participate were randomly assigned to one of two conditions'

Jeffery 1988

Methods	Country: USA Setting: faculty and staff of the University of Minnesota Design: RCT
Participants	59 volunteer smokers. Av age 36.8, female 64.5% Participation rate: 2%
Interventions	Self-help manual; optional education/counselling; financial contracts of US$5 to US$25 bi-weekly. One group aimed at cessation, the other at reduction or cessation.
Outcomes	Self-reported cessation rate immediately post-treatment and at 6m, biochemically validated at both points (CO, SCN)
Notes	15,000 staff members were approached to join the study. Of 137 smokers expressing an interest in the programme, only 59 actually signed up to it.

Risk of bias

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

Sutton 1988a

Methods	Country: UK Setting: Company A with occupational health program near London Design: RCT: cessation motivation vs seat belt video groups
Participants	77 in videotape conditions (33 for smoking video, 44 for seatbelts video), 55 non-participant smokers (no-treatment control group).
Interventions	Trial was described to company as a 'health information programme', and was open to all employees, whether or not they smoked. 1. 25-minute video 'Dying for a Fag' (DFF) plus a cessation booklet, the Heatth Education Council's 'The smoker's guide to non-smoking' 2. 25-minute video on seatbelt use, + a leaflet about seatbelts 3. Smokers who chose not to participate - no videos or information
Outcomes	Self-reported PP smoking cessation at 3m and 1yr with CO validation < 10 ppm
Notes	Although all 4 trials (a-d) are of similar design, and are reported in a single paper, we have treated them here as four separate RCTs. Cash incentives were offered at baseline and at 12m follow up to boost questionnaire response rates. The authors also present a 4-study pooled analysis, which failed to detect signficant differences in cessation rates.

Risk of bias

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

Sutton 1988b

Methods	Country: UK Setting: Company B with occupational health program near London Design: RCT: cessation motivation vs cessation motivation plus confidence boosting vs. political aspects of tobacco video groups
Participants	150 in videotape conditions (46, 50 and 54 in the 3 groups), + 374 non-participant smokers
Interventions	Trial was described to company as a 'smoking education programme', and was open only to smokers. 1. 25-minute video 'Dying for a Fag' (DFF) plus a cessation booklet, the Heatth Education Council's 'The smoker's guide to non-smoking' 2. DFF with additional sequence to boost the confidence of those making a quit attempt (DFF+C) 3. 'Licence to Kill', on the political aspects of smoking (LTK). 4. Smokers who chose not to participate - no videos or information
Outcomes	Self-reported PP smoking cessation at 3m and 1yr with CO validation < 10 ppm
Notes	Cash incentives were offered at baseline and at 12m follow up to boost questionnaire response rates. The authors also present a 4 study pooled analysis, which failed to detect significant differences in cessation

Sutton 1988b (*Continued*)

	rates. Although the cessation rates appear to be significantly better in this study than in the other 3, the authors point out that follow up was around New Year, when many people try and stop anyway, and may also have been influenced by the concurrent BBC series 'So you want to stop smoking'

Risk of bias

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

Sutton 1988c

Methods	Country: UK Setting: Company C with occupational health program near London Design: RCT : cessation motivation vs cessation motivation minus a gory sequence vs. advertising aspects of tobacco videotapes groups
Participants	197 in videotape conditions (56, 67 and 74 in the 3 groups) + 226 non-participant smokers
Interventions	Trial was described to company as a 'smoking education programme', and was open only to smokers. 1. 25-minute video 'Dying for a Fag' (DFF) plus a cessation booklet, the Heatth Education Council's 'The smoker's guide to non-smoking' 2. DFF with graphic 'shock' sequence about diseased lungs edited out, to lower fear element (DFF-G) 3. 'The Tobacco War', on the advertising aspects of smoking (TW). 4. Smokers who chose not to participate - no videos or information
Outcomes	Self-reported PP smoking cessation at 3m and 1yr with CO validation < 10 ppm
Notes	Cash incentives were offered at 12m follow up to boost questionnaire response rate. There were no differences between the video and non-participant groups in long-term abstinence . The authors also present a 4 study pooled analysis, which failed to detect signficant differences in cessation rates.

Risk of bias

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

Sutton 1988d

Methods	Country: UK Setting: Company D with occupational health program near London Design: RCT: cessation motivation vs another cessation motivation vs. advertising aspects of tobacco videotapes groups
Participants	179 in videotape conditions (62, 59 and 58 in 3 groups) + 360 non-participant smokers
Interventions	Trial was described to company as a 'smoking education programme', and was open only to smokers. 1. 25-minute video 'Dying for a Fag' (DFF) plus a cessation booklet, the Heatth Education Council's 'The smoker's guide to non-smoking' 2. "Smoker's Luck", on a continuing smoker suffering from advanced smoking-related disease (SL) 3. 'The Tobacco War', on the advertising aspects of smoking (TW). 4. Smokers who chose not to participate - no videos or information
Outcomes	Self-reported PP smoking cessation at 3m and 1yr with CO validation < 10 ppm
Notes	There were no differences between the video and non-participants groups in long term abstinence. Cash incentives were offered at baseline and at 12-month follow-up to boost questionnaire response rates. The authors also present a 4 study pooled analysis, which failed to detect signficant differences in cessation rates.

Risk of bias

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

Burling 1989

Methods	Country: USA Recruitment: Veterans Administration Medical Centre employee volunteers Design: RCT, no details of randomization method
Participants	58 smokers 57% female, Av. age 44 All participants smoked for at least 6m (validated with CO measurement) Participation rate: not reported
Interventions	1. American Cancer Society and ALA pamphlets about smoking, a telephone hotline, and a stop-smoking contest which gave vouchers for a draw, for each day when expired CO < 8ppm. 2. As 1, plus use of a computer to enter data on smoking behaviour and to smoke a cigarette through a filter attached to the computer; this produced an individualized nicotine fading programme
Outcomes	Abstinence at 6m Validation: CO < 8ppm
Notes	Participants in the computer group had lower self efficacy scores than the contest-only group

Burling 1989 (*Continued*)

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

Burling 2000

Methods	Country: USA Recruitment: Worksite volunteers Design: RCT, no details of randomization method
Participants	87 smokers 36% female, Av. age 38, av. cigs/day 15 Participation rate: not reported
Interventions	1. The Last Draw, an internet-based interactive programme to aid preparation, quitting and relapse prevention, plus FadeAid, an aid to nicotine fading 2. ALA Freedom from Smoking booklet, 2 manuals and an audio relaxation tape
Outcomes	Abstinence at 6m (7day PP) Validation: CO
Notes	73% of Group 1 participants used the interactive programme, compared with 90% of the comparison group who used the ALA programme

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

Campbell 2002

Methods	Country: USA Recruitment: 10 small manufacturing companies in NC. Design: Cluster RCT, no details of randomization
Participants	859 blue-collar women at baseline (73% of eligible). 538 completed programme to 18m. 53% aged 40 or younger, 58% African American. Mean BMI 29. 30% I group, 22% C group smoked.
Interventions	1. Intervention: computer-tailored 'magazine' with dietary, exercise, smoking advice, at baseline and 6m, plus social support at work from trained helpers in participants' chosen activity. N.B. No lay helpers offered smoking support. 2. Delayed intervention (control): One computer-tailored 'magazine at 6m, no social support.

Campbell 2002 (*Continued*)

Outcomes	Abstinence at 18m: self-reported, no biochemical validation.
Notes	This trial was added to the 2005 update Natural (lay) helpers declined training in smoking cessation, so this arm of the intervention was not available to participants trying to quit

Risk of bias

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

Kornitzer 1987

Methods	Country: Belgium Recruitment: industrial worksite primary care clinic Design: RCT, no details of randomization method
Participants	199 adult male smokers (av cpd 24-5)
Interventions	1. Nicotine gum (4 mg) for at least 3m 2. Nicotine gum (2 mg) for same time period. Minimal physician support
Outcomes	PP abstinence at 12m Validation: cotinine and carboxyhaemaglobin in a sub-sample
Notes	Blinding was broken at 3m, and participants were free to choose their dosage of nicotine gum. Results were stratified by Fagerstrom score.

Risk of bias

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

Sutton 1987

Methods	Country: UK Recruitment: Worksite primary care clinic in UK retail company (employees 3,253) Design: RCT, no details of method
Participants	270 participants invited out of 334 who expressed an interest Av age:34, 70% F av cpd 15.5

Sutton 1987 (*Continued*)

Interventions	1. Nicotine gum (2 mg) at least 4 boxes, duration not stated. (172 people) 2. Non-intervention control group (no placebo) of 64 continuing smokers Low level of support
Outcomes	Sustained abstinence at 12m; Validation: expired CO
Notes	Slight contamination of intervention group, as 4 control group members were moved at their own request into the intervention group.

Risk of bias

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

Sutton 1988e

Methods	Country: UK Recruitment: Worksite primary care clinic (employees 3,253) Design: RCT, no details of method
Participants	161 adult smokers who were still smoking after 3m of a videotape smoking cessation programme. Av cpd 15-19
Interventions	1.Nicotine gum (2 mg) for up to 12w 2.Non-intervention control group (no placebo). Low level of support
Outcomes	Validated long-term abstinence at 12m Validation: expired CO
Notes	Participants are the non-quitters at 3m from Sutton 1988d 5/82 control subjects asked for and received treatment. One was a long-term abstainer, and is classed as a control group success.

Risk of bias

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

Kornitzer 1995

Methods	Country: Belgium Recruitment: Worksite Design: RCT, computer-generated list
Participants	374 volunteers male and female, age > 20 yrs. No. of cigarettes: > 10 day for > 3 years
Interventions	1.Active patch and active gum (2mg as required) 2.Active patch and placebo gum 3.Placebo patch and placebo gum High level of adjunct support.
Outcomes	Sustained abstinence at 12m Validation: baseline salivary cotinine, and expired CO < 10 ppm at each follow up
Notes	Other outcomes included dermatological and systemic adverse effects, and time to relapse.

Risk of bias

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

Rodriguez 2003

Methods	Country: Spain Setting: 1 transport company (mostly bus drivers) and 2 electrical utility worksites (mostly clerical) in Bilbao. Design: Open RCT, with randomization by sealed opaque envelopes and computer-generated random lists
Participants	218 participants randomized to intervention (115) and control (103). All had physical check up, Fagerstrom NTQ, lab tests and ECG at baseline
Interventions	1. Intervention: 5-8 mins structured individual counselling on smoking cessation at baseline by occupational physician, + further contacts at 2 days, 15 days and 3m. Grade I (Fagerstrom score < 5) counselling only. Grade II (Fagerstrom score 5-7) 8 wks x14 mg nicotine patches. Grade III (Fagerstrom score > 7) 4 wks x 21 mg, 4wks x 14mg, 4wks x 7mg. Lower grade interventions could be upgraded if necessary. Participants kept records of progress, withdrawal symptoms, adverse events; weight and tobacco consumption were checked at specified intervals. 2. Control: minimal (30-60 secs) sporadic unstructured advice, usually at annual medical check up
Outcomes	Continuous abstinence (7 day PP at each assessment) at 12m. Validated at each assessment by expired CO <= 10ppm
Notes	This trial was added to the 2005 update Secondary outcomes were: change in tobacco withdrawal symptoms, and weight changes.

Rodriguez 2003 (*Continued*)

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

Malott 1984

Methods	Country: USA Setting: volunteers from telephone company (8) and a medical clinic (16) Design: RCT, no details of randomization method
Participants	24 participants av age 34, had smoked for an average of 16 years, and av cpd 24. Average score on the Fagerstrom NTQ 6.0 Participation rate: not reported
Interventions	Group therapy 1. controlled smoking 2. controlled smoking plus partner support
Outcomes	Self-monitoring records, laboratory analyses of spent cigarette butts, and CO at 6m
Notes	Other outcomes included nicotine levels (brand smoked), smoking reduction, CO levels in continuing smokers and % of cigarette smoked.

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

Glasgow 1986

Methods	Country:USA Recruitment: VA hospital, savings and loan association, and a health insurance agency employee volunteers Design: RCT, no details of randomization procedure
Participants	29 adult cigarette smokers 69% female. Av. age 33.5 Average 25 cpd Fagerstrom score 5.7, indicating moderate levels of tobacco dependence. Participation rate: not reported
Interventions	1. Basic program (BP): subjects participated in 6 weekly group meetings- focused on making reductions in the no. of cpd and reductions in nicotine content. Midway through the programme subjects given the option of either complete cessation or reducing the percentage of each cigarette smoked.

Glasgow 1986 (*Continued*)

	2. BP and social support (SS): the same treatment as subjects in the BP group; in addition, each BP plus SS subject selected a partner who provided support and encouragement during non-work hours.
Outcomes	Self reports, examination and weighing of saved cigarette. Butts and 2 biochemical measures of smoking exposure, CO and saliva thiocyanate.
Notes	Outcomes included changes in nicotine content (brand smoked), amount of cigarette smoked, and number of cigarettes smoked. The influence of social support, or lack of it, was also assessed.

Risk of bias

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

Dawley 1991

Methods	Country: USA Recruitment: worksite volunteers in 2 comparable oil refineries in Southern Louisiana Design: RCT, no details of randomization method
Participants	30 smokers (14 at intervention site and 16 at comparison site) 76% male Av. age: 39, av. cpd 21 Participation rate: not reported
Interventions	1. Intervention: comprehensive programme of smoking control, discouragement, cinnamon sticks as cigarette substitutes, and smoking cessation 2. Control: smoking cessation alone
Outcomes	Self-reported smoking cessation with urinary cotinine validation
Notes	Introduction includes lengthy discussion of economic and health costs of smoking

Risk of bias

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

Erfurt 1991

Methods	Country: USA Setting: 4 General Motors worksites, Michigan Design: Cluster randomization by worksite
Participants	Random sample of 400-500 employees screened at baseline and followed up 3 yrs later. Predominantly male, white, blue collar. 41-45% smoked at baseline, but in the rescreened sample only 41% in site 3 and 36% in site 4 smoked at baseline
Interventions	Smoking, high blood pressure & obesity targetted. 1 worksite was allocated to each of 4 conditions: 1. Wellness screening; identify risks & referral 2. As 1. + media, programme sign-up campaigns and classes 3. As 1. + media, program sign-up campaigns, menu of interventions including guided self-help, group or individual counselling + follow up 4. As 3 + follow-up counselling + Plant Organization including peer support, aimed at reducing relapse. All sites initiated no smoking areas during the period.
Outcomes	Self-reported smoking status
Notes	Quit rates were calculated by combining 1985 smokers and ex-smokers (i.e. at risk of relapse)as the denominator. If the calculation is based only on current smokers at 1985 compared with 1988 quitters, the results do not reach statistical significance. Reduced prevalence at all 4 sites coincided with the setting-up of restrictive policies in each site.

Risk of bias

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

Hymowitz 1991

Methods	Country: USA Setting: 6 white-collar worksites. No worksite had a formal no-smoking policy or ongoing smoking cessation activities. Design: Cluster randomized trial
Participants	6 worksites ranging in size from 950 to 3,300 employees. 25% smoking prevalence. 252 employees aged 21 and older participated, representing only a small portion of the total number of smokers at each worksite. 62% female. Av. age 42.3 >60% White
Interventions	1. Full programme (I): volunteers participated in a 5w training programme for quit-smoking group leaders, and received additional training ,support, and how-to manuals to carry out a protocol for health education and sitewide intervention activities, as well as for the implementation of worksite smoking policies. 2. Group-only (C): volunteers participated in the training programme for group leaders, but did not carry out the protocols for health education and smoking policies

Hymowitz 1991 (*Continued*)

Outcomes	Self-reported cessation at 12m Validation: expired air CO
Notes	Unit of randomization was worksite but unit of analysis was the individual.

Risk of bias

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

Rand 1989

Methods	Country: USA Recruitment: Smoking volunteers employed at Francis Scott Key Medical Center, Baltimore. Design: RCT, no randomization detail
Participants	47 subjects who completed 5 days verified abstinence.
Interventions	1.Contingent payment for continued abstinence + frequent monitoring (n = 17) 2. Non-contingent payment for abstinence + frequent monitoring (n = 16) 3. Non-contingent payment, infrequent monitoring (n = 14)
Outcomes	Quit rate at 6m, confirmed by CO validation
Notes	Subjects had received a minimal cessation programme, i.e. a 15-minute talk and a booklet, with no skills training in cessation or relapse prevention.

Risk of bias

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

Windsor 1988

Methods	Country: USA Recruitment: University of Alabama employees volunteering for a quit smoking programme Design: randomized trial, using sealed numbered envelopes containing computer-generated assignment prior to baseline interview.
Participants	378 smokers Av. age 37, av cpd 23-27 Therapist: health visitor

Windsor 1988 (*Continued*)

Interventions	All groups received a 10 minute session of brief advice 1.+ S-H manuals 2. +S-H and another session of counselling (20-30 mins) with skills training, buddy selection and a contract 3.as 1. With monetary awards for cessation 4.as 2 with monetary rewards for cessation
Outcomes	Abstinence at 1 yr (sustained at 6w, 6m & 1 yr) Validation: saliva thiocyanate < 100 ng/ml at all follow ups
Notes	Other outcomes included some cost-benefit analysis, including efficacy of incentives..

Risk of bias

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

Glasgow 1993

Methods	Country: USA Recruitment: 19 worksites in Oregon. Design: Cluster randomized RCT
Participants	Worksites from 140-600 employees. Smoking prevalence of 21-22%; Av age 40-41. 63% female. 474 in Incentives (I) Group, 623 in No incentives (NI) Group
Interventions	Company steering groups ran the programmes 1. I Group members were paid US$10 for each verified abstinent month, up to 10m, + monthly and end-of-programme lotteries. There was also a buddy scheme, with cash prizes to helpers. 2. NI Group operated their normal company policy, which usually restricted but didn't ban smoking
Outcomes	Cessation rates at 12m and 2 yrs, verified by CO and salivary cotinine
Notes	Analysis was at both worksite and individual level.

Risk of bias

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

Hennrikus 2002

Methods	Country: USA Setting: 24 worksites in and around St Paul. No overlap with the Healthy Worker Project. Design: Randomized 2 x 3 factorial design, with smokers followed up at 12m and 24m. 85.5% responded to 12m survey, and 81.7% to 24m survey
Participants	2402 smokers on 24 sites, four sites randomized to each of the 6 conditions. There were significant differences in demographic characteristics between sites. Smoking prevalence ranged from 10.7% to 37.2%
Interventions	The three programme formats were group counselling, telephone counselling or a choice of group or phone. The programmes were then offered with and without incentives (=6). The incentive site smokers received US$10 for signing up to a programme, and US$20 for near or full completion. They were also offered US$20 for 30 days cessation, and were then entered into a prize draw for a US$500 cash prize.
Outcomes	Rates of recruitment to the programmes, and 7-day smoking PP at 12m and 24m follow up. Validation was by self report, confirmed by family member or friend. A sample of 188 quitters at 24m were asked to supply a saliva sample (128 complied). Winners of the prize draw could only claim their prizes by verifying abstinence with salivary cotinine.
Notes	This is the SUCCESS Project. Significant differences between worksites meant that several covariates had to be controlled for in the analyses. Other outcomes included comparing quit rates of registrants for the programmes with non-registrants

Risk of bias

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

Shi 1992

Methods	Country:USA Setting: 9 Pacific Gas and Electric worksites, allocated to 4 levels of intervention. Design: Quasi-experimental, random assignment of worksites. Sites were blinded to other intervention conditions.
Participants	2887 workers across 9 sites at baseline HRA survey (69% of eligibles). At 2 yr follow up 1998 (48%) were surveyed. Cross-sectional, not cohort surveys. > 40% of participants were manual workers, 25-31% clerical, 15-21% managerial and 12-16% technical staff.. 74-79% male, > 70% aged 30-49.
Interventions	1. (3 sites, 1372 participants): HRA (height, weight, smoking, BP, cholesterol, HDL levels) at start and end of programme, + a bi-monthly health newsletter (counts as control group). 2. (2 sites, 1083 participants): As 1, + health resources centre and free self-care booklets. 3. (2 sites, 1016 participants) As 2, + behaviour change workshops and a divisional HealthWise social support team. 4. (2 sites, 693 participants): As 3, + case management programme for high-risk participants (the 15% with the

Shi 1992 (*Continued*)

	highest risk scores) and an environmental policy (space, smoking policies, incentives, health fairs)
Outcomes	Smoking prevalence at 2 yr follow up in all four intervention groups. Self-report 'current smoker' at HRA; no biochemical confirmation.
Notes	This trial was added to the 2005 update. This is the HealthWise Stepped Intervention Study (HSIS). Level 4 sites were pre-selected by PG&E management (non-random) and were significantly smaller than the other levels, reflecting the expense of the Level 4 interventions

Glasgow 1995

Methods	Country: USA Setting: 26 worksites in Oregon Design: Cluster randomized trial
Participants	26 heterogeneous worksites in Oregon with between 125 and 750 employees - an average of 247. Participation rate: at baseline, early intervention rate was 38% and delayed intervention 58%. At 2 yr follow up, early intervention rate was 40% and delayed intervention was 57%
Interventions	Take Heart Project, focusing on diet and smoking Early intervention (multifaceted programme consisting of employee steering committee and a menu approach to conducting key intervention activities tailored to each site) vs. delayed but similar intervention
Outcomes	Self-reported smoking cessation
Notes	This is the Take Heart worksite wellness program. Other outcomes included dietary intake and cholesterol levels

Risk of bias

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

Sorensen 1996

Methods	Country: USA Setting: 108 worksites in 16 US states Design: Randomized matched-pair trial, using cross-sectional surveys at baseline and 2 yr follow up
Participants	108 worksites with over 28,000 employees (49 - 1700 workers per site). Participation rate 72%, Av age 41, 77% male, 92% white. Only 3 of the 4 study centres (84 sites) measured changes in smoking, as the 4th centre sites (Florida) had smoking bans already in place.
Interventions	Each workplace had an employee as co-ordinator, and an employee advisory board. 1) Individual core interventions: Process included a kickoff event, interactive activities, posters and

Sorensen 1996 (*Continued*)

	brochures, self assessments, self-help materials, campaigns and contests, and direct education through classes and groups. 2) Environmental core interventions: Consultation on smoking policy, changes in cafeteria and vending machine food, and additional nutritional education. Control sites had results of employee survey, and in some cases an optional minimal intervention of posters and newsletters.
Outcomes	Self-reported smoking cessation, without biochemical validation. 6m abstinence at follow up, smoking prevalence.
Notes	This is the Working Well Trial. Randomization and analysis were both based on worksite. Other outcomes were dietary fat reduction, fibre intake and fruit and vegetable consumption. Some control sites had minimal interventions such as posters and brochures. The Working Well trial generated a nested cohort study, the WellWorks Trial, which examined dietary and smoking changes stratified by job type at the Massachusets worksites. See Sorensen 1998 reference.

Risk of bias

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

Sorensen 1998

Methods	Country: USA Setting: 24 mainly manufacturing worksites in Massachusets, randomized into 12 pairs, and all thought to be using known or suspected carcinogens. Randomization was by worksite, but analysis was by individual. Analysis in this paper was cohort-based
Participants	5914 (61%) of sampled employees responded at baseline, and 5406 (62%) at 2 yr follow up. The cohort who responded to both surveys was 2658 employees.
Interventions	3 elements of intervention: 1) Joint worker-management programme planning and implementation 2) Consultation by project staff with management on environmental changes, inc tobacco control policies, healthy foods, occupational hazard reduction 3) Health education programs targeting individual behaviours in the risk factor areas.
Outcomes	Self-reported abstinence for 6m before final survey. No biochemical validation
Notes	The WellWorks Study is a nested component of the Working Well trial, but, unlike that trial, attempted to integrate health promotion and health protection interventions, and is therefore assessed separately. Other outcomes included fat, fibre and fruit and vegetable consumption, and differences between blue- and white-collar workers in all outcomes.

Sorensen 1998 (*Continued*)

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

Willemsen 1998

Methods	Country: Holland Setting: 4 work sites (chemical, telecommunication, public transport and local government) and 4 other similar worksites Design: cluster randomized trial
Participants	279 employees at intervention sites and 234 employees at comparison sites Average age: 41 years 75% male
Interventions	1. Comprehensive program (self-help manuals, group courses, a mass media campaign, smoking policies and a 2nd yr programme) 2. Minimal intervention (self-help manuals only).
Outcomes	Self-reported smoking cessation and saliva cotinine estimation
Notes	Analysis of light vs heavy smokers suggests greater efficacy among heavy smokers (P values not given). Other outcomes included relapse rates, the effectiveness of a 2nd yr programme.

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

Emmons 1999

Methods	Country: USA Setting: 26 worksites in RI and SE Mass (Brown University based). Only 22 sites completed the trial. Design: randomized matched pair, following a cohort over 3 yrs. Randomization process not described
Participants	22 worksites, and 2055 participants who completed all surveys. No demographic differences between intervention and control groups. Smoking prevalence 28% across both groups.
Interventions	1. Intervention sites: As with Working Well Trial (Sorensen 1996), but including physical activity; a combination of individual and environmental programmes, including space, showers, equipment and discounted membership of fitness facilities. 2. Control sites: Minimal care: Could offer 2 S-H smoking cessation programmes and 1 each on nutrition and physical activity.

Emmons 1999 (*Continued*)

Outcomes	Self-reported abstinence at 3 yrs for 6m prior to assessment, and 7-day PP No biochemical validation used. Secondary outcome: movement through stages of change
Notes	This trial was added to the 2005 update This is the Working Healthy Projected, nested within the Working Well trial

Risk of bias

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

Nilsson 2001

Methods	Country: Sweden Recruitment: 4 public sector worksites (568 employees) in Helsinborg. Design: RCT Randomization: method of allocation not stated.
Participants	Of 128 at-risk workers invited, 60/65 randomized to the intervention group attended for baseline assessment, and 53/63 from the control group. Mean age was 49.7, 61% female.
Interventions	1. Intervention group received 16 group sessions a year, as well as individual counselling by a nurse. Sessions included lectures, discussions, video sessions and outdoor activities. 2. Control group received standard written and oral advice about cardiovascular risk factors at the start of the intervention, and nothing thereafter.
Outcomes	PP at 12m and 18m. No biochemical validation.
Notes	Smoking was only one of several risk factors targeted, including BMI, BP,heart rate, low-density lipoprotein and cholesterol. Group sessions were held in working hours but away from the worksites.

Risk of bias

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

Sorensen 2002

Methods	Country: USA Setting: 15 manufacturing sites, probably handling hazardous chemicals, in Massachusetts. Design: RCT, randomized by worksite, but analysed by individual employee.
Participants	9019 employees (80%) across 15 sites. Mean workforce size 741 employees. Responders in the control groups were younger, more likely to be female, less educated, less likely to be white, and less likely to be hourly-paid rather than salaried.
Interventions	1. Control [8 sites] had Health Promotion (HP) intervention, i.e. consultation to management on tobacco control policies, catering and cafeteria policies, and programmes aimed at individuals, including self assessment with feedback, self-help activities, contests, demonstrations and displays, opportunities to try behaviours and goals, and group discussions. 2. Experimental Group [7 sites] (HP/OHS= health promotion with occupational health and safety) had the same elements as the Control sites, plus management recommendations to reduce occupational hazard exposure. For individuals, occupational health and safety training was added to the tobacco and nutritional elements of the control programme.
Outcomes	Quit rates (PP) at 6m, reported by cross-sectional survey and for the smoking cohort. Self report only, no biochemical validation
Notes	This is the Wellworks-2 Trial, targeting particularly blue collar workers. Analyses were cross-sectional and cohort Other primary outcomes were nutrition and perceived exposure to occupational hazards.

Risk of bias

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

ALA: American Lung Association
av: average
BMI: body mass index
BP: blood pressure
CO: carbon monoxide
cpd: cigarettes per day
ETS: environmental tobacco smoke
FTND: Fagerström Test for Nicotine Dependence
h: hour
HDL: high density lipids
HRA: health risk assessment
inc: Including
I: intervention; C: control
m: month
NRT: nicotine replacement therapy
NTQ: nicotine tolerance questionnaire
PPA: point prevalence abstinence
ppm: parts per million

RCT: randomized controlled trial
S-H: self help
vs: versus
w: week
yr: year (s)

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

Addley 2001	Observational study, no control worksites. Smoking was one of a number of lifestyle changes surveyed over a three-year period, by a follow-up postal survey six months after assessment.
Armitage 2007	RCT for smoking reduction; 2m duration New for 2008 update.
Baile 1991	Follow-up only four months. Evaluated the impact of a hospital smoking ban with no report of cessation programmes.
Barbeau 2006	Pre/post study, no control group, assessment at 5m New for 2008 update.
Bertera 1990	Non randomized. Evaluated the relative efficacy and cost-effectiveness of a stop smoking clinic versus self-help kit in the workplace
Borland 1991b	Examined predictors of smoking cessation attempts not cessation rates after the introduction of workplace smoking bans.
Borland 1995	One group post-test only. Surveyed smokers two years after a total workplace ban.
Brenner 1992	Population-based survey, to assess the effects of workplace smoking bans and cessation rates, expressed as a quit ratio
Brenner 1994	One group, post-test only. Evaluated smoking regulations at the workplace and smoking behaviour in Southern Germany.
Brigham 1994	Follow-up for only four weeks. Examined the effects of a restricted worksite smoking ploidy on employees who smoke.
Broder 1993	Pre- and post-ban surveys on three buildings (137 workers), to assess air quality and physical symptoms of ETS. Prevalence was not a primary outcome, but was reported as unchanged between the two surveys
Bunger 2003	Description of a cardiovascular risk reduction intervention in a power plant; no control or comparison site
Burling 1994	Descriptive report of a computer-directed programme for smoking cessation treatment. Previous reported outcome data from a minimal intervention and intensive stop smoking treatment are presented.
Busch 2005	Observational study of 2 German factory interventions. New for 2008 update.

(*Continued*)

Campbell 2000	Cross-sectional survey of 859 women in nine North Carolina worksites, to assess health behaviours, risks and desire to change behaviour. A population-based survey, with no control group or intervention.
Choi 2007	6 wk RCT of patches for reducing craving. New for 2008 update.
Conrad 1996	Non-randomized. Evaluated exposure to a worksite health-promoting environment as an aid to smoking cessation.
Cooreman 1997	Eight years had lapsed between surveys. Evaluated the impact of a smoking ban in a large Paris hospital
Cornfeld 2002	Large cohort study, not a controlled intervention trial
Daughton 1992	One group, no pre-test . Evaluated the effect of a smoking ban with partially subsidised cessation programmes.
Dawley 1984	Non-randomized. Evaluation of a smoking cessation treatment programme of ten one-hour sessions.
Dawley 1993	Follow-up for only four months. A programme of smoking control in one company versus a smoking cessation class in a second company.
Eisner 1998	Outcome not smoking cessation but bartenders' respiratory health. Evaluated the respiratory health of bartenders before and after legislative prohibition of smoking in all bars and taverns by the state of California.
Emont 1992	Outcome not smoking cessation. Evaluated the effectiveness of incentives as an aid to recruitment.
Eriksen 2005	Survey of Norwegian nurses' smoking New for 2008 update.
Etter 1999	Follow-up for only four months. Evaluated a short-term impact of a University-based smoke-free campaign.
Farkas 1999	Non-workplace for part of study. Evaluated the association of household and workplace smoking restrictions with quit attempts, six month cessation and light smoking.
Farrelly 1999	Cross-sectional not pre-post-test. Estimated the impact of workplace smoking restrictions on the prevalence and intensity of smoking among all indoor workers.
Fine 2004	Comparison of of CHD risk factor interventions and musculo-skeletal interventions in Welsh workplaces. Outcome was acceptability and feasibility in small workplace. New for 2008 update.
Glasgow 1997	Data from a population-based survey of adult smokers who completed surveys in 1988 and 1993, as part of the COMMIT trial.
Gomel 1993b	Follow-up for only six weeks. Examined the short-term effects of a workplace smoking ban on indices of smoking, cigarette craving, stress and other health behaviours in 24 employees.

(*Continued*)

Gottlieb 1990a	Non-randomized. Three-stage study included a baseline survey, an assessment of the effects of competition on recruitment to a self-help cessation programme and examination of the outcome of the cessation programme.
Graham 2007	Observational study, no control group New for 2008 update.
Gritz 1988	Non-randomized. Evaluation of a self-help smoking cessation programme for registered nurses.
Hagimoto 2007	Assessment of counsellors' skills and success rates in 6 Japanese worksites. New for 2008 update.
Hailstone 2005	Evaluation, no control group. New for 2008 update.
He 1997	Follow-up for only three weeks. Examined the effects of acupuncture on smoking cessation or reduction for motivated smokers.
Heloma 2001	Nine Finnish worksites surveyed before and after legislation to restrict ETS; not a controlled trial
Helyer 1998	Non-randomized. Evaluated the effectiveness of a worksite smoking cessation programme in the military.
Hope 1999	Non-randomized study, with no control or comparison group, and short follow-up (timing not stated). Surveyed five workplaces before and after a one-year health promotion campaign, targeting multiple health behaviours, including smoking. Primarily interested in gender and social class differences
Hotta 2007	Evaluation study, no control group New for 2008 update.
Hudzinski 1994	Outcome was daily cigarette consumption, cessation rate not reported. Study was designed to assess changes in employee health, particularly weight gain and CO levels, and smoking behaviour.
Humerfelt 1998	Community-based, not workplace. Evaluated the effects of postal smoking cessation advice in smokers with asbestos exposure and /or reduced forced expiratory volume in one second.
Hunt 2003a	The SMART study; RCT, targeting employed adolescents rather than adults.
Hunt 2003b	Healthy Directions - Small Businesses study; RCT, but smoking cessation was not the target intervention, and was offered in both intervention and control sites (=24).
Hutter 2006	Evaluation of Allen Carr programme; no control group New for 2008 update.
Izuno 1990	Non-randomized. Examined the factors critical to behaviour modification with respect to smoking cessation at worksites.
Jason 1990	Non randomized. A cessation programme with incentives and competition offered in one company, compared to a control company.

(*Continued*)

Kadowaki 2004	Ten-year Japanese programme of annual small-scale smoking cessation interventions; assessed at two months, but primary outcome was overall prevalence after ten years. Controlled trial, but not randomized.
Kinne 1993	Population-based telephone survey of 1228 employed adults to assess impact of worksite smoking policies.
Klesges 1986	Non-randomized. A smoking cessation programme offered in five companies, with and without competitions for participation and cessation.
Koffman 1998	Not a randomized study, as one of the three participating worksites refused to be randomized.
Kunitsuka 2002	Survey of post-intervention multiple lifestyle changes, including number of cigarettes smoked. No control group used.
Longo 1996	Not pre-post-test evaluation but post-ban quit ratio. Examined the impact of workplace smoking bans on smoking behaviour of employees.
Longo 2001	Not pre-post-test. Examined the long term impact of workplace smoking bans on employee smoking cessation and relapse.
Lowe 1987	Cessation was not an outcome of interest. Evaluated method of contact (phone vs letter) as an aid to recruitment.
Maheu 1989	Non-randomized. Two worksites offered a multi-component behavioural programme with nicotine gum. Additional competition in one site.
Matson-Koffman 1998	Non-randomized. Evaluated the effectiveness of a multi-component smoking cessation programme supplemented by incentives and team competitions.
McMahon 2001	Small non-randomized pilot study, based on stages of change model, to compare expert systems, group support and self-help manuals.
McMahon 2002	Happy Heart at Work programme; 10-yr evaluation, without a control group
Musich 2003	Survey of changes in risks among GM employees; not a controlled trial
Muto 1998	Non-randomized. Evaluated the effectiveness of a smoking cessation programme known as 'Smoke Busters'.
Nepps 1984	Non-randomized. Evaluation of a minimal contact smoking cessation programme at the worksite.
Nerín 2002	Evaluation of an anti-smoking programme, without a comparison worksite
Nerín 2005	Evaluation study, no control group New for 2008 update.
O'Connell 2006	Evaluation study, no control group New for 2008 update

(*Continued*)

Offord 1992	One group, post-test only. Evaluated the effect of a smoking ban, with no-cost nicotine dependence treatment.
Olive 1996	One hospital had pre-test data. Evaluated changes in employee smoking behaviour after implementation of restrictive smoking policies.
Olsen 1990	Non-randomized. Evaluation of a smoking cessation incentive programme for Dow chemical employees in the USA.
Olsen 1991	Non-randomized. A five-year evaluation of a smoking cessation incentive programme for chemical employees.
Ong 2005	Cost-effectiveness rather than efficacy evaluation. New for 2008 update.
Patten 1995	Population-based telephone survey of 1844 Californian adult indoor workers, to assess changes in smoking status and cigarette consumption, related to whether or not their workplace was smoke-free, and for how long the ban had been in place..
Pegus 2002	The Heart At Work programme. Smoking prevalence was measured, but was not an intervention outcome
Prior 2005	Cohort study, no comparison worksite New for 2008 update.
Richmond 1985	Non-workplace setting. A smoking cessation programme for use in general practice
Rosenstock 1986	Post-test only. Evaluated a non-smoking policy in a health maintenance organization
Roto 1987	Non-workplace setting for half of the participants. Evaluated nicotine gum and advice versus advice only for smoking cessation.
Ryan 2002	594 employees at a UK pharmaceutical company (GSK) attempted to quit with bupropion, and were followed up at six months. Not an RCT.
Schlegel 1983	Non-randomized. Evaluation of 'BUTT OUT' , a quit smoking programme developed specifically for the Canadian Armed Forces.
Scott 1986	Non-randomized. Nurses in different units offered cessation treatment or a waiting list control. 29 participants.
Shipley 1988	Non-randomized. Determined the effect of a smoking cessation programme compared with health screening on employee smoking.
Sloan 1990	Non-randomized. Evaluated cessation and relapse in a year-long workplace quit-smoking contest.
Sorensen 1991	One group post-test only . Evaluated the impact of a restrictive smoking policy with free onsite smoking cessation classes.

(*Continued*)

Stoddard 2005	RCT of teenagers (aged 15-17) working part-time, many still in school. New for 2008 update
Ullen 2002	Evaluation of a Swedish hospital smoking ban, but without a comparison worksite
Waage 1997	Non-randomized. Smoking intervention based on risk communication in subjects at risk of asbestos-related lung cancer.
Wakefield 1996	Did not report smoking cessation rate. Compared the reported prevalence and acceptance of bans on smoking among indoor workers in South Australia.
Whitney 1994	One group, post-test only. Determined the impact of a smoking cessation programme using nicotine replacement therapy as part of a larger wellness programme.
Wilbur 1986	Comprehensive health promotion intervention, but not a randomized trial
Willemsen 1995	Non-randomized. Evaluated a smoking cessation intervention for Dutch employees consisting of self-help methods and a group programme.
Willemsen 1999	Non-randomized. Examined the impact of a comprehensive worksite smoking cessation programme on employees who do not take part in cessation activities.
Woodruff 1993	Results of the 1990 California Tobacco Survey; 11704 working adults responded. Aim was to assess relationship of worksite policy (or its absence) to smoking status, controlling for demographic factors

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

Simpson 2000

Trial name or title	Australian National Workplace Health Project
Methods	Cluster-randomized trial, 20 worksites, 2x2 factorial design
Participants	Employees in participating worksites. 2498 completed baseline survey, 2082 completed health risk appraisal
Interventions	Socio-behavioural and environmental intervention, for physical activity, healthy eating, smoking and alcohol
Outcomes	Behaviour change at 1 and 2 yrs
Starting date	NK
Contact information	judys@health.usyd.edu.au
Notes	Included in 2005 update; no further info for 2008 update

DATA AND ANALYSES

Comparison 1. Results of included studies

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Results of included studies			Other data	No numeric data

Comparison 2. Individual Treatments

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Any behavioural therapy (various endpoints)	11		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2 Individual Counselling (various endpoints)	8		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
3 Any self-help intervention (various endpoints)	8		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
4 Pharmacological Treatments (various endpoints)	5		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
5 Social support	2		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

Comparison 3. Worksite Treatments

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Environmental support (various endpoints)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only
2 Incentives (various endpoints)	4		Risk Ratio (M-H, Fixed, 95% CI)	Subtotals only

Analysis 1.1. Comparison 1 Results of included studies, Outcome 1 Results of included studies.

Results of included studies

Burling 1989	58 smokers, all given self-help materials and support. Experimental group (29) also exposed to computerised nicotine fading.	No significant difference in quit rates. 3/29 in Group 1 vs 6/29 in Group 2. (See also Cochrane Review 'Self-help interventions for smoking cessation')	Validation (participation and abstinence) measured at CO>8ppm
Burling 2000	87 smokers, randomised to an interactive nicotine fading programme, or a conventional cessation programme. 73% of the experimental group used their programme, compared with 90% of the comparison group who used theirs	No significant difference in quit rates. 6/45 in Group 1.vs 5/42 in Group 2. There was more evidence of effect for those who used the programmes than for those that didn't. (See also Cochrane Review 'Self-help interventions for smoking cessation')	
Cambien 1981	304 intervention smokers recalled at 2 yrs, and 306 control smokers. 195 participants lost to follow up, proportion of smokers not reported	21.4% of intervention smokers quit, vs 13.4% of control smokers. Point prevalence at 2 yrs, not a significant difference	Validation by blood CO levels
Campbell 2002	538 women in 9 worksites (4 exp, 5 control) completed all surveys (282 I, 256 C) to 18m.	No raw data given for smoking, but prevalence went down by around 3% in both groups. No significant differences, and no p values.	Self-report on all outcomes, no biochemical validation
Dawley 1991	16 employees in the experimental company (comprehensive programme), and 14 in the comparison company (cessation-only programme)	Comprehensive Group achieved 43% (7/16) quit rate at 5 months, while the Cessation-only Group achieved 21% (3/14). P-values not given, but numbers too small for significant difference.	Validation by urinary cotinine
DePaul 1987	425 smokers in 43 corporations, randomised to group support programmes or self-help alone programmes Attrition rate was 8% in both groups	6% vs 2% continuously abstinent (NS), 19% in both groups were abstinent at 12 months point prevalence. Companies were the unit of analysis, similar results found using individual as unit of analysis. (See also Cochrane Review 'Self-help interventions for smoking cessation')	Partial validation by salivary cotinine, with family and colleague report
DePaul 1989	419 smokers in 38 worksites, randomised to experimental programme (206) and comparison programme (213). The attrition rate	At the company level of analysis the 12 month point prevalence quit rates were Group 26% vs No Group 16% (p<0.06); continuous absti-	Partial validation by salivary cotinine, with family and colleague report

Results of included studies (*Continued*)

	was 17% for Group worksites and 29% for Non Group worksite participants, so correcting the data for attrition would increase the apparent efficacy of the Group condition.	nence rates were 11% (Group) vs 3% (No Group) (p<0.05). Reported rates were not based on Intention to Treat, but on participation in the programmes. Correcting for attrition would increase the efficacy of the Group programme. At 24 months, 30% of the Group smokers were abstinent, comnpared with 19.5% of Non-Group smokers (no p value). (See also Cochrane Review 'Self-help interventions for smoking cessation')	
DePaul 1994	844 smokers in 61 worksites, randomised to Self-help [SH] (289), Incentives [I] (281) or Group support [G] (283). 12 month attrition rates were 52.5% in SH, 47.2% in I, and 37.5% in G.	12 month quit rates for sustained abstinence were 5.1% (n=79) SH, 11% (n=91) I, 31.2% (n=109) G (p<0.01). An Intention to Treat analysis, taking account of attrition, would further favour the intervention groups. (See also Cochrane Review 'Self-help interventions for smoking cessation')	Validation by salivary cotinine at 6 months, and CO<9ppm at 12 months
Emmons 1999	2055 workers (28% smokers) completed all surveys from 22 worksites, and constituted the cohort.	At 3 yr final follow up, 8.0% of the intervention smokers had quit for 6m, and 8.1% of the control smokers. 25.6% and 21.8% respectively claimed 7-day PP. Differences were non-significant	Self-report, with no biochemical validation
Erfurt 1991	Four sites were assessed at baseline; Site 1 had 1096 smokers (45%), Site 2 598 (44%), Site 3 844 (41%) and Site 4 834 (44%). At 3 year follow-up Site 4 had been significantly restructured.	Participation was affected by the intervention: 5% in Site 1, 9% in Site 2, 53% in Site 3 and 58% in Site 4. Possible bias due to different baseline characteristics of people rescreened in site3 & 4 limit interpretation of follow-up smoking prevalences: 41.6%, 40.6%, 36.1%, 31.0% All sites had significant relative reductions in smoking: 7.8% (p<0.01), 10.6% (p<0.01), 11.7% (p<0.001), 13.2% (p<0.001). Of those smoking in 1985 who were re-screened in 1988, 17.1% at Site 1 had quit, 17.6% at Site 2, 20.3% at Site 3 and 18.9% at Site 4 (NS).	Self-report only, not biochemically validated

Results of included studies (*Continued*)

Frank 1986	48 smokers initially randomised to three groups, with varying levels of hypnosis, booster and self-management training. A 4th group (15 smokers) was later recruited, with Group 2 interventions applied more intensively. Attrition rate of 6% across the initial 3 groups at end of treatment, 17% at 3 months and 25% at 6 month follow-up.	No difference between the groups for smoking cessation 6 months after treatment, regardless of the frequency, length between sessions, or addition of behavioural methods. Quit rate was 20% for all groups, based on Intention to Treat. Intensive intervention produced initially higher quit rates (60% at end of treatment), but this reverted to 20% by 6 months (See also Cochrane Review 'Hypnotherapy for smoking cessation')	Salivary cotinine measured at 3 months, but self-report only at 6 months
Glasgow 1984	36 employees, randomised to abrupt reduction (13), gradual reduction (12) and gradual reduction + feedback (11). Attrition at 6 months was respectively 4, 0 and 1.	At 6 months up to one third in the gradual condition were abstinent compared to no subjects in the abrupt condition (NS). Intention to Treat analysis showed that the gradual reduction programme was more successful than the abrupt reduction ($p<0.05$)	CO<10 ppm at 6 months, weighing of cigarette butts
Glasgow 1986	29 employees randomised to Basic Programme (13) or Basic Programme + Social Support (16). Attrition 7% at end of treatment, and a further 7% at 6 months	Consistent with previous findings, supportive social interactions were not related to treatment outcome.3/13 in the Basic Programme had quit at 6 months, and 3/16 in the Basic + Social Support Group (NS). (See also Cochrane review 'Enhancing partner support to improve smoking cessation').	Self report, weighing of cigarette butts, CO monitoring and salivary thiocyanate
Glasgow 1993	19 worksites, random allocation to Incentive programme (474 smokers) or No Incentive programme (623 smokers). Attrition rates at 1 year were 19% (I) and 24% (no I), and at 2 years were 27% and 32% respectively	At 2 year follow-up 49/344 (14%) were abstinent in the Incentives group, and 49/426 (12%) in the No incentives group (NS). Intention to Treat analysis would give more conservative quit rates	CO monitoring and salivary cotinine
Glasgow 1995	26 worksites, randomised to early or delayed interventions. 1222 employees were followed up at 2 years.	Comprehensive programme; a 26% rate of cessation was noted across both longitudinal cohort groups (NS), and a 30% rate across both cross-sectional groups (NS). No significant differences were seen between the 2 types of intervention	Self report, not biochemically validated

Results of included studies (*Continued*)

Gomel 1993a	28 ambulance stations randomized to 4 levels of risk reduction intervention. 128 baseline smokers followed for 1 yr	No significant differences between HRA and RFE groups at any follow-up point, nor between BC and BCI groups. HRA and RFE groups (68 smokers) were pooled and compared with 60 smokers in pooled BC and BCI groups. Continuous abstinence rates at 6m were 1% for HRA+RFE and 10% for BC+BCI (Fisher's Exact Test p=0.05); 12m rates were 0% and 7% (p=0.05).	Serum cotinine validation used.
Gunes 2007	200 smokers randomized to 7-step behavioural programme or no intervention, followed for 6m		
Hennrikus 2002	24 worksites, randomised to 6 programmes, 4 worksites in each programme. 2402 smokers were surveyed at baseline and at 12 and 24 months. 85.5% response rate at 12 months, and 81.7% at 24.	407 (17%) smokers signed up to programmes. 15.4% at 12 months and 19.4% at 24 months reported themselves as non-smokers. Recruitment was significantly higher in the incentive sites (22% vs 12% p=0.0054), but did not translate into higher cessation rates. Quit rates were consistently higher among programme registrants than among non-registrants, but the differential was greater in the non-incentive sites (15%) than in the incentive ones (6.7%), consistent with incentives attracting smokers less motivated to quit.	Self-report, validated by family member or friend. A sample of quitters were asked to supply saliva, and were paid $25 if they complied. Winners of cessation prize draws had to supply a valid saliva sample.
Hymowitz 1991	Six worksites randomised to Full Programme or Group-only interventions. Participation was 50% in the Full Programme sites, and 44% at Group-only (NS). 193/252 smokers who began the quit programme completed it. Randomisation was by worksite, but analysis was by individual.	At 12 months, 23/131 (18%) in the Full Programme arm had quit, while 27/121 (22%) in the Group-only arm had quit (NS).	Self-report and expired CO<8 ppm.
Jeffery 1988	59 employees were randomly assigned to reduction (29) or cessation (30) groups, and surveyed at baseline and at 6 and 12 months. Attrition was 30% - intention to treat analysis.	At 12 months 4/29 (14%) had quit in the reduction group, and 3/30 (10%) in the cessation group. No significant differences between the groups on either of the outcomes (dropout rate, cessation at 12	self-report confirmed by expired CO<8 ppm.

Results of included studies (*Continued*)

		months).	
Kadowaki 2000	263 male employees randomised to intervention (132) or control (131). No attrition, as inclusion was compulsory.	Quit rates 17/132 (Intervention), 4/131 (Control) at 5-month follow-up (p=0.003). Male smoking decreased from 62.9% to 56.7% (p=0.04). Delayed intervention in the control group lead to 13% quit rate (16/123)	Expired CO<9 ppm at baseline, 5 months and 12 months, and a urine test at 12 months
Klesges 1987	136/480 smokers over 8 worksites; all received a behavioural programme, with the intervention sites also receiving a competition and prize component. Each group of sites (Intervention and Control) were also divided between relapse prevention training (2) and no relapse training (2). Attrition rate was 7% at end of treatment, increased to 10% by 6 months follow-up.	Competition intervention resulted in significantly higher quit rates at the end of the trial (39% vs 16%, p<0.004) but these differences decayed at 6 months (12% vs. 11%, NS). Using the baseline of 480 smokers who could have participated, 3% were abstinent at 6 months	Expired CO<10 ppm
Kornitzer 1980	30 Belgian factories (16,230 men) randomized to intervention (risk assessment, physician and written advice) or control (assessment only). tested at 2 yrs.	High risk intervention group (n=1268) reduced prevalence by 18.7% (84.5% to 68.7%), and high risk control group (n=202) reduced by 12.2% (80.8% to 70.9%). P < 0.05. Random sample comparison: 5% of intervention group (n=327) reduced by 12.5%, compared with 10% control sample (n=800) reduced by 12.6% (ns).	Self report only, no biochemical validation.
Kornitzer 1987	199 employees were randomised to receive 2mg (101) or 4mg (98) nicotine gum. Attrition at one year was 6% in the 2mg group and 7.2% in the 4mg group.	At 3 months 36% of the 2mg group and 45% of the 4mg group claimed to be abstinent. At that point,blinding was broken and individuals could choose their treatment group. Results were stratified by Fagerstrom score dependency. At 12 months, the 4mg group (90) had a 50% higher abstinence rate than the 2mg group (94) (p<0.05); this fails to reach significance if an intention-to-treat analysis is conducted. In the first 3 (blinded) months of trial, the heavier smokers benefited	Baseline and 12 month cotinine blood samples (random sample of 69% at 12 months).

Results of included studies (*Continued*)

		more from the higher dose gum. After unblinding, 17% of the 4mg group continued treatment, whereas 39% of the 2mg group continued treatment. In the 4mg group 31% switched to 2mg, while 5% of the 2mg group switched to 4mg.	
Kornitzer 1995	374 employees randomised to Group 1(149, active patch + active gum), Group 2(150, active patch + placebo gum) or Group 3(75, placebo patch + placebo gum)	At 12 months, abstinence in Group 1 was 18.1% (NS), in Group 2 12.7% (NS) and in Group 3 13.3% (NS). Time to relapse was significantly longer in Group 1 compared with the other 2 groups (p=0.04).	Salivary cotinine at baseline, and expired CO<10 ppm at subsequent checks
Lang 2000	30 worksite physicians (1095 smokers) were randomised to Group A (504, simple advice) or Group B (591, advice + support and 'contract').	2 physicians dropped out post randomisation. 3.4% of baseline non-smokers in each group were smokers at 1 year follow-up. The sustained abstinence rate at 6 months or more (A: 4.6%; B: 6.1%) was non-significant using the physician as the unit as analysis. At 12 months, Group A had a quit rate of 13.5%, and Group B a rate of 18.4% (p=0.03)	Self-report, with CO<7 ppm validation on a subset of 231 subjects whose physicians had access to a CO monitor.
Li 1984	871 employee smokers, randomised to Group 1 (simple warning) or Group 2(brief physician advice), stratified by normal/abnormal lung function. After fine tuning, at 3 months 215 workers received counselling, while 361 received simple warning and 3 were excluded. Attrition was 30%.	Counselled workers had an 8.4% abstinence rate at 11 months, compared with 3.6% in the control group (p<0.05). Feedback on abnormal lung function was not significantly related to increased rates of quitting	Expired CO<10 ppm at 11 months follow-up in all quitters, and in a random sample of 379 continuing smokers
Malott 1984	24 employees randomised to controlled smoking Group (1) or controlled smoking + partner support Group (2). Attrition 4% at 6 months	Few differences were observed between controlled smoking and controlled smoking plus partner support conditions either during treatment or at the 6-month follow-up. 25% of Group 1, and 17% of Group 2 were abstinent at 6 months (NS). (See Cochrane review 'Enhancing partner support to improve smoking cessation').	Self-monitoring, butt counts, expired CO levels

Results of included studies (*Continued*)

Nilsson 2001	113 workers randomised to intervention (65) or control (63). Attrition at 12 months was 32% for the intervention group, and 24% for the control group. At 18 months the respective attrition rates were 34% and 27%.	Baseline prevalence for both groups was 65%. At 12 months the intervention group point prevalence rate was 37%, and the control group 63%. At 18 months, the rates were 40% and 59% respectively. This difference influenced the decrease in mean risk score from 10.3 to 9.0 after 18 months in the intervention group (p=0.042)	Self-report, not biochemically validated
Omenn 1988	402 employee smokers randomised within their preference for group or self-help programmes, to 3 programmes, MCP (1), RPP (2) or MTP (3). 7% attrition rate at 12 months.	Self-reported quit rates similar across all three group preference conditions but more missing saliva samples in self-help so validated rates lower. All self-help programmes similar. Results: Group 1 8/51, Group 2 10/57, Group 3 4/51 (NS) SH1 7/76, SH2 9/82, SH3 6/85 (NS)	Salivary cotinine at 12 months <35 ng/ml
Rand 1989	47 employees randomised to contingent payment/frequent CO monitoring group (17), non-contingent payment/frequent CO monitoring (16), non-contingent payment/ infrequent monitoring (14). 4 participants failed to abstain for 5 days, and were excluded before randomisation. At 6 months 11 more participants had dropped out. Analyses were Intention to Treat at randomisation.	Contingent payment combined with frequent CO monitoring delayed but did not ultimately prevent participant relapse to smoking by the end of the six month follow-up. Contingent payment group had CO value at or less than 11 ppm significantly longer than the other two groups (p=0.03). CO monitoring alone had no effect on abstinence. At six months, only 2 subjects (1contingent, 1 non-contingent) had achieved sustained abstinence.	Expired CO monitoring <12 ppm
Razavi 1999	344 post-cessation abstainers randomised to psychologist support (135), ex-smoker support (88), or no formal support (121),	12 months abstinence rates were 59/135 (43.7%) in the PG group; 33/88 (37.5%) in the SG group; 43/121 (35.5%) in no support group (NS).	Expired CO and urinary cotinine. Unvalidated self-report (higher) were also given.
Rodriguez 2003	218 smokers randomized to counselling + NRT (115) or minimal sporadic advice (103) in 3 Bilabao (Spain) worksites	12 months continuous abstinence rates were 23/114 (20.2%) for the intervention group, vs 9/103 (8.7%) in the control group (P = 0.025). NNT was 9 people treated for 3mss to produce 1 quitter	Expired CO <+ 10 ppm

Results of included studies (*Continued*)

Schröter 2006	38 smokers assigned to standard behavioural (SB) programme, 41 to relapse prevention (RP) programme. Assessed at 12m for continuous and PP abstinence	12m continuous abstinence rates were 8/38 (21.1%) for SB, and 5/41 (12.2%) for RP.	Self-reported, no biochemical validation
Shi 1992	2887 workers (533 smokers) across 9 Californian sites, partially randomized to 4 intervention levels. No non-intervention control group	2 yr cross-sectional survey of 1998 workers (250 smokers); Prevalence declined by 34% from 18% to 12% in Level 1 ($p < 0.1$); by 18% from 17% to 14% in Level 2 ($p < 0.1$); by 35% from 24% to 15% in level 3 ($p < 0.01$); by 44% from 14% to 8% in Level 4 ($p < 0.01$)	Self-reported PP at HRA, not biochemically validated
Shimizu 1999	53 volunteer employee smokers, randomised to intervention and control groups.	After the 5 months of intervention, smoking cessation rate in the intervention group (19.2%) tended to be higher than that in the control group (7.4%), (NS). Control group was given same programme after the 5 months for the intervention group. At six months after both groups were treated, overall cessation rate was 24.5%, and at one year was 13.2%.	Expired CO monitoring
Sorensen 1993	Eight worksites, randomised to intervention (1885 workers) or comparison (1479 workers). At baseline, 9 months before intervention, 34% of respondents were current smokers (I:39%;C:31%) Six-month data were on only 7 of the 8 sites, because of ownership changes at the 8th. Six-month survey was of all smokers then employed, = 66% of originally surveyed employees. Analyses were by individual, while randomisation was by worksite.	Analysis of all smokers, not just participants. At the 6-month follow-up, 12% of smokers in the intervention group reported quitting, compared with 8.8% in the control group ($p<0.05$), controlling for age, sex & occupation.	Self-report only. Baseline and follow-up salivary cotinines obtained for 52% of baseline smokers. These data were not analysed.
Sorensen 1996	108 matched worksites (>28,000 workers), randomised to intervention or control conditions, though Florida center sites did not target smoking, leaving smoking outcomes available in only 84 worksites.	Worksite was the unit of allocation and analysis. Baseline smoking data were not reported in detail. There was a difference of 1.53% (NS) in the 6-month quit rates between intervention and control sites, and a reduction in prevalence from 24.5% to 21.2% (I), and from	Self-reported, no biochemical validation

Results of included studies (*Continued*)

		25.8% to 21.8% (C), a difference between the 2 groups of 0.66% (NS).	
Sorensen 1998	Cohort analysis (2658 employees) of a randomised controlled study of 12 matched pairs of worksites. Worksite was unit of allocation, but analysis was by individual.	PP abstinence for the 6 months prior to 2-year follow-up was 15% for intervention group and 9% for control group (p=0.123) Blue-collar cessation rates for the 2 groups were 18% (I) and 9% (C), while the white-collar workers achieved higher rates in the control than in the intervention group; office worker rates were 2.5% (I) vs 5.1% (C), and professipnal/managerial rates were 14.2% (I) vs 18.6% (C).	Self-reported, no biochemical validation
Sorensen 2002	Cross-sectional analysis (9019 at baseline [80%] and 7327 [65%]) at six months follow-up, plus cohort analysis of 5156 employees who responded to both surveys (embedded cohort of 436 smokers). Worksite was unit of allocation, but analysis was by individual.	At six months, point prevalence in the HP/OHS sites fell from 20.4% to 16.3%, and in the HP sites from 18.6% to 17%. In the embedded cohort (825 smokers) at 6m, the HP/OHS quit rate was 11.3%, compared with the HP rate of 7.5% (OR=1.57, p=0.17). Within the cohort, blue-collar quit rates more than doubled in the HP/OHS sites (11.8%) compared with the HP sites (5.9%, p=0.04)	Self-reported, no biochemical validation
Sorensen 2007	Baseline participants 674 workers, (354 Int/ 320 Cont). 188 smokers (101 Int, 87 Cont) completed baseline and 6m surveys	7-day self-reported PPA at 6m: Int: 19/101 (19%), Cont: 7/87 (8%) (P=0.03). ITT analysis Int: 19/125 , Cont: 7/106, P=0.04.	Self-reported, no biochemical validation
Sutton 1987	270/334 interested smokers invited to nicotine gum cessation programme; the uninvited 64 represented a control group. 172 (64%) of invitees attended the 1st consultation, 163 the 2nd. One-year follow-up rate was 99% (9% by phone).	12% (20/172) of those who attended the intervention course were abstinent at 12 months, compared with 1% (1/98) of those who did not accept the invitation, and 2% (1/64) of the control group; p values not given.	Expired CO<11 ppm
Sutton 1988a	Video programme (smoking, plus seat-belt advice) was offered to all employees. 77 employees were ran-	Abstinence rates (DFF: 3%, SB [control] 0%) were not significantly different from each other at 12	Expired CO<11 ppm.

Results of included studies (*Continued*)

	domised to DFF video (33) or seatbelt (44=control) videos.	months follow-up, There was no significant difference in validated abstinence between the video groups and the non-participant group.	
Sutton 1988b	150 employees (smokers only) participated. 46 watched the DFF video, 50 watched a confidence-boosting version of the DFF video, and 54 (control group) watched LTK video.	Abstinence rates (DFF: 11%, DFF+C 8%, LTK [control] 9%) were higher than in the other 3 studies, but not significantly different from each other at 12 months follow-up. But there was a significant difference in abstinence rates between participant groups and the non-participant group (4%, p<0.05).	Expired CO<11 ppm.
Sutton 1988c	197 employees (smokers only) participated. 56 watched the DFF video, 67 watched a less gory version of the DFF video, and 74 (control group) watched the TW video. Non-responder smokers at baseline had higher smoking prevalence (45%) than responders (29%), suggesting some response bias.	Abstinence rates (DFF: 4%, DFF-G 3%, TW [control] 4%) were not significantly different from each other. at 12 months follow-up. There was no significant difference in abstinence rates between the video groups and the non-participant group.	Expired CO<11 ppm.
Sutton 1988d	179 employees (smokers only) participated. 62 watched the DFF video, 59 watched SL video, and 58 (control group) watched TW video. Non-responder smokers at baseline had higher smoking prevalence (34%) than responders (22%), suggesting some response bias.	Abstinence rates (DFF: 3%, SL 2%, Tw [control] 5%) were not significantly different from each other at 12 months follow-up. There was no significant difference in validated abstinence artes between the video groups and the non-participant group.	Expired CO<11 ppm.
Sutton 1988e	Fourth study (D) of the video studies groups provided a nested RCT. 161 continuing smokers at 3-month follow-up were randomised to intervention (79) or control (82). 40.5% response rate, attending at least one consultation.	22% (7/32) of attenders in the intervention group were abstinent at 12 months, compared with 2% (1/47) of the non-attending invitees, and compared with 2% (2/82)of the control group (p<0.001). 16% of intervention group achieved 'complete' sustained abstinence at 12 months, vs 2% control group (p<0.01).	Expired CO<11 ppm.
Tanaka 2006	Six intervention sites matched to 6 control sites; Of 1017 intervention smokers who completed base-	6m sustained abstinence at 36m ITT analysis was 8.9% (123/1382) intervention vs 7.0% (121/1736) con-	No biochemical confirmation

Results of included studies (*Continued*)

	line and 36m follow up, 125 participated in cessation campaign, and 79 accepted counselling + NRT.	trol. Quit rates in both groups rose steadily over 36m.	
Terazawa 2001	228 smokers randomized to intervention (117) or control (111). 25 smokers in the intervention group made a supported quit attempt	PP 11.1% (13/117) in the intervention group at 12m, compared with 1.8% (2/111) controls. Continuous abstinence 6.8% (8/117) intervention, compared with 0.9% (1/111) controls. Fisher's Exact test 2-tailed P = 0.04	Probably validated by expired CO
Willemsen 1998	Four intervention worksites matched to 4 control sites (minimal self-help), giving 498 smokers who completed baseline survey and enrolled in programmes.	Overall sustained abstinence quit rates at 6 months were 8% (9% for heavy smokers) in the comprehensive group, and 7% (4% for heavy smokers) in the minimal group (no p values given)	Self-report, plus baseline Fagerstrom score. At 4-month follow-up, 'bogus pipeline' procedure was used, and at 14 months salivary cotinines were collected from 41/79 quitters
Windsor 1988	387 smokers randomly assigned to four groups, in a 2x2 factorial pre-/post-test design. 37 were lost to follow-up, and were counted as continuing smokers	As monetary incentives made no difference, groups 1&3 were compared with 2&4. Sustained abstinence at 1 year was 5.8% (11/190) in the self-help only groups, and 14.4% (27/188) in the self-help + counselling groups (p<0.001).	Baseline salivary cotinine, and follow-up salivas at 6 weeks, 6 months and 1 year.

Analysis 2.1. Comparison 2 Individual Treatments, Outcome 1 Any behavioural therapy (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 2 Individual Treatments

Outcome: 1 Any behavioural therapy (various endpoints)

Study or subgroup	Cessation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Glasgow 1984	4/12	0/13		9.69 [0.58, 163.02]
Frank 1986	9/45	3/20		1.33 [0.40, 4.41]
DePaul 1987	14/233	4/192		2.88 [0.97, 8.62]
Klesges 1987	8/66	7/61		1.06 [0.41, 2.74]
Omenn 1988	10/57	4/51		2.24 [0.75, 6.69]
DePaul 1989	22/206	6/213		3.79 [1.57, 9.16]
DePaul 1994	10/281	4/280		2.49 [0.79, 7.85]
Razavi 1999	33/88	43/121		1.06 [0.74, 1.51]
Shimizu 1999	5/26	2/27		2.60 [0.55, 12.22]
Schrter 2006	5/41	8/38		0.58 [0.21, 1.62]
Gunes 2007	6/100	2/100		3.00 [0.62, 14.51]

Analysis 2.2. Comparison 2 Individual Treatments, Outcome 2 Individual Counselling (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 2 Individual Treatments

Outcome: 2 Individual Counselling (various endpoints)

Study or subgroup	Cessation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Cambien 1981	65/304	41/306		1.60 [1.12, 2.28]
Li 1984	18/215	13/361		2.32 [1.16, 4.65]
Gomel 1993a	4/60	0/68		10.18 [0.56, 185.27]
Kadowaki 2000	17/132	4/131		4.22 [1.46, 12.20]
Lang 2000	36/591	23/504		1.33 [0.80, 2.22]
Terazawa 2001	8/117	1/111		7.59 [0.96, 59.70]
Tanaka 2006	123/1382	121/1736		1.28 [1.00, 1.62]
Sorensen 2007	19/101	7/87		2.34 [1.03, 5.30]

Analysis 2.3. Comparison 2 Individual Treatments, Outcome 3 Any self-help intervention (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 2 Individual Treatments

Outcome: 3 Any self-help intervention (various endpoints)

Study or subgroup	Cessation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Jeffery 1988	3/30	4/29		0.73 [0.18, 2.96]
Omenn 1988	9/82	7/76		1.19 [0.47, 3.04]
Sutton 1988a	2/33	3/55		1.11 [0.20, 6.31]
Sutton 1988b	5/46	15/374		2.71 [1.03, 7.11]
Sutton 1988c	2/56	5/226		1.61 [0.32, 8.10]
Sutton 1988d	2/62	11/360		1.06 [0.24, 4.65]
Burling 1989	6/29	3/29		2.00 [0.55, 7.24]
Burling 2000	6/45	5/42		1.12 [0.37, 3.40]

Analysis 2.4. Comparison 2 Individual Treatments, Outcome 4 Pharmacological Treatments (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 2 Individual Treatments

Outcome: 4 Pharmacological Treatments (various endpoints)

Study or subgroup	Intervention n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Kornitzer 1987	24/98	21/101		1.18 [0.70, 1.97]
Sutton 1987	21/270	1/64		4.98 [0.68, 36.32]
Sutton 1988e	5/79	2/82		2.59 [0.52, 12.99]
Kornitzer 1995	19/150	10/75		0.95 [0.47, 1.94]
Rodriguez 2003	23/114	9/103		2.31 [1.12, 4.76]

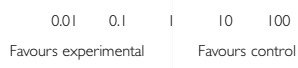
Analysis 2.5. Comparison 2 Individual Treatments, Outcome 5 Social support.

Review: Workplace interventions for smoking cessation

Comparison: 2 Individual Treatments

Outcome: 5 Social support

Study or subgroup	Experimental n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Malott 1984	2/12	3/12		0.67 [0.13, 3.30]
Glasgow 1986	3/16	3/13		0.81 [0.20, 3.37]



Analysis 3.1. Comparison 3 Worksite Treatments, Outcome 1 Environmental support (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 3 Worksite Treatments

Outcome: 1 Environmental support (various endpoints)

Study or subgroup	Cessation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Windsor 1988	27/188	11/190		2.48 [1.27, 4.85]
Dawley 1991	7/16	3/14		2.04 [0.65, 6.43]
Erfurt 1991	39/223	39/228		1.02 [0.68, 1.53]
Hymowitz 1991	23/131	27/121		0.79 [0.48, 1.29]

Analysis 3.2. Comparison 3 Worksite Treatments, Outcome 2 Incentives (various endpoints).

Review: Workplace interventions for smoking cessation

Comparison: 3 Worksite Treatments

Outcome: 2 Incentives (various endpoints)

Study or subgroup	Cessation n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Risk Ratio M-H,Fixed,95% CI
Windsor 1988	5/95	6/95		0.83 [0.26, 2.64]
Glasgow 1993	49/344	49/426		1.24 [0.86, 1.79]
Gomel 1993a	1/30	3/30		0.33 [0.04, 3.03]
Rand 1989	1/16	0/14		2.65 [0.12, 60.21]

APPENDICES

Appendix 1. Search strategies for electronic databases

Strategy for EMBASE

smok* or tobacco
('Health-Behavior') in DEM,DER
'Health-Promotion' in DEM,DER
'Health-Care-Psychology' or 'Health-Education'
'Prevention' or 'Health-Screening'
#2 or #3 or #4 or #5
explode 'occupational-health' / all subheadings
explode 'workplace-' / all subheadings
#7 or #8
#1 and #6 and #9
Strategy for MEDLINE
explode "Health-Behavior"/ all subheadings
explode "Health-Education"/ all subheadings
"Health-Promotion"/ all subheadings
explode "Primary-Prevention"/ all subheadings
#1 or #2 or #3 or #4
explode "Work"/ all subheadings
"Workplace"/ all subheadings
"Occupational-Health"/ all subheadings
#6 or #7 or #8
smok* or tobacco
#5 and #9 and #10
Strategy for PsycINFO
"Health-Behavior" in DE

explode “Health-Care-Psychology”
explode “Health-Education”
“Health-Promotion” in DE
explode “Prevention”
explode “Health-Screening”
#1 or #2 or #3 or #4 or #5 or #6
work* in DE
#7 and #8
smok* or tobacco
#10 and #9

Appendix 2. Glossary of tobacco-related 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 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

(*Continued*)

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
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

(*Continued*)

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: 23 April 2008.

22 May 2008	New search has been performed	Four new included studies added (behavioural interventions). Review restructured to exclude bans and restrictions, which are now covered in a separate review. Forest plots changed from OR to RR.
16 May 2008	New citation required but conclusions have not changed	Order and names of authors amended.
23 April 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 1, 2002

Review first published: Issue 2, 2003

19 February 2005	New citation required and conclusions have changed	Substantive amendment

CONTRIBUTIONS OF AUTHORS

KC conducted the search

KC and MM extracted and checked the data

KH wrote the update, with editorial input from MM and TL

DECLARATIONS OF INTEREST

None known

SOURCES OF SUPPORT

Internal sources

- Department of Primary Health Care, Oxford University, UK.
- National School for Health Research School for Primary Care Research, UK.

External sources

- NHS Research & Development Programme, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Workplace; Counseling; Psychotherapy, Group; Randomized Controlled Trials as Topic; Smoking [*prevention & control]; Smoking Cessation [*methods]

MeSH check words

Humans