

# Quit and Win contests for smoking cessation (Review)

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[Intervention Review]

# Quit and Win contests for smoking cessation

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## ABSTRACT

### Background

Quit and Win contests were developed in the 1980s by the Minnesota Heart Health Program, and have been widely used since then as a population-based smoking cessation intervention at local, national and international level. Since 1994 an international contest has been held every two years in as many as 80 countries (2002).

### Objectives

To determine whether quit and win contests can deliver higher long-term quit rates than baseline community quit rates.

To assess the impact of such programmes, we considered both the quit rates achieved by participants, and the population impact, which takes into account the proportion of the target population entering the contest.

### Search strategy

We searched the Cochrane Tobacco Addiction Group Specialized Register, with additional searches of MEDLINE, EMBASE, CINAHL, PsycINFO and Google Scholar. Search terms included competition\*, quit and win, quit to win, contest\*, prize\*. Most recent search date was November 2007.

### Selection criteria

We considered randomized controlled trials, allocating individuals or communities to experimental or control conditions. We also considered controlled studies with baseline and post-intervention measures.

### Data collection and analysis

Data were extracted by one author and checked by the second. We contacted study authors for additional data where necessary. The main outcome measure was abstinence from smoking for at least six months from the start of the intervention. We used the most rigorous definition of abstinence in each trial, and biochemically validated rates where available. We decided against performing a meta-analysis, because of the heterogeneity of the included studies, and the small number of scientifically valid studies.

## Main results

Five studies met our inclusion criteria. Three demonstrated significantly higher quit rates (8% to 20%) for the quit and win group than for the control group at the 12-month assessment. However, the population impact measure, where available, suggests that the effect of contests on community prevalence of smoking is small, with fewer than one in 500 smokers quitting because of the contest. Levels of deception, where they could be quantified, were high. Although surveys suggest that international quit and win contests may be effective, especially in developing countries, the lack of controlled studies precludes any firm conclusions from this review.

## Authors' conclusions

Quit and win contests at local and regional level appear to deliver quit rates above baseline community rates, although the population impact of the contests seems to be relatively low. Contests may be subject to levels of deception which could compromise the validity of the intervention. International contests may prove to be an effective mechanism, particularly in developing countries, but a lack of well-designed comparative studies precludes any firm conclusions.

## PLAIN LANGUAGE SUMMARY

### Do Quit and Win contests encourage people to give up smoking

Controlled trials suggest that quit and win contests may help some smokers to quit, but they have little effect on community smoking rates. Fewer than one smoker in 500 quits because of the contests. Deception levels, where they can be measured, are often high. International quit and win contests are often well supported, especially in developing countries, but there is no clear evidence from trials that they are effective.

## BACKGROUND

The Quit and Win contest was first developed by the Minnesota Heart Health Program (MHHP), and was run in three Minnesota communities in the early 1980s, using mass media and posters and brochures distributed to schools, workplaces and medical facilities (Lando 1994). The prize was a holiday to Disneyworld, in a raffle for those achieving biochemically validated cessation at one month post-programme. A validated quit rate of 32% was achieved at one month, although 16% of those originally claiming to have quit did not turn out to be smoke-free, and relapse rates at 12 months were high. The success of the programme has been influential, particularly in the USA, where it has been the model for many recruitment and cessation campaigns.

The rationale for developing the Quit and Win model was based on a number of assumptions:

- widespread quit attempts may benefit from a network of support from family, friends, colleagues, and other smokers trying to quit, and from non-smoking members of the community;
- most smokers prefer to try and quit on their own rather than seeking treatment;

- most quit attempts fail within the first 30 days, with less than half surviving even for one week;
- the possibility of winning a large prize could offset the discomforts of quitting, and could attract large numbers of smokers to make the attempt;
- after 30 days of abstinence, the intrinsic reinforcements for quitting are more likely to maintain abstinence.

The key features of the seminal MHHP contests, many of which remained unchanged through their national and international versions, were:

1. Smoking status was validated prior to entry, and quitting was biochemically validated among potential winners.
2. Smokers were adults (18+), and pledged to quit for 30 days on the target quit date.
3. A large grand prize was offered, e.g. a family holiday, plus several smaller prizes such as bicycles or health club membership.
4. Prizes were donated, or paid for by donation.

5. Contests were heavily promoted through the media, through school children, and through community organizations and work-sites.

6. Support was sought from health professionals and community leaders.

7. Contests were run and promoted by a local volunteer task force, led by a single paid staff member.

Quit and Win competitions have subsequently been developed and extended to national and international applications. In 1985, the North Karelia Project in Finland adopted it as part of a community-based smoking cessation programme, and in the following year the programme was offered nationally on Finnish television, reaching an estimated 46% of adult smokers, and enrolling 1.6% of the adult smoking population. Among smokers who saw at least one of the eight programmes, 7.5% made a quit attempt, and 17% of those who made a quit attempt were abstinent at six-month follow up (Korhonen 1992).

In 1994, under the auspices of the World Health Organization, the first international Quit & Win contest was conducted, with 13 countries participating. The contest has been run every two years since then, and has grown exponentially. Estimated quit rates at one year follow up have shown great variation across different countries, with year 2000 continuous abstinence rates reported to range from 5% (Argentina) to 44% (regional China), and an average across all participating countries of 21% (Sandstrom 2002). The 2002 contest, the latest for which full details are readily available, awarded a grand prize of US\$10,000, and six regional prizes of US\$2500 drawn from among the national winners. This contest attracted 700,000 participants from more than 80 countries. The most recent International Quit and Win contest was held in May 2004, and was administered by the National Public Health Institute in Helsinki, Finland (KLT 2003). Preliminary results for this contest are available on the organizers' web site (Q&W 2006)

While competitions and incentives may offer benefits in increased participation rates, there are attendant risks to such a mechanism. Verification, especially in a community-based intervention, is often a thorny issue. An Australian study which interviewed a pseudo-random sample of 300 entrants to a national stop-smoking lottery, with a main prize of a car worth A\$30,000, found that 34% of those who had entered were either never-smokers or ex-smokers at the time they signed up, even though a condition of entry was being a verified current smoker (Chapman 1994).

Furthermore there are limitations to quit rates of participants as the indicator of the success of a community-based programme such as this. The MHHP, for example, has demonstrated that achieved quit rates cannot be assessed in isolation from community participation rates (Lando 1990). At first sight, the intervention community's quit rate of 37% appeared less impressive than the control group's 45%. However, the participation rate for the

intervention group was 1.06% of the eligible smoking population, compared with the control community's 0.2%, yielding a public health impact (participation rate x cessation rate) more than four times greater than for the control group. As this measure highlights the interdependence of participation and cessation rates in any assessment of the success of a cessation programme, we propose to use it in this review to evaluate the studies, where the data will support it.

Any enhanced participation rate that incentives may deliver also has to be weighed against the stability of the long-term quit rates that are achieved. Smokers who elect to take part in a cessation programme that offers material rewards may be differently motivated from those who sign up to more conventional cessation methods, and this may be reflected in differential relapse rates.

### Cost effectiveness

The use of rewards and incentives increases the costs of running smoking cessations programmes, and the question must arise of whether the outlay is justified by the benefits that the component delivers. In other words, how many more quit attempters will join a programme that rewards their participation, and how much, if at all, is the quit rate enhanced by the end of programme follow up?

There is some evidence that community-based programmes fare better than workplace ones in incentive-based recruitment (Nelson 1989). The Pawtucket Heart Health Program (PHHP) proactively recruited smokers at the annual Octoberfest between 1983 and 1987, and also at local worksites from 1985 to 1987. On a cost effectiveness analysis, those recruited at worksites cost more per participant than those recruited at the Octoberfest. However, because of the lower quit rates among the Octoberfest recruits, the cost per successful quitter was much lower for the worksite recruits. Any attempt to rate the efficacy of a programme needs to be clear about the unit by which success is measured.

This review will attempt some assessment of the cost effectiveness of programmes that incorporate reward mechanisms. The issue of calculating and comparing programme costs, however, is problematic. Those studies which report a costing component rarely take full account of all the direct and indirect costs involved, and sometimes make a series of rather tenuous assumptions to support their estimate.

## OBJECTIVES

To assess the effects of community-based contests such as Quit and Win on rates of smoking cessation.

We will address the following questions:

(I) Cessation:

1. Do competitions, contests and incentives affect rates of smoking cessation or rates of relapse a) among the participants and b) among the target population?

2. Does the amount and type of incentive alter the rates of smoking cessation?

(II) Recruitment:

1. Do prizes improve recruitment to community smoking cessation programmes?

2. Does the amount and type of incentive alter the effect on recruitment?

(III) General:

1. What are the costs to the community of incentives and contests?

2. How great is the risk of disbenefits arising from the use of competitions and incentives, eg false claims, ineligible applicants?

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Randomized controlled trials allocating communities to intervention or to control conditions.

Controlled trials with baseline measures and post-intervention outcomes

#### Types of participants

Adult smokers, either gender, within the targeted community.

#### Types of interventions

Population-based quit and win contests at local, national and international levels.

#### Types of outcome measures

##### Cessation:

Cessation rates, point prevalence and sustained abstinence, for a minimum of six months from the start of the intervention, whether or not they were biochemically validated. The gold standard is biochemically verified sustained abstinence for at least six months.

##### Recruitment:

Rates of recruitment to and participation in smoking cessation programmes.

Public health impact (participation rate x cessation rate), wherever the data are available.

### Search methods for identification of studies

We searched the Cochrane Tobacco Addiction Group Specialized Register, which includes studies identified by systematic electronic searches of multiple databases, handsearching of specialist journals, and 'grey' literature (conference proceedings and unpublished reports not normally covered by most electronic indexing systems). In addition, we have used specifically developed strategies to search four electronic databases, EMBASE, MEDLINE, CINAHL and PsycINFO. Search terms included competition\*, contest\*, prize\*, quit and win, quit to win. For the 2008 update, we also searched Google Scholar, using the search string ["quit and win" smoking]. The most recent search was November 2007.

### Data collection and analysis

There were four stages in the review process:

Stage 1: One author prescreened all search results (abstracts), for possible inclusion or as useful background

Stage 2: Two authors independently assessed relevant studies for inclusion. We resolved discrepancies by consensus. The Co-ordinating Editor was available to resolve any persistent disagreements. We have noted reasons for the non-inclusion of studies.

Stage 3: One author extracted data, and the second author checked them. This stage included an evaluation of quality. Two independent authors assessed each study according to the presence and quality of the randomization process, whether or not trialists and assessors were 'blinded', whether the analysis was appropriate to the study design, and the description of withdrawals and drop-outs.

Stage 4: We decided not to perform a meta-analysis of the included studies, because of their paucity, heterogeneity of design and variable quality. We have presented the results in a narrative form, and have also tabulated the main findings of each study (Summary Table 1). We have also given details of many of the key excluded studies of local and national quit and win contests ([Appendix 1](#)), and the series of WHO-sponsored international quit and win contests ([Appendix 2](#)). For the updated version of this review, we include the Cochrane Tobacco Addiction Group's glossary of tobacco-related terms ([Appendix 3](#)).

## RESULTS

### Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

The history of Quit and Win contests, from their inception in the Minnesota Heart Health Program (MHHP) in the early 1980s to their global status (most recently in May 2006), has been outlined briefly in the background section of this review. The practicality and relative success of the MHHP contests, with participation rates of between 1% and 7% and follow-up abstinence rates (non-verified self report) at six to eight months of between 21% and 24%, have encouraged other health promotion teams to run and evaluate similar contests. Other landmark local and national quit and win contests are summarized in Table 2. Later studies modified some of the contest parameters; the eligible age was lowered from 18 to 16 in the 1988 Swedish contest and to 17 in Finland 1986, and raised to 20 in the Hunter Valley intervention; contest duration was varied in the 26 COMMIT contests, and increased to six weeks in the Medicine Hat contest. Prizes could be cash (PHHP, COMMIT, Buffalo, Kick It!), holidays (Stanford Five City 1982, Finland 1986, Sweden 1988, Buffalo, Heartbeat Wales 1990, UK Q&W 1990, Medicine Hat, Kick It!) or consumer goods (Buffalo, Hunter Valley 1991 [a car], Q&W UK 1990, Medicine Hat, Kick It!).

International Quit and Win, run under the auspices of the World Health Organization (WHO), and administered through the National Public Health Institute (KTL) in Finland, has been held every two years since 1994. Although each participating country runs its own national competition, to the agreed rules of the controlling body, all national prize winners are entered for a super prize draw (US\$10,000) plus six regional prizes of US\$2500 each, with their chances of winning proportionate to the number of participants registered in each country. The International Quit and Win campaign also conducts a one-year follow-up survey. From the 2000 contest onwards, there have also been prize draws for supporters of successful quitters, and for health professionals involved in the administration of the contests ([Sandstrom 2002](#)). Table 3 summarizes the international contests held to date.

Although much has been written about the Quit and Win experience, and the concept has been widely applied, evaluations have generally not been conducted to rigorous trial standards. We found five studies which compared a quit and win contest with a no-contest control group.

[Lando 1991a](#) randomized 200 smokers to receive the National Cancer Institute's *Quit for Good* self-help programme, 200 to receive the Minnesota *Quit and Win* self-help materials, and 170 to act as a non-intervention control group. Participants were contacted by phone seven months later, to assess smoking status, recall and use of the brochures, and for a rating of their usefulness. This trial tested the efficacy and acceptability of different self-help cessation materials, and did not include the prize element of the full Quit and Win contest.

[Bains 2000](#) compared quit rates of 231 entrants for a Quit and Win contest in two counties of Eastern Ontario with a non-participant

control group. The controls were smokers who had not entered the contest and who lived in the same area or in two adjacent counties. They had been contacted by a process of random telephone calls. The Quit and Win contest offered the chance to win C\$1000 to those participants who abstained for the month leading up to the draw. The winners' smoke-free status was confirmed by a nominated 'buddy'. All entrants received a 'Quit Kit' of support materials, including cessation advice, maintenance tips, a list of local cessation programmes, and a fridge magnet with the number of a health information unit line. Follow up was by telephone interview at one year.

[McAlister 2000](#) described a quasi-experimental evaluation of a quit and win contest held in Pitkaranta (in Russian Karelia). Following on the success of the 1996 international quit and win contest held in the area in May, the study team ran a continuous contest from September 1996 to March 1997, with registering smokers required to quit for at least four weeks to be eligible to win prizes. The monthly draw was for a three-day break in North Karelia. Winners were verified by carbon monoxide (CO) monitoring. Competing smokers could also nominate a 'supporter' (usually a spouse or friend), who was also eligible for a prize draw. Leaflets and the local press featured role-model stories and encouragement throughout the duration of the contest. Baseline surveys were conducted in Pitkaranta and in a neighbouring comparison district (Suojarvi), and a panel of daily smokers (176 in Pitkaranta and 202 in Suojarvi) were re-surveyed one year later.

[Hahn 2005](#) used a quasi-randomized study to compare 494 quit and win contestants (56% of all registrants) in Lexington-Fayette county, Kentucky, with 512 randomly selected smokers from outside the contest area. The intervention group received various forms of quitting assistance, including weekly mailed postcards giving gender-specific advice throughout the contest period, an online cessation web site, a toll-free quit line and the chance to win a grand prize of US\$2500 or one of five US\$500 prizes. The contest was widely promoted through mass media, physicians, community organizations and worksites. Intervention and control subjects were surveyed by phone at baseline and at three, six and twelve months, with all claims of abstinence verified by urinary cotinine and the testimony of a nominated 'buddy'. The trialists also reported separately ([Hahn 2004](#)) on a sub-group of 248 contest participants and 290 controls defined as low-income (earning less than US\$25,000 a year).

[Hawk 2006](#) reported a campaign in Erie and Niagara counties (New York state), in which participants could choose to enter a one-month quit and win contest with a grand prize of US\$1000, or could receive a free two-week supply of nicotine patches or gum, or could combine both options. The contest alone attracted 849 smokers, the free nicotine replacement therapy (NRT) alone 690 smokers, and the combination 230 smokers. Background smoking demographics were collected by two telephone surveys which over-sampled smokers. Publicity materials included leaflets and newsletters targeting African American and Latino residents, who

had higher rates of smoking than non-Hispanic white residents. As well as comparing abstinence rates, the study set out to determine the characteristics of the participants in their self-selected groups, and to identify predictors of quitting.

### Risk of bias in included studies

One of the five included studies (Lando 1991a) was a randomized controlled trial, but gave no details about the methods of randomization, and was therefore rated 'B' (unclear) for concealment of allocation. Bains 2000, McAlister 2000 and Hahn 2005 were all controlled trials, without random allocation (rated 'C', not applicable). Hawk 2006 was an observational comparison study (rated 'C', not applicable).

Lando 1991a conducted the study in an area that for three years had been taking part in the Minnesota Heart Health Program (MHHP), so that there was already a heightened awareness of the smoking cessation campaign and of Quit and Win contests in particular. Indeed, the participants had all taken part in baseline screening for the MHHP, and 15% of all participants across the three arms of the study had entered previous quit and win contests. It is likely they would already be familiar with the Quit and Win materials that some of them were being asked to test. The authors commented that smokers were somewhat under-represented in the MHHP, with a smoking cohort of less than 28% compared with the population prevalence rate of over 31%. Given that 60% of the adult population presented for the initial MHHP screening, and that study participants were drawn only from the screened group, the under-representation of smokers within that group meant that less than 54% of the smoking population of the area was eligible to participate in the trial. It is also likely that those who did would be unusually receptive to making a quit attempt.

Similarly, McAlister 2000 derived his experimental group from a population survey linked with the 1996 International Quit and Win contest held in Pitkaranta (Russian Karelia). This was one of nine demonstration areas, designated by the World Health Organization 'an intensive campaign area' (Korhonen 2000). Furthermore, the study programme in Pitkaranta received support throughout from staff at the North Karelia Project, and from the National Public Health Institute of Finland (organizers of International Quit and Win). The comparison community for the study was neighbouring Suojarvi, which had no history of intensive anti-smoking activities. Although the economy and demography of the two areas were described as 'very similar', no direct comparisons were reported or quantified. The authors point out that the greater success in following up the experimental group was probably attributable to the more intense activity and interest in smoking issues among health workers in Pitkaranta.

Bains 2000 assembled an experimental cohort of almost all (231/239) of the smokers who were participating in a 1995 quit and win contest held in two Eastern Ontario counties, while the control group was composed of smokers who had not entered the contest

but had responded positively to a random telephone dialling programme. The two groups were therefore very differently constituted, and displayed many baseline disparities (see the Included Studies table).

Hahn 2005 similarly targeted contestants in a local quit and win contest (Bluegrass 2001), but unlike Bains selected the controls from outside the contest catchment area. There were significant differences between the groups by age, gender, education, income and stage of change, but these were controlled for in the analyses. Attrition rates were 37% for the intervention group and 40% for controls.

Hawk 2006 did not randomize participants to the three interventions, but explored differences between the self-selected groups. All claims of abstinence were by unvalidated self-report, and length of follow up varied between four and seven months. Follow up was achieved for about 60% of sampled participants, in similar proportions across all three groups. The telephone survey-based reference group is likely to be subject to similar constraints to those reported for Bains 2000 above.

Only one of the included studies (Hahn 2005) attempted to validate every claim of abstinence by testing for urinary cotinine, and this study also routinely cross-checked with the testimony of a nominated 'buddy'. Two of the studies did not use biochemical validation, but relied upon self report (Lando 1991a) or 'buddy' confirmation (Bains 2000). Both studies acknowledged that the reported quit rates might therefore be somewhat inflated by false claims. In the McAlister study, only the potential winners of the prize draw had their claims of abstinence biochemically tested, using expired CO. Hawk 2006 did not attempt any form of validation.

Lando 1991a, McAlister 2000 and Hawk 2006 presented quit rates as both an intention-to-treat analysis (i.e. including all participants randomized in the denominator, and assuming those lost to follow up to be continuing smokers) and on a responders-only basis. Hahn 2005 reported quit rates in an intention-to-treat analysis as both 7-day point prevalence and continuous abstinence measures, and distinguished throughout between self-reported and biochemically validated rates. Bains 2000 reported quit rates based only on those who gave follow-up information at one year, but with a follow-up rate of 86.5% of the intervention group and 84.4% of the controls, this is unlikely to have significantly compromise the final comparisons.

### Effects of interventions

Hahn, McAlister and Bains all found significant differences in the one-year quit rates between the experimental and control participants.

Hahn 2005 reported a 7.3% (36/494) biochemically validated quit rate at 12 months for the quit and win group, compared with 0.6% (3/512) for the controls ( $P < 0.0001$ ). This contrasts with

12-month self-reported abstinence rates of 24.6% and 8.1% respectively. Only 59% of self-reported quitters who agreed to provide a urine sample actually did so. Logistic regression analysis, controlling for baseline differences in stage of change, age, education and marital status, showed that at 12 months follow up the intervention group had more than five times the odds of confirmed abstinence than the control group (OR 5.3, 95% CI 2.3 to 12.5). Those who completed the study were significantly older, more likely to be married, and to have higher educational level and income than those who dropped out. Women, ethnic minorities and those with an income below US\$25,000 were as likely to quit as men, whites, and those with a higher income.

**McAlister 2000** reported a 7% (13/176) quit rate in Pitkaranta compared with 0.5% (1/202;  $P < 0.05$ ) in the comparison community of Suojarvi, for smokers who had abstained for longer than the previous month. The corresponding point prevalence quit rates were 14% (26/176) and 1% (2/202;  $P < 0.01$ ). This result should be viewed with some caution, for the reasons given earlier, and because follow-up rates were relatively low and disparate; the study team re-contacted 58% of the experimental panel at one year, but only 42% of the controls.

**Bains 2000** reported a 1% quit rate among the random survey control group (4/385 on an intention-to-treat basis, or 4/325 on a responders-only basis), and a 19.5% quit rate among the experimental group, based on 200 responders. An intention-to-treat analysis would yield a quit rate of 16.9%, still substantially higher than in the control group. The authors urge caution, however, in interpreting these results, since the two groups were profoundly different. The experimental group, comprising contestants in a local quit and win contest, were on average younger, heavier smokers, better educated and more likely to be employed. The process of random telephoning to assemble a control group tended to identify people more likely to be at home (older, not working, lower socio-economic status), leading to "systematic differences" between smokers who enter quit smoking contests and smokers who don't. The study found no baseline demographic features to be significantly predictive of cessation at one year.

**Lando 1991a** found no significant differences between the three arms of the study. The Quit and Win group achieved a point prevalence quit rate of 8.9% (17/191), the Quit for Good group 10.2% (20/197), and the no-materials control group 10.8% (17/157). The equivalent intention-to-treat quit rates were 8.5%, 10% and 10% respectively. However, the authors point to several factors that affect interpretation of these results: Follow up that was intended to evaluate at seven months was in fact conducted only three or four months after the distribution of the brochures, and may not have represented the stable long-term quit rates. More significantly, nearly half of the quitters at follow up (24/53 [sic]) had stopped smoking before the materials were sent out. Quit rates for those who only stopped after the receipt of the self-help materials are reduced to 6.0% (11/184) for Quit and Win, 5.3% (10/

189) for Quit for Good, and 5.4% (8/148) for the control group. The equivalent intention-to-treat rates for these groups would be 5.5%, 5% and 4.7% respectively. The authors speculate that the baseline phone call may have prompted the spontaneous quit attempts, but it should also be remembered that the trial was conducted in a region already very committed and accustomed to the MHHP, among a group of people who had already signed up to that programme and been screened for it. This could well have contributed to the awareness and receptivity of all participants in the study, and is further reflected in the unusually high quit rate achieved by the control group, who received no self-help assistance at all.

**Hawk 2006** detected no significant differences between the quit rates of any of the three groups, whether on a per protocol or an intention-to-treat analysis. Responders-only quit rates were 29% for the quit and win contestants, 26% for the NRT users and 27% for the combination group. Ethnic minority smokers were over-represented across the groups, suggesting that targeted recruitment had been effective. The study demonstrated an unexpected interaction between intervention and age, with younger people in the combination group achieving higher abstinence rates than their counterparts in the single intervention groups (33%, versus Q&W 25% and NRT 19%), while older participants in the combination group achieved lower abstinence rates than those in the contest and NRT groups (20%, versus Q&W 33% and NRT 31%).

#### Population impact

A useful measure of the efficacy of quit and win initiatives within the community is the population impact of a given intervention. This is calculated by multiplying the achieved quit rate by the percentage of smokers who participated in the contest, and affords a comparator between different events in different communities. Our tabulation of key quit and win studies (Table 2) includes this measure where it was reported or could be calculated.

**Bains 2000** reports a population impact of 0.17%, based on a participation rate of 0.83% of adult smokers. In practical terms, and assuming there is a causal link between entering the contest and quitting, this would mean that one in every 588 smokers within the community might be expected to achieve long-term abstinence because of the quit and win contest.

A similar calculation for the **McAlister 2000** study gives a population impact of 0.21%, based on the reported participation rate of about 3% of smokers in the Pitkaranta contest; in other words, about one in every 500 smokers in the community might be expected to achieve abstinence through taking part in the contest. Neither **Hahn 2005** nor **Hawk 2006** reported the smoking prevalence rates in the target communities, so a population impact measure could not be estimated for these studies.

It is not appropriate to attempt to derive a population impact figure from the Lando study, partly because the experimental design precludes it, but also because in this trial the Quit and Win group were not offered the defining component of a quit and win contest, namely a tangible incentive for abstinence. The selective

components and the distributive effects of randomization mean that a population impact cannot be estimated for this trial.

## DISCUSSION

It is difficult to draw firm conclusions from the few controlled quit and win studies that have been reported so far. The five included studies in this review reported on relatively small numbers of participants. They were all conducted within communities that had current or prior experience of quit and win contests. For the most part the control groups or communities were either not attuned to smoking as a public health priority (McAlister 2000), or were probably too different to support a meaningful comparison (Bains 2000). The single randomized trial (Lando 1991a) excluded the 'win' component, and concentrated on the efficacy of the self-help materials. It is therefore not possible to draw meaningful conclusions from this trial about the effectiveness of the fully functional contest. The New York state study (Hawk 2006), while demonstrating benefits for the three intervention groups, lacked a true control group, and warned against over-interpretation of its findings. Probably the most promising results have emerged from Hahn 2005, in which biochemically validated outcomes and controlling for baseline differences still demonstrated a benefit of the quit and win contest. Their finding that women and low-income smokers, both groups less likely to succeed in quitting, were as likely to achieve abstinence as men and higher-income registrants, shows particular promise.

Bains 1998, in her review of 17 population-based incentives trials, estimates a mean cessation rate of 23% among all participants in at one year, and a 1% quit rate among all smokers in the target communities. Such a measure, while interesting, makes no allowance for heterogeneity among populations and trial designs. An alternative measure of effect is the population impact (cessation rate x percentage of smokers enrolled), where this is reported or can be calculated. The Results section of our review gives the population impact at longest follow up for Bains 2000 and McAlister 2000, and Table 2 gives this measure where it is reported or can be estimated for the landmark excluded studies. Population impact approximates the number of smokers who quit because of participating in the intervention (in this case, a quit and win contest), assuming that there is a causal link between the two. In our review, population impact ranges from 0.07% at one year in Heartbeat Wales (Roberts 1993), which is roughly equal to one in every 1400 smokers in the community, to 0.61% in Bloomington at 3-4 months (Lando 1991b), or roughly one in 160 smokers.

### Design and evaluation

Population-based interventions are less amenable to a randomized controlled trial (RCT) design than worksite- or clinically-based ones. The organizers of the Swedish 1988 and 1989 Quit and Win

competitions preferred a modified time-series design for their evaluation (Tillgren 1995), and Bains 1998 discusses the prohibitive logistics of setting up a community-based RCT to avoid selection bias. In the same vein, Chapman 1993 has pointed out that in developed countries such as Australia (and the same would hold true for many regions in the USA and Europe) the ubiquity of tobacco control laws, regulations, taxes, mass-reach campaigns and a high level of media discussion have made controlled trials virtually impossible to conduct, since comparable communities can not be isolated from contaminating influences. The discussion of the included studies in this review illustrates those difficulties.

### Participants and non-participants

Smokers who enter a quit and win contest are usually a self-selected group, and may share different characteristics from smokers who choose not to join the contest. From the included and excluded studies in this review, people who register for a contest tend to be predominantly female (Altman 1987; Bains 2000; Cummings 1990; Hahn 2005; HEA 1991; Korhonen 1992; O'Connor 2006; Roberts 1993; Tillgren 1992), younger (Altman 1987; Bains 2000; Cummings 1990; Hahn 2005; Hawk 2006; HEA 1991; Korhonen 1999; O'Connor 2006), better educated (Bains 2000; Cummings 1990; Hahn 2005; Hawk 2006; Korhonen 1999; Lando 1995a), smoking more cigarettes per day (Bains 2000; Cummings 1990; Hawk 2006; Korhonen 1999; O'Connor 2006), in the contemplation or preparation stage of change (Hahn 2005; Lando 1991b; Resnicow 1997; Roberts 1993), and to have made more previous quit attempts than those smokers who do not enter the contest (Korhonen 1999). The picture for socio-economic status is less consistent, with Bains 2000 and HEA 1991 finding a preponderance of professional and semi-professional participants (socio-economic class ABC1) signing up for the contest, while Tillgren 1992 and Lando 1991b report a higher proportion of manual or blue-collar workers.

Interestingly, the Bluegrass trial found only a weak link between signing up for the contest and the desire to win the cash prize, with 81% of low-income participants (less than US\$25,000 a year) indicating that they would have entered the contest anyway (Hahn 2004). O'Connor 2006 reported that fewer than one-third of participants in the New York contests claimed to be financially motivated to enter, with the contest that offered more than twice the value in prize money achieving no greater reach or efficacy than the other ten contests.

### Quitters and non-quitters

There also appear to be clear differences among the participants between those who succeeded in quitting and those who didn't. While several studies found no correlation between gender and quitting success, higher quit rates among men than among women were reported by Korhonen 1992 (16% versus 11%) and Tillgren 1992 (30% versus 25%). Tillgren also found that male quitters tended to be younger (35 to 54) than female quitters (55 to 85).

Successful quitters tended to be older (HEA 1991; Leinweber 1994; Roberts 1993), of higher socio-economic status (Lefebvre 1990; Tillgren 1992), to smoke more heavily (Chapman 1993; Roberts 1993), and to have made no or fewer previous quit attempts than unsuccessful contestants (Chapman 1993; Leinweber 1994; Roberts 1993; Tillgren 1992). Two factors emerged across several studies as consistent predictors of successful quitting: one was the assistance of supportive others, whether a spouse or cohabiting partner (Hawk 2006; Lefebvre 1990; Tillgren 1992), non-smokers living with the contestant (Leinweber 1994), family and friends (Lando 1991a; Roberts 1993) or workmates (Lefebvre 1990). Unfortunately Hahn 2005, the most rigorously designed of the included studies, did not measure the efficacy of the supportiveness of the designated 'buddy', and reported this as a limitation of its own analysis (Hahn 2004). The second mechanism predictive of success was abrupt or 'cold turkey' cessation rather than tapering, reducing smoking or switching brands (Hahn 2004; King 1987; Lando 1991b; Roberts 1993).

### Publicity and recruitment

One reason for variation in the mix of smokers attracted to a contest may derive in part from the methods used to promote it. All the included quit and win contests used some form of mass media promotion, including newspapers, radio and television, either with paid or public service advertisements and articles. Most of the campaigns used posters and fliers, distributed through pharmacies, hospitals, dentists' and doctors' offices. Schools, churches, work-sites, libraries, sports events and shopping centres were routinely leafleted. The Quit and Win/free NRT campaign (Hawk 2006) targeted those ethnic minority groups with higher rates of smoking, producing an eight-page newsletter featuring African American and Latino testimonies, in English and Spanish versions. Some contest organizers recruited proactively at festivals and health fairs (Hahn 2004; Hahn 2005).

Several studies have suggested that the preponderance of younger, employed, better educated smokers in quit and win contests may reflect the channels through which entries are recruited. Among the included studies, Bains 2000 has commented that the control group who did not enter the quit and win contest tended to be older, of lower socio-economic status, and unemployed or retired. This group is especially vulnerable to chronic illness and mortality, and to smoking-related diseases in particular. Hahn 2005, like Bains, used quit and win contestants as the experimental group and assembled the control group by random digit dialling (but outside the intervention community), and found similar baseline differences, with the control subjects being significantly older (43 versus 38) and with fewer college graduates (37% versus 65%).

Of the studies considered in this review, only one included and two excluded studies reported that they had reached significant numbers of blue-collar and lower-paid workers. Hahn 2004 reported separately on a cohort of low-income smokers (earning un-

der US\$25,000 a year), long identified as at higher risk of smoking-related diseases and largely untouched by most tobacco cessation approaches (Kiefe 2001). Despite the intervention group achieving significantly higher long-term quit rates than the control group, the authors caution against over-interpretation of the results. They point out that the quit and win contestants were younger, more educated, more likely to be in the preparation or action stage of change and more likely to be unmarried than the control group.

### Deception

Although biochemical validation of claims of abstinence is the gold standard for controlled trials (Benowitz 2002), in practice most population-based contests, with limited resources and many participants, only test the prize winners to verify their smoking status. Most study quit rates are therefore based on self-reported abstinence claims, and should be treated with some caution. The only study which attempted biochemical validation of all claims of abstinence was Hahn 2005; this study also contrasted self-reported quit rates with confirmed ones, demonstrating more than a three-fold difference in twelve month quit rates for the intervention group between self-reported (24.6%) and confirmed (7.3%) rates of cessation. The control group disparity was more than thirteen-fold (8.1% versus 0.6%). Blanket biochemical verification at entry would clearly be impractical and prohibitively expensive. Whether some kind of affirmation procedure built into the contest protocol would reduce levels of deception is questionable. It continues to be a programme design issue that contest organizers have to live with, and need to take account of in their analyses.

### International Quit and Win

We have not been able to identify any controlled trials of international quit and win contests, and it seems unlikely in practice that any such studies can be implemented. There are, however, several reports and population-based studies of six international contests run so far (1994 to 2004), which merit consideration in the discussion section of this review. We have no detailed information about the findings of the 2006 contest.

The history of international quit and win contests is discussed in the background section of this review, and descriptive features of the contests held to date are summarized in Table 3. Briefly, the contests have been run every two years within the WHO's CINDI framework (Countrywide Integrated Noncommunicable Diseases Intervention) since 1994 by the National Public Health Institute (KTL) in Finland, which supports national organizing committees within the participating countries. Information and contest entry is increasingly accessible on the world wide web ([www.quitandwin.org](http://www.quitandwin.org)). Participants must be aged 18 or over, and have been daily smokers for at least one year. Winners' smoking status is verified by a urine sample. From 1998 the contests have been

supported jointly by the European Union and the Finnish Centre for Health Promotion, and have also been sponsored by major pharmaceutical companies. The 1998 contest, in which 200,000 people from 48 countries participated, recruited 0.1 promille (1 in 10,000) of all smokers worldwide. The first competition in 1994 involved 13 European countries, and the event has grown steadily until 2002 when it encompassed 80 participating countries worldwide (700,000 people). The most recent competition, held in May 2004, reached 73 countries (688,000 people) through 80 campaigns. It remains to be seen whether or not the reach of the contest is beginning to plateau out. From 2000, the main cessation contest has been augmented by a supporters' contest and by a health professionals' contest.

Although there are great differences in quit rates between participating countries, the organizers report that on average about 20% of contest participants are estimated to have remained continuously abstinent at one-year follow up (Sandstrom 2002). Because of the considerable variation in participation and abstinence rates between participating countries, it was recognized early on that some global measure was needed to afford comparability. The population impact (Korhonen 2000), or public health impact (Sandstrom 2001), calculated as participation rate  $\times$  conservative estimate of successful quitters, was proposed as the most useful measure. One significant finding of Korhonen's comparison of eight campaign sites in 1996 is that, despite heterogeneous one-year quit rates ranging from 11.9% (Finland) to 34.6% (Pitkaranta), the population impact measures suggested that higher participation rates were not correlated with lower abstinence rates. In other words, more smokers did not mean less highly motivated smokers. Given that across a number of contests the average cessation rate stayed relatively stable at between 10 and 30% (Sandstrom 2002), and given that the rates do not appear to be diluted by increased participation, the potential of quit and win contests would seem to depend primarily upon enhancing participation rates (Lavack 2007).

The increasing heterogeneity of the participant countries makes comparisons and meaningful conclusions very problematic. A report of the 1996 contests in regional China and in Finland, for example, attributes the spectacularly higher Chinese one-year quit rate (41.7% versus 18.2%) to a number of cultural differences, including a higher prevalence of less addicted or 'easy' quitters, radically different prevalence rates by gender, different sorts of prizes (money versus a trip to the Olympics), and even pharmacologically different nicotine patches in the two countries (Sun 2000). Similarly, a report of the 1998 Iranian contest (Pourshams 2000) speculated that the unusually high quit rate of 39.8% had been contaminated by a mixture of false claims of abstinence (30% of the biological samples indicating current smoking) and a high proportion of nonsmokers entering the contest. The cautious estimate (assuming non-responders to be smokers) of validated cessation was adjusted to 27.8%, with the high level of success attributed to

the relative lack of other quitting facilities, Iran's lower economic status compared with European countries, and the possibly higher participation rate of nonsmokers eager to win a prize. A recent conference summary of the subsequent Quit and Win campaigns in Iran has reported one-year quit rates of 65.5% (2000), 58% (2002) and 68% (2004) (SarrafZadegan 2006).

The official report for the 2000 contest drew attention to the generally higher quit and win cessation rates in developing countries, compared with the developed world (Sandstrom 2002). Not only are these contests considered to be cost-effective, with two-thirds of them costing less than US\$10,000 to run, but they have also raised awareness of tobacco control issues, often by linking with other smoking control programmes such as World No Tobacco Day (Kenya), and by influencing anti-tobacco legislation (Nigeria, Brazil). This comes at a time of aggressive marketing by the tobacco industry in the developing regions, and indeed British American Tobacco (BAT) ran a counter-campaign to coincide with Quit and Win in Kenya, as did BAT and Philip Morris in Romanian schools.

As with regional and national contests, the quitting aid that has consistently been cited in International Quit and Win evaluations as the most important and effective is support from friends and family. The addition in 2000 of the supporters' contest to the basic structure of the quit and win campaign is a response to that finding, and an attempt to consolidate its effectiveness.

#### Cost effectiveness

Only one of the five included studies in this review reported any information about the cost effectiveness of their intervention. Hawk 2006 estimated that the cost per quitter for the Quit and Win contestants was US\$130, and for the free NRT users US\$179, but pointed out that such comparisons may be misleading, since the two groups were self-selected and demographically different from each other.

## AUTHORS' CONCLUSIONS

### Implications for practice

The conclusions and implications for practice and research are based only upon the Included Studies in this review.

1. No randomized controlled trials have shown that quit and win contests increase the number of people giving up smoking. However, controlled studies suggest that there is an increase in quit rates among participants compared to control populations. Possible biases in these results include differences between control and intervention populations and accuracy of outcome ascertainment because of deception rates.
2. Using estimates from controlled trials, calculations of population impact suggest that fewer than one in 500 smokers in com-

munities targeted by quit and win contests quit as a result of the contest.

3. Enhancing participation rates may be important for delivering improved absolute numbers of quitters through quit and win contests.

4. The two elements which appear to lead to success in a quit and win contest are supportive others (family, friends, workmates), and abrupt quitting ('cold turkey') rather than reducing or brand switching.

5. There are insufficient data to draw conclusions about cost effectiveness of quit and win contests

## Implications for research

There are considerable difficulties in designing controlled studies of quit and win contests.

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\* *Indicates the major publication for the study*

## CHARACTERISTICS OF STUDIES

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

#### Bains 2000

Methods	Country: Canada Setting: Four counties in Eastern Ontario; entrants to a 1995 Q&W contest in 2 counties (Frontenac, Lennox and Addington), and a random sample of non-entrant smokers from all 4 counties (Frontenac, Lennox and Addington, Hastings, Prince Edward) Design: Quasi-randomized; Intervention group were all entrants to the Q&W contest; controls were selected by random telephone dialling (full details obtained from authors).	
Participants	231 Intervention participants, 385 control smokers. All had to be 18+, daily smokers of at least 10 cpd. Baseline differences: Int group higher %female (59.4% vs 54%), younger, more highly educated, more likely to be employed, more likely to be in a professional or semi-professional job. Significant differences also in av cpd, av years smoking, quit attempts in past year, number of smoking friends, working in a smoke-free workplace, number of smoking co-workers, and stage of change.	
Interventions	1. Intervention: Entry into a locally publicised Q&W contest. 'Quit Kit' supplied to each entrant (letter of encouragement, cessation info, list of local cessation programmes, tips on maintenance, fridge magnet with health unit info phone number). 2. Control: No cessation support, only baseline and 1 year telephone interview	
Outcomes	Contest winners (smoke-free for month prior to the draw) not biochemically validated; verification was from 'buddy' testimony. Unvalidated self report of 6 months continuous abstinence at 1 year follow up	
Notes		
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Allocation concealment (selection bias)	High risk	C - Inadequate

#### Hahn 2005

Methods	Country: USA Setting: Bluegrass Kentucky 2001 quit and win contest Design: two-group quasi-randomized study	
Participants	1. Intervention: 494 registrants in a quit and win contest in Lexington-Fayette county (56% of all entrants); av age 38, 68% female, 47% married, 89% white, 65% college education, 48% earning >\$25,000, 98% smoked cigarettes 2. Control: 512 current smokers selected by random digit dialling from outside the contest area (=8.5% of contacted households). av age 42.8, 56% female, 54% married, 91% white. 37% college education, 39% >\$25,000, 92% smoked cigarettes.	

**Hahn 2005** (Continued)

	All participants had to be 18+ and using tobacco within last 30 days	
Interventions	<p>1. Intervention: Community quit date; weekly gender-specific cessation information by post throughout contest; online quit assistance; toll-free phone quit assistance; media campaign; support through worksites, physicians, health professionals, community leaders. Registrants declared tobacco status, and nominated a tobacco-free 'buddy'. Lottery draw for cash prizes (grand prize US\$2500 and 5 prizes of US\$500) for all validated quitters.</p> <p>2. Controls: baseline and follow-up surveys only Telephone interviews at baseline, and at 3, 6 and 12m.</p>	
Outcomes	7-day PP. Abstinence at contest end validated by 'buddy' testimony. Follow-up interviews at 3m, 6m and 12m, with urinary cotinine test for all quitters at all follow-up points.	
Notes	<p>In 2005 version of our review, this trial reported on low-income smokers only. The current version reports full trial data.</p> <p>ITT analysis, with missing or non-negative urines and drop-outs counted as continuing smokers.</p>	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Allocation concealment (selection bias)	High risk	C - Inadequate

**Hawk 2006**

Methods	<p>Country: USA Setting: New York (Erie and Niagara counties) 2003 quit and win contest Design: three-group non-randomized study; daily smokers could enter the Q&amp;W contest, or take up free NRT vouchers, or do both. No active control group, but 524 smokers took part in a 2-wave telephone survey (Oct/Nov 2002 and March/May 2004) to provide a population estimate.</p>	
Participants	<p>1. 849 entered the Q&amp;W contest; mean cpd 21, mean age 40, 63% F, 23% ethnic minority, 37% married, 62% &gt; high school education 2. 690 took up free NRT; mean cpd 21, mean age 43, 58% F, 20% ethnic minority, 43% married, 57% &gt; high school education 3. 230 took free NRT and entered the contest ; mean cpd 20, mean age 41, 64% F, 30% ethnic minority, 41% married, 60% &gt; high school education Participants in Groups 2 and 3 had to be 18+ years, smoking at least 10 cpd; women had to declare themselves not pregnant</p>	
Interventions	<p>1. Q&amp;W contest, 1m beginning January 1st 2003, for prize draw of US\$1000, plus other prizes 2. NRT group screened via NYS Quitline, community stop smoking programmes and local pharmacies, and given a voucher for 2-wk supply of NRT patches or gum. 3. Combination group took up both components</p>	

**Hawk 2006** (Continued)

Outcomes	7-day PP abstinence, assessed 4m-7m post-quit date. 62% of Q&W group random sample (204), 60% of NRT group random sample (179) and 64% Combination group random sample (143) gave follow-up interviews.	
Notes	new for 2008 update. Campaign particularly targeted ethnic minority smokers, i.e. African American, Latino.	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Allocation concealment (selection bias)	Unclear risk	D - Not used

**Lando 1991a**

Methods	Country: USA Setting: Mankato, Minnesota, in 1986 as part of the MHHP Design: Randomized controlled trial	
Participants	570 adult smokers. av age 42, av cpd 20, married 76%; 53% of the marrieds had a smoking spouse, and 24% were married to an ex-smoker. 39.7% had no more than a high school education, 39.6% had college or vocational training, 20.7% completed college or higher. 16% professional, 39% clerical, 30% blue-collar, 15% not working for pay.	
Interventions	1. Intervention 1; 200 people: NCI 'Quit for Good' programme, cessation and maintenance/relapse prevention booklets. 2. Intervention 2; 200 people: MHHP 'Quit and Win' programme. A detailed brochure, more structured than 'Quit for Good', on quitting and maintenance. 3. Control group: 170 people: No intervention. Follow-up telephone interviews on smoking status (self report only), and recollection and use of the materials.	
Outcomes	PP at 7 months, results given as ITT and also excluding non-responders; analysis also offered on those who quit only after receiving the materials. All claims of abstinence were unconfirmed biochemically.	
Notes	Follow up was often only 3-4 months after receipt of materials, rather than the planned 7 months. No prizes were offered to the Q&W group; the intervention being tested was simply the self-help cessation materials	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Allocation concealment (selection bias)	Unclear risk	B - Unclear

**McAlister 2000**

Methods	Country: Russia Setting: Pitkaranta and Suojarvi, a comparable neighbouring district, both in Russian Karelia Design: quasi-experimental panel study in 1996, with baseline and 1-year smoking surveys
Participants	176 daily smokers in Pitkaranta (experimental) and 202 in Suojarvi (control). Baseline comparisons not discussed, but communities reportedly 'very similar'. Smoking prevalence estimated to be 47% for men and 6.3% for women in Pitkaranta, and 55% and 8.3% respectively in Suojarvi.
Interventions	1. Intervention: 6 month rolling Q&W contest, monthly draws for holidays for quitters and their nominated supporters. Newspaper and leaflet support throughout the campaign. 2. Control: Surveys only, no cessation programme or contest.
Outcomes	PP at 12 month on ITT basis, and on responders-only basis. CO validation for potential winners
Notes	Baseline measure was taken from a large international study of adult populations in different countries in Eastern and Western Europe. One-year follow up was an ad hoc survey by the McAlister study team.

***Risk of bias***

Bias	Authors' judgement	Support for judgement
Allocation concealment (selection bias)	High risk	C - Inadequate

av: average

CO: Carbon Monoxide

cpd: cigarettes per day

ITT: intention-to-treat

MHHP: Minnesota Heart Health Program

NCI: National Cancer Institute

PP: point prevalence

Q&W: Quit and Win

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

Study	Reason for exclusion
Ashbury 2006	Random sample (347 completed surveys) follow up of participants 12m post-contest. No comparison group.
Chapman 1993	4-month follow up of a contest, no control group

(Continued)

Croghan 2001	Before-and-after population-based survey, without a control group
Cummings 1990	Population-based survey, without a control group
Elder 1991	No comparison group, followed up for only 2 months.
Glasgow 1985	Cross-sectional survey of participants one week post-contest; no control group
Gomez-Zamudio 2004	Interventions being tested were pharmacological aids, social support and cessation materials. No comparison group
HEA 1991	Population-based survey, no control group
King 1987	No details of comparison community
Kinoshita 2004	Overview of 3 Osaka quit and win contests 1998-2000, no control groups.
Korhonen 1992	Inter-contest comparison of TV groups; no non-intervention control group
Korhonen 1993	No non-intervention comparison group
Korhonen 1998	Evaluation of 1994 contests in Finland, Russia, Catalonia; no comparison groups
Korhonen 1999	No comparison group
Lai 2000	Before-and-after population-based survey, without a control group
Lando 1990	Comparison of 2 Minnesota contests, but only 4-5 months follow up
Lando 1991b	Survey data, followed up at 3-4 months, without a control group
Lando 1995a	No comparison group
Lefebvre 1990	No non-intervention comparison group
Leinweber 1994	6-week follow up, no comparison group
O'Connor 2006	11 contests in New York 2001-2004, 4-6m follow up. No control groups
Pirie 1997	Intervention being tested was social support, not the contest itself.
Resnicow 1997	Quit and win surveyed as part of a multicomponent intervention, no non-intervention control group reported
Roberts 1993	Follow up of a pilot contest, surveyed at 4 months

(Continued)

Rooney 2005	No non-intervention comparison group
SarraZadegan 2006	International Q&W contests in Iran; participation and self-reported quit rates
Tillgren 1992	No non-intervention control group
Tillgren 2000	Contest for smoking mothers, 12m follow up, no control group.

## DATA AND ANALYSES

### Comparison 1. Summary Tables

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 RESULTS OF INCLUDED STUDIES			Other data	No numeric data

#### Analysis 1.1. Comparison 1 Summary Tables, Outcome 1 RESULTS OF INCLUDED STUDIES.

##### RESULTS OF INCLUDED STUDIES

Study	Denominator	Abstinence	Time point	Validation	Quit rate	Stat sig?	Other outcomes	Comment
Bains 2000	231 (I) 385 (C)	PP, 39/200 (I), 4/325 (C) responders only	12 months	No biochemical. 'Buddy' confirmation	19.5% (I) 1% (C)	Not stated. [OR 19.44, CI 6.5 to 65.22)	Impact rate of 0.17% (i in 588) . Stage of change predicted cessation	
Hahn 2005	494 (I) 512 (C)	7-day PP: 36/494 (I) 3/512 (C)	12 months	Urinary cotinine all claims, + buddy confirmation	PP confirmed: 7.3% (I) 0.6% (C)	P<0.0001	Predictors of quitting. OR of being confirmed quit 5.3 (CI 2.3 to 12.5) for I over C	Int quit rate stayed stable over time, while C quit rate rose over 12m
Hawk 2006	849 (Q&W) 690 (NRT) 230 (both) 524 (survey)	7-day PP: % only, from followed-up sample	4-7 months (median 5.5)	self-report	29% (/204) 26% (/179) 27% (/143) ITT: 18% (/326) 16% (/300) 17% (/224)	non significant	Predictors of quitting. Characteristics of participants by group.	
Lando 1991a	200 (QFG) 200 (Q&W) 170 (C)	PP: QFG 20/197 Q&W 17/191 Control 17/157	7 months [in practice 3-4 months]	self-report, no biochemical validation	PP: QFG 10.2% Q&W 8.9% Control 10.8% ITT: QFG	non significant		Rates for those who received materials were: QFG: 5.3% Q&W 6.0% Cont: 5.4%

RESULTS OF INCLUDED STUDIES (Continued)

					10.0% Q&W 8.5% Control 10.0%			
McAlister 2000	176 (I) 202 (C)	PP: 26/102 (I) 2/85 (C) ITT: 26/176 (I) 2/202 (C)	12 months	Self-report. Only potential winners tested (expired CO)	PP: 26% (I) 2% (C) ITT: 14% (I) 1% (C)	PP: P<0.01 ITT: P<0.01		

APPENDICES

Appendix I. Major Quit & Win contests (Excluded studies)

STUDY	ELIGIBILITY	PRE-VERIFICATION	DURATION	FINALISTS DRAW	VALIDATION	PRIZES	EN-TRANTS (%)	IMPACT (reach x quit)	LONG-TERM QUIT
MHHP 1982-9	Adults 18+ smoking at least 10 cpd for at least 6m	report by 3 friends or a physician; raised CO	30 days	50 quitters	CO and SCN (finalists only)	Family trip to Disney World, bikes, health club membership, vouchers, cash	5276 (1-7%)	0.39% (Bloomington)	6m-8m: 21%-24%
Stanford 5 City 1982	NS	YES	1 month	All quitters	CO; report from 'significant other'	Trip to Hawaii	500 (2%)	Not stated [we estimate 0.44]	12m: 15% (Continuous abstinence, CO verified)
PHHP 1983-7	Adults 18+, at least 5 cpd for at least 6m	CO face-to-face recruits; friend/family on	~4 weeks	All quitters	CO<10ppm	US\$500 cash	1205 (% not stated)	Not stated	12m: 12.8%-23.7%

(Continued)

		entry form							
Finland 1986	Adults 17+, daily smokers	Not stated	2 weeks	All registrants	Names of 2 witnesses; blood tests for all winners	Trip to Hawaii, + 160 lesser prizes, from puzzles to ferry cruises	16,089 (1.6% Finland, 3.2% North Karelia)	Not stated [we estimate 1.2% at 2 weeks]	6m: 17% (Finland), 18% (Turku), 22% (North Karelia)
Buffalo 1988	Adults 18+, smoking any tobacco	NO	30 days	All registrants	CO test for selected winners, + testimony of 3 witnesses	US\$1000, Florida holiday, airline tickets, VCR machine, weekend breaks, baseball tickets	2565 (1%)	0.3%	8m: 32%
Sweden 1988	Adults 16+, daily tobacco users for at least 1 yr	Not stated	4 weeks	All quitters	Signed guarantee from 2 witnesses; SCN for all winners	Trip to Hawaii	12840 (0.64% total: 1.93% in Stockholm, 0.32% rest of Sweden)	Not stated [we estimate 1.8% Stockholm, 0.18% rest of Sweden]	4 yrs: 20% (all Sweden)
COMMIT 1990-2	Adults 18+	Not stated	3 weeks -5 months	Not stated	CO or SCN	US\$1000	Not stated (average 1.26% [0.27-3.11%])	Not stated	8m: 16% (Raleigh)
Heartbeat Wales 1990	Adults 18+	Not stated	1 month	All registrants each month	SCN (winners only)	Holiday in Tobago, + smaller monthly prizes	687 [we estimate 0.24%]	Not stated	1yr: 30% continuous abstinence
Quit & Win UK 1990	Adults 18+, smoking av. 5 cpd for at least 6m	Not stated	1 month	All registrants	"biochemical validation procedures"	Luxury holidays, colour TVs	12,452 (not stated)	Not stated	12m: 21%

(Continued)

Medicine Hat 1990	Adults 18+	NO	6 weeks	All confirmed quitters	'Buddy' testimony	Trip to California, health club membership, college tuition waiver, golf bag, cosmetic bag	75 (not stated [we estimate 0.9%])	Not stated	1 yr: 21% continuous abstinence
Hunter Valley 1991	Adults 20+	signed declaration	1 month? (not clear)	All registrants	CO, cotinine, + witnesses	A\$10,000 car	1167 (1.15%)	Not stated	4m: 29.2%
Kick It! 1992	Adult 18+ African-Americans, current smokers	NO	30 days (x 2)	All confirmed quitters	CO<10 ppm (+ for Contest 1 2 signed witness statements)	Trip to Disneyland, US\$250, TV, microwave, gift vouchers, theatre tickets	84 (not stated)	Not stated	6m: 20/84
Quit Smoking Gals! 1995-6	Daily smoking mothers of small children (0-6 yrs)	Not stated	7 months	Not stated	Written testimony from 2 witnesses. Winners CO tested	Three grand prize trips to Legoland	238 (5.5%)	0.79% (smoke-free at 12 months); end of contest quit rate not available	12m: 14.3% continuous abstinence
Wisconsin college students 2000	College students (any age, but analysis restricted to 18-24)	Not stated	7 weeks	All confirmed quitters	Mid-point and final CO <7ppm, winners and runners up salivary cotinine	Spring [Fall] contest: US\$1500 [3x\$500] travel voucher, \$500 electronics gift voucher, \$250 [2x\$100] mall gift	152 over 2 contests [114/38] (-2%)	0.6% [based on 120 participants aged 18-24)	6m: 12% self-reported

(Continued)

						voucher , \$100 cash[ 3xbook tokens]; College with most entrants/ quitters got \$250 bonus for student health pro- motion.			
NY 2001- 2004 (11 contests)	Adults 18+, daily cig smokers	NO	1 month	All quitters	3 witness confir- mations + CO: win- ners only	US\$1000 (Hudson Val- ley \$2000, \$1000, \$500 per country)	5504 (mean 0.55% of smok- ing popu- lation, 2.18% of newspa- per circula- tion smok- ers)	0.17% 7- day PPA mean across 11 contests at follow up	4-6m: mean 33.5 (quit at follow up), 16.7% (ITT)

## Appendix 2. International Quit & Win contests

Year	Countries	Participation rate	Quit date	Supporters contest	Health pro	Prizes	Follow up
1989	2 (Finland, Es- tonia)	Estonia 4.5%, Finland NS	Not stated	NO	NO	Not stated	6m: Es- tonia 23%, Fin- land 19%
1994	13 (63,000+)	Finland 0.6%, Russia 0.1%, Catalonia 0.1%	April 7 (World Health Day)	NO	NO	Hol- iday trips (na- tional prizes)	1yr CA: Fin- land 15.4%, Russia 12.1%, Catalo- nia 14.5%
1996	25 (70,000+)	0.2% to 1.2%	May 2	NO	NO	Cash; hol- iday trips; Super winner was	1yr: 20/25 com- plied. response

(Continued)

						Chinese	rates 51% (Hungary) to 91% (Russia). CA from 11.9% (Finland) to 38% (China) . Pop impact 0.28% highest in North Karelia
1998	48 (200,000+)	0.01% (Japan) to 1.7% (Finland)	May 2	NO	NO	Cash; Super winner was Chilean	1yr: 17/48 completed. Response rate 37% (Argentina) to 100% (Italy) . CA from 10% (Finland) to 42% (USA)
2000	70 (426,000+)	0.0008% (Tanzania) to 1.69% (Malta)	May 2	YES	YES (unofficial)	Cash; Super winner was Chilean	1yr: 28/70 completed. Response rate 27% (Romania) to 93% (China) . CA 4.7% (Argentina) to 44.2% (Italy)
2002	80 (700,000)		May 2	YES	YES	Cash; Super winner was Canadian	
2004	73 (687,000)		May 2	YES	YES	Cash; Super winner was German	
2006	89		May	YES	NK	Cash; Super winner was Indonesian	

### Appendix 3. 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
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.

(Continued)

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'; <i>Nicotine &amp; Tobacco Research</i> , 2003; 5 (1); 13-25
Relapse	A return to regular smoking after a period of abstinence
Secondhand smoke	Also called passive smoking or environmental tobacco smoke [ETS] A mixture of smoke exhaled by smokers and smoke released from smouldering cigarettes, cigars, pipes, bidis, etc. The smoke mixture contains gases and particulates, including nicotine, carcinogens and toxins.
Self-efficacy	The belief that one will be able to change one's behaviour, e.g. to quit smoking
SPC [Summary of Product Characteristics]	Advice from the manufacturers of a drug, agreed with the relevant licensing authority, to enable health professionals to prescribe and use the treatment safely and effectively.

(Continued)

Tapering	A gradual decrease in dose at the end of treatment, as an alternative to abruptly stopping treatment
Tar	The toxic chemicals found in cigarettes. In solid form, it is the brown, tacky residue visible in a cigarette filter and deposited in the lungs of smokers.
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: 29 January 2008.

Date	Event	Description
22 June 2011	Amended	Additional table converted to appendix to correct pdf format

## HISTORY

Protocol first published: Issue 4, 2004

Review first published: Issue 2, 2005

Date	Event	Description
18 July 2008	New citation required but conclusions have not changed	Name of lead author changed. Source of support added.
18 February 2008	New search has been performed	One new included study, four new excluded studies
22 November 2007	Amended	Converted to new review format.
17 February 2005	New citation required and conclusions have changed	Substantive amendment

## CONTRIBUTIONS OF AUTHORS

KH and RP extracted the data. KH wrote the review. RP commented on the review and gave statistical advice.

## DECLARATIONS OF INTEREST

None known

## SOURCES OF SUPPORT

### Internal sources

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

### External sources

- NHS Research and Development Fund, UK.

## INDEX TERMS

### Medical Subject Headings (MeSH)

\*Motivation; \*Reward; Controlled Clinical Trials as Topic; Health Promotion [\*methods]; Smoking Cessation [methods; \*psychology]

### MeSH check words

Humans