

Community interventions for reducing smoking among adults (Review)

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[Intervention Review]

Community interventions for reducing smoking among adults

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Editorial group: Cochrane Tobacco Addiction Group.

Publication status and date: Edited (no change to conclusions), published in Issue 4, 2008.

Review content assessed as up-to-date: 30 January 2006.

Citation: Secker-Walker R, Gnich W, Platt S, Lancaster T. Community interventions for reducing smoking among adults. *Cochrane Database of Systematic Reviews* 2002, Issue 2. Art. No.: CD001745. DOI: 10.1002/14651858.CD001745.

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ABSTRACT

Background

Since smoking behaviour is determined by social context, the best way to reduce the prevalence of smoking may be to use community-wide programmes which use multiple channels to provide reinforcement, support and norms for not smoking.

Objectives

To assess the effectiveness of community interventions for reducing the prevalence of smoking.

Search strategy

We searched the Cochrane Tobacco Addiction Group specialised register, MEDLINE (1966-January 2006) and EMBASE (1980-January 2006) and reference lists of articles.

Selection criteria

Controlled trials of community interventions for reducing smoking prevalence in adult smokers. The primary outcome was smoking behaviour.

Data collection and analysis

Data were extracted by one person and checked by a second.

Main results

Thirty-seven studies were included, of which 17 included only one intervention and one comparison community. Only four studies used random assignment of communities to either the intervention or comparison group. The population size of the communities ranged from a few thousand to over 100,000 people. Change in smoking prevalence was measured using cross-sectional follow-up data in 21 studies. The estimated net decline ranged from -1.0% to +3.0% for men and women combined (11 studies). For women, the decline ranged from -0.2% to +3.5% per year (n=11), and for men the decline ranged from -0.4% to +1.6% per year (n=12). Cigarette consumption and quit rates were only reported in a small number of studies. The two most rigorous studies showed limited evidence of an effect on prevalence. In the US COMMIT study there was no differential decline in prevalence between intervention and control communities, and there was no significant difference in the quit rates of heavier smokers who were the target intervention group. In the Australian CART study there was a significantly greater quit rate for men but not women.

Authors' conclusions

The failure of the largest and best conducted studies to detect an effect on prevalence of smoking is disappointing. A community approach will remain an important part of health promotion activities, but designers of future programmes will need to take account of this limited effect in determining the scale of projects and the resources devoted to them.

PLAIN LANGUAGE SUMMARY

Can community interventions reduce smoking among adults

Although intervention communities often showed substantial awareness of their programme, this rarely led to higher quit rates. Similarly, increased knowledge of health risks, changes in attitudes to smoking, more quit attempts, and better environmental and social support for quitting were not accompanied by reductions in community smoking levels. In the best designed trials, light to moderate smokers did slightly better than heavy smokers (the US COMMIT study), and men did a little better than women (the Australian CART study), but overall smoking rates remained similar between intervention and control communities.

BACKGROUND

The prevalence of cigarette smoking reached a peak in industrialized countries during the 1960s, and has since fallen. The prevalence among men at that time was substantially higher than among women, but the difference in prevalence between men and women has narrowed. The reductions in prevalence have been most marked among those members of society with more years of education and higher incomes, but there has been little change among those with fewer years of education and lower incomes. More recently the decline in adult smoking prevalence has been offset by an increase in smoking initiation amongst young people (MMWR 1998a), and an increase in smoking prevalence in many less developed countries.

Policy initiatives, such as higher cigarette taxes, have been shown to reduce cigarette consumption (MMWR 1998b; Townsend 1994) and smoking initiation (Lewit 1994). However, increases in cigarette prices place a greater burden on those with lower incomes who tend to have greater difficulty in stopping smoking. It is less clear whether other types of smoking policy, such as making worksites smoke-free, or having smoke-free public buildings actually reduce the prevalence of smoking (Eriksen 1998; Pierce 1998).

Most people who stop smoking make several attempts before they succeed, and most of these attempts are made without special help. For individuals who seek help, a variety of methods have been shown to help stop smoking, including individual advice and counselling, nicotine replacement therapy, antidepressants, smoking cessation classes, stay quit support groups (Hughes 2004; Lancaster 2005; Silagy 2004; Stead 2005). Other methods, such

as hypnosis and acupuncture, are also used, but their efficacy has not been demonstrated. (Abbott 2005; White 2006).

The recognition that decisions to smoke are made within a broad social context led to the development of community-wide programmes to reduce both the initiation and the prevalence of smoking. Ockene has suggested that 'an effective public health approach is a comprehensive one that successfully engages the individual and, through multiple channels in the community, provides reinforcement, supports and norms for not smoking' (Ockene 1992). The effectiveness of such multidimensional approaches in reducing initiation in smoking in young people has been considered in a previous Cochrane review (Sowden 2003). The aim of this review is to evaluate the effectiveness of community interventions primarily aimed at reducing smoking among adults.

Most such interventions have focused on cardiovascular disease (CVD) risk reduction and have included cigarette smoking as one of these risk factors (Carleton 1995; Fortmann 1993; Goodman 1995; Gutzwiller 1985; Lando 1995; Maccoby 1977; Puska 1985). More recently community-based interventions have focused solely on cigarette smoking (COMMIT 1995; Fisher 1998; Mudde 1995). In this review, we aim to assess the effectiveness of community-based programmes, and to identify, if possible, what factors in their design, implementation or evaluation may have influenced the smoking behavioural outcomes (Susser 1995).

OBJECTIVES

To carry out a systematic review to assess the effectiveness of community interventions in reducing the prevalence of smoking.

We addressed the following questions:

1. Do community-based interventions reduce smoking (measured by prevalence, cigarette consumption, quit rates or initiation rates) compared with no intervention in comparison communities?
2. Which characteristics of these studies are related to their efficacy?

METHODS

Criteria for considering studies for this review

Types of studies

Any study which evaluated the effectiveness of community interventions in which smoking behaviour change was a part of the intervention programme using one of the following designs:

- controlled trial randomizing communities or geographical regions
- a non-randomized controlled trial allocating communities or geographical regions.

Types of participants

Adults, 18 years or older.

Types of interventions

We considered a community intervention as a co-ordinated, multidimensional programme aimed at changing adult smoking behaviour, involving several segments of the community and conducted in a defined geographical area, such as a town, city, county or other administrative district. We had planned to include only those studies which involved community members in intervention planning and implementation, but have relaxed this restriction so that other community-based studies could be included. We have explored differences in smoking behavioural outcomes in relation to whether or not community members were involved in intervention planning. Specific programmes or components of programmes were not specified as these were expected to vary between studies. Detailed descriptions of each intervention were recorded in the Table of Included Studies.

Types of outcome measures

Primary measures of smoking behaviour

- self-reported smoking status (current smoker, recent ex-smoker - during time of intervention)
- self-reported cigarette consumption (cigarettes per day).

We report biochemical confirmation of self-reported quit status, but did not exclude studies without this measurement. Biochemical validation was not used in the majority of these studies, and there is evidence to indicate that self report of smoking status in community surveys is reasonably accurate (Dwyer 1986; Patrick 1994; Velicer 1992). Where possible we examined smoking behavioural outcomes by sex, age and socio-economic status.

We excluded assessment of other types of tobacco use (pipes, cigars, cigarillos, or chewing tobacco), although reducing consumption of these may be a part of the community programme.

Mediating variables and Intermediate outcomes

We have used the PRECEDE/ PROCEED model as a framework to identify predisposing, enabling and reinforcing factors as mediating variables (Green 1991). For predisposing factors we looked for variables concerning knowledge of health risks related to smoking, attitudes such as motivation and intention to quit smoking, and confidence in quitting, and beliefs related to the harmful effects of smoking. For enabling factors, we identified skills in quitting, such as the number of quit attempts and the length of the longest attempt, and barriers to quitting such as the number of other smokers in the household or among friends, or at work. For reinforcing factors, we looked for measures of social influence or pressure to quit smoking, social support for quitting, and for norms concerning smoking.

Process measures

We recorded the methods of community organization and involvement of community members during the process of planning and implementing the interventions. We recorded the different 'communication channels' used, including health professionals, other professionals, lay personnel, health agencies, social agencies, work-sites, government, mass media (television, radio, newsprint), other media such as printed materials and videotapes, public events, contests, and health fairs.

We also looked for descriptions of formative research, pilot studies and ongoing evaluation and modification of programme components during the interventions, evidence of the extent of intervention exposure, programme reach, participation and awareness, dose-response relationships, and maintenance of programmes after the interventions were completed. We also recorded intervention costs.

Morbidity and mortality

Reduction in cardiovascular morbidity and mortality was the underlying rationale for the community studies focused on cardiovascular risk reduction. However, this was assessed in less than one third of these trials, and in none of the community studies focused on smoking. For this reason, we do not include these as outcomes in this review.

Search methods for identification of studies

We identified possible studies from the Tobacco Addiction Review Group specialised register, by searching for the terms 'commu-

nity' or 'communities' in any field (most recent search in January 2006). We checked previous reviews of community-based prevention programmes. (Smith 1994; WHO 1988)

We searched EMBASE (date of last search January 2006, via OVID) using the following terms:

CIGARETTE-SMOKING*

SMOKING-CESSATION*

SMOKING CESSATION

SMOKING* in DE

TOBACCO-SMOKE in DE

#1 or #2 or #3 or #4 or #5

CARDIOVASCULAR-DISEASE in DE

“coronary-artery-disease;” in DE

“Cardiovascular-diseases-and-cardiovascular-surgery” in EC

heart adj health

#7 or #8 or #9 or #10

PREVENTION in EM

prevention in de

control in de

#12 or #13 or #14

#6 and #11 and #15

We conducted an additional search of MEDLINE and the Cochrane Controlled Trials Register (CENTRAL) to identify any heart health programmes not already included in the Tobacco Addiction Group specialised register.

We checked bibliographies of related papers for relevant studies, and made personal contact with content area specialists.

Data collection and analysis

There were four stages in the review process:

Stage 1: reports were pre-screened for relevance by at least one reviewer

Stage 2: two reviewers independently assessed relevant studies for inclusion

Stage 3: one reviewer extracted data, and a second reviewer checked them

Stage 4: inferences across studies were assessed by qualitative narrative synthesis.

The decision not to attempt a quantitative synthesis was based on the marked heterogeneity expected amongst the potentially eligible studies. We expected heterogeneity in the content, length and intensity of the interventions, and in the study design, evaluation strategy (cohort follow up/cross-sectional follow up), measures of smoking behaviour used, and length of follow up.

We compared smoking-related outcomes in studies addressing several risk factors with those in which smoking was the focus.

RESULTS

Description of studies

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

We found 37 studies meeting the inclusion criteria. Detailed information about each is shown in the Table of Included Studies. We found two other studies in which more intensive community-based interventions were compared with less intensive ones, but not with an 'untreated' comparison community. We describe the characteristics of these two studies (Darity 1997; Stillman 1993) separately. We excluded several additional studies, and describe their characteristics and the reasons for their exclusion in the Table of Excluded Studies.

Characteristics of the communities

We define community in this context as an aggregation of households and associated services and institutions in a specified geographic area. Eighteen studies (49%) took place in communities in Europe, and 15 studies (41%) in North America. Two took place in Australia (Egger 1983; Hancock 2001), one in South Africa (Roussow 1993) and one in India (Anantha 1995). Twenty-three studies (62%) took place in towns or cities while 14 (38%) were in counties or districts. The intervention communities were characterized as urban (10, 27%), rural (12, 32%), mixed (6, 16%) and unclear (9, 24%). The population size varied from a few thousand to hundreds of thousands of people.

Seventeen studies (46%) involved only one intervention and one comparison community, but others involved two, three or more communities, or had a single intervention but multiple control communities. The Community Intervention Trial for Smoking Cessation (COMMIT, COMMIT 1995) study took place in 11 pairs of cities in North America, and the Cancer Action in Rural Towns (CART, Hancock 2001) study in 10 pairs of towns in Australia. In some studies, the comparison group was not a comparable community, but randomly selected participants from that country, or state, or a neighbouring district.

Characteristics of the participants

All the studies involved adults, and most studies (89%) included both women and men, of varying age ranges. Two studies targeted men (Jenkins 1997; McPhee 1995) and two targeted women (O'Loughlin 1999; Secker-Walker 2000). Several studies targeted specific ethnic groups including African Americans (Fisher 1998; Goodman 1995; Schorling 1997), Mexican Americans (McAlister 1992) and Vietnamese men (Jenkins 1997; McPhee 1995).

Characteristics of the interventions

Twenty-four interventions (65%) aimed at cardiovascular risk factor reduction (usually cholesterol, blood pressure and smoking, and sometimes weight loss/obesity and physical activity). Nine (24%), aimed solely at reducing tobacco use, usually cigarette smoking, four (11%) at cancer risk reduction or the promotion of healthy behaviours. Twenty-two studies (59%) used educational and informational approaches to influence behaviour, while the other 15 studies (41%) also used policy initiatives.

Content of the interventions

In 25 studies (68%) there was a description of the theoretical background for the interventions. Fourteen (38%) drew explicitly on social cognitive theory, 11 (30%) on communication theory and 10 (27%) on diffusion of innovation theory. All three theories were specified in seven studies (19%). In 20 (54%) studies, other theories were used including community participation in eight (22%), stages of change in six (16%), social marketing in three (8%), and planned behaviour or reasoned action in four (11%). The PRECEDE model of planning and evaluation for health education and policy interventions was used in seven (19%) studies. In 23 studies (62%), there was a description of the process of community involvement: coalitions or planning groups in 23 (62%), employment of local community staff in 16 (43%), and task forces or working groups, which included community members, in 12 (32%).

The channels through which the interventions were delivered included: health professionals in 32 studies (86%), volunteers in 19 (51%), and teachers in 16 (43%); community agencies in 21 (57%), schools in 22 (59%), businesses in 18 (49%), local health departments in 20 (54%), local government in 17 (46%), worksites in 18 (49%), restaurants in 15 (41%), churches in nine (24%), hospitals in seven (19%), and retailers in six (16%). A variety of public events, such as lectures or health fairs were used in 32 studies (86%). Screening for cardiovascular risk factors was an integral part of 13 studies (35%).

Mass media were used in 31 studies (84%): 30 (81%) used newsprint, 15 (41%) news stories and another 15 (41%) also used paid advertisements; 22 (59%) used radio, of which 15 (41%) used news stories and seven (19%) news stories and paid advertisements or radio spots, 22 (59%) used television; ten (27%) news stories and 12 (32%) news stories and paid advertisements or television spots. Posters/billboards were used in 22 studies (59%), newsletters or mailings in 10 (27%), and decals or bumper stickers in seven (19%).

Interventions specifically for smoking included self-help materials such as quit-kits in 18 (49%), cessation groups in 17 (46%), both cessation and support groups in three (8%), brochures or booklets about smoking in 16 (43%), individual counselling in ten (27%) [face-to-face six (16%), telephone three (8%), and both in one], audiotapes, videotapes, or slide shows in nine (24%), quit contests in eight (22%), and a quit-line in four (11%).

Smoking policy: Advocacy for smoke-free worksites played a role in 11 studies (30%), for smoke-free public buildings in seven studies (19%), for smoke-free schools in three (8%), and for other anti-smoking policies, such as banning cigarette vending machines in seven (19%).

Evaluation and follow-up

Cross-sectional follow-up, or independent, surveys were used to evaluate the interventions in 14 studies (38%), cohort follow up in 14 (38%), and both cohort and cross-sectional follow-up eval-

uations in the remaining nine (24%). Few studies reported follow up beyond the immediate post-intervention evaluation except: North Karelia (25 years, Puska 1985), CORIS (12 years, Rousso 1993), Stanford 5-city (Fortmann 1993), Minnesota Heart Health Program (Lando 1995) and Pawtucket Heart Health Program (Carleton 1995) (each 2 years).

Questionnaires were administered in person in 24 studies (65%), by telephone in 15 (41%) by both methods in four and by mail in two. Physical examinations were conducted in 18 studies (49%), and blood tests were done in 16 (43%). A biochemical test to validate smoking status was obtained in 11 studies (30%) (serum thiocyanate five, serum thiocyanate and exhaled carbon monoxide one, exhaled carbon monoxide two, serum cotinine two and salivary cotinine one). In two of these, only subsamples were tested to estimate deception rates, and in two others the test was used as a 'bogus pipeline' (samples collected but not tested, to discourage deception). In one other study permission to do a test was obtained, but none was taken, again as a 'bogus pipeline'.

Smoking-related outcomes measured

Thirty-one studies (84%) reported differences in smoking prevalence as their major smoking behavioural outcome. Fourteen studies (38%) reported changes in the number of cigarettes (or grams of tobacco) smoked per day, and for three of these, this was the main outcome. Eighteen studies (49%) reported quit rates, and for three of these, this was the main outcome. Five studies (14%) also assessed initiation rates of tobacco use. A few studies included other tobacco use: pipes five (14%), cigars five (14%), cigarillos four (11%), chewing tobacco two (2%), and snuff two (2%).

Mediating variables and intermediate outcomes measured

Among the 37 studies in the main review, we were unable to find any reference to mediating variables in ten (27%). In the remaining 27 studies, for the predisposing factors, some measure of knowledge or belief was obtained at baseline in 18 (49%), but it was only possible to determine whether there was an intervention effect in six (16%), because follow-up data could not be found in the others. Similarly, for attitudes to smoking, there were 20 (54%) studies in which at least one attitudinal measure was obtained at baseline, but only nine (24%) had follow-up data for assessment of an intervention effect.

For enabling factors, we identified some measure of skills in quitting in 13 (35%) studies, and for nine (24%), these measures were obtained post-intervention. As for barriers to quitting, the respondent's smoking environment was assessed in six (16%) studies, and for two of these, post-intervention data were found.

For reinforcing factors, we found some measure of social influence concerning quitting smoking in 13 (35%) studies. In five, the measures concerned social influence or pressure to quit smoking, and two of these studies had post-intervention data. In another seven studies, the measures related to social support for quitting, but only one reported a post-intervention outcome. One other study included measures of general emotional support and social networks with follow-up data in the intervention and reference

areas.

Measures of norms concerning smoking were mentioned in four (11%) studies, and two of these had post-intervention results. A fifth study used the respondent's smoking environment as a surrogate for norms, but we have included that study among the two with smoking environmental outcomes.

Process Evaluation

We found descriptions of formative research or pilot studies to develop or pre-test intervention components in 10 (27%) studies. No reports of such preliminary work were found in the remaining studies.

Evidence of ongoing evaluation and modification of programme components during the course of the interventions was found in nine (24%) studies. The methods used for these ongoing evaluations included telephone and postal surveys of both the target population and programme implementers, semi-structured interviews or focus groups with key stakeholders, and collation of relevant project documentation. Several of the larger studies used computer systems to track events and participation. Individual programme components, such as cessation groups and quit-smoking contests, were evaluated in 10 (27%) studies, community mobilization or project organization in eight (22%), and perceived programme ownership in four (11%). Content analysis of local media, usually newspapers, was undertaken in eight (22%) projects. No reports of the use of such feedback or these other process assessments were found in the remaining studies.

For intervention exposure, we looked for numerical details concerning the extent to which programme components were made available to the intervention community, such as numbers of television spots or radio spots broadcast, programme-related newspaper articles published, health fairs held, self-help kits distributed, cessation or support groups run, or calls to a quit-line and such like. Detailed descriptions of intervention exposure were found in 21 (57%) studies, some numerical detail in another 12 (32%), and little or none in the remaining four (11%).

Plans to assess programme reach, participation or awareness were reported in 26 (70%) studies, but information concerning the magnitude of these measures of programme penetration varied from none to numbers of participants or percentages of the target population. For programme participation we looked for information concerning the number or proportion of individuals participating in intervention activities. For programme awareness, we looked for information concerning the number or proportion of individuals who had heard of, or were aware of the intervention programme. These individuals need not have participated in any intervention activity. We found that 'reach' was used in two ways. In some studies, it was used for programme participation, and in others for programme awareness, so we have included 'reach' in 'participation' or in 'awareness' as appropriate. Estimates of participation rates were found in 13 (35%) studies, and of rates of programme awareness in 17 (46%), with seven of these having estimates of both rates. A summary intervention receipt index was

described in one study (COMMIT). No numerical details were found in the other studies in which plans to collect these data were described. No reports of participation or awareness were found in the remaining 11 (34%) studies.

Dose-response: Assessment of a relationship between intervention dose and a smoking behavioural outcome was found in seven (19%) studies, but the strength of the evidence and the measures used to assess intervention dose varied substantially among these. For one study, COMMIT, intervention receipt indices were significantly correlated with quit ratios among the cohort of light/moderate smokers, but not among the heavy smokers, and also with quit ratios among smokers and recent ex-smokers in the cross-sectional follow-up survey. However, the differences in receipt indices between intervention and comparison communities were small. No relationship was found between receipt indices and smoking prevalence in the cross-sectional follow-up data. This is the only study which included the comparison communities in a dose-response analysis.

Among the other six studies, there was some evidence, often slender, for a dose-response in the intervention communities in four (Minnesota Heart Health Program - screening participation and smoking prevalence; Kilkenny Project - overall awareness score and having attempted to change health habits in the past five years; Neighbors for a Smoke-Free North-Side - heard of programme and smoking prevalence; and Healthy Bergeyk - programme awareness and quitting smoking). No dose-response relationship was found in the other two studies (the Bootheel Project - programme awareness and smoking prevalence, and the Dutch Community Study - exposure to programme elements and quitting smoking), neither of which showed net intervention effects for smoking. In one other study, the Stanford Three-city Project (Maccoby 1977), intervention dose was shown to be related to gains in cardiovascular disease knowledge score. No descriptions of dose-response relationships were found in the other 24 (75%) studies.

Maintenance: Evidence of continuation of intervention components in the original communities was found for 12 (32%) studies, nine cardiovascular risk reduction projects, two smoking reduction projects, and one cancer reduction project. Reports of continuation, but without further details, were found for another five (15%) studies, three cardiovascular risk reduction, one smoking reduction and one cancer reduction. Two other projects (Breathe Easy and the Danish Municipality Project) were unable to maintain programme components for more than a few months after withdrawal of external funding. Three studies (Schleiz Study, Heartbeat Wales and the Kilkenny Project) each reported widespread dissemination of intervention components or materials, but did not provide evidence of local programme continuation. No evidence of maintenance was found for the remaining 12 (38%) studies, although sustainability was a reported aim for two of these.

Characteristics of excluded studies

Twenty-three other studies were identified as possibly relevant but did not meet all the inclusion criteria. Two compared two inten-

sities of intervention and are discussed briefly in the Results section (Darity 1997; Stillman 1993). Four studies did not have a community organization component (Abramson 1981; Kornitzer 1980; Oganov 1985; Pierce 1986), and five did not have a comparison community (Gyarfas 1981; Marin 1994; Muntoni 1999; Rhomberg 1991; Tretli 1985). One study had only seven months of follow up (McAlister 2004). One study in Cuba did not have smoking as a target behaviour (Spiegel 2003). Five Chinese studies were identified but two did not have smoking as a target behaviour (Fang 1999; Xu 2003) and three had insufficient details of methods or results available (Cheng 2001; Jiang 2003; Wei 1995). In one study, the comparison community had an inadequate sample size (Feruglio 1983). In the other four studies no outcome evaluation has been conducted or published (Brownson 1997; Holm 1989; Schechter 1982; Shea 1992).

Risk of bias in included studies

Allocation to intervention or comparison groups

Thirty-three studies (89%) used a quasi-experimental design, with non-random assignment of communities to intervention and comparison groups. Among these, four studies did not use a comparison community, but rather a random sample from the population elsewhere in the country, state, a neighbouring district, or zip codes in another city. Only four studies (11%) used a random assignment of matched communities to either the intervention or comparison group. Among these, only the COMMIT (COMMIT 1995) and CART (Hancock 2001) studies had a sufficient number of communities to allow adequately powered statistical comparisons. Both these studies used random assignment between pairs of demographically matched communities, 11 pairs in the COMMIT study and 10 pairs in the CART study. One Dutch study (Mudde 1995) used random assignment between two selected communities, while the other Dutch study (Van Assema 1994) used random selection of the intervention site from six matched communities and then random selection of the comparison site from three that were outside the selected intervention site's media market.

Selection of participants in whom outcome measures were made

Most studies made a random selection of individuals from lists such as population registries and city rolls. Several studies used random-digit telephone sampling, or random selection of households, or households within randomly selected blocks.

Response rates and retention rates

Thirty-four studies (92%) reported response rates, often combining the rates for intervention and comparison groups. In some studies the overall response rates for baseline and follow-up surveys were also combined. Response rates averaged 77%, standard error (SE) 2% (n=35) for initial intervention group surveys, and 76%, SE 2% (n=34) for comparison group surveys. Among the cohort studies, most (18/23, 73%) noted attrition rates at their follow-up surveys. Converted to retention rates (100 - attrition rate), these

averaged 61%, SE 3.1% (n=18) for the intervention groups, and 64%, SE 2.6% (n=18) for the comparison groups. The characteristics of those lost to follow up in the 23 cohort follow-up studies (drop-outs) were described in 14 reports (61%).

Comparability of intervention and comparison groups at baseline

Information on the demographic characteristics of the participating populations at baseline was reported in 31 studies (84%). In 14 (38%), this included age and sex, in two (5%), age, sex and education, and in 15 (41%), age, sex, education and other characteristics, such as marital status, household income or ethnicity. Six studies (16%) provided no demographic data.

In only five studies (14%) were intervention and comparison communities shown to be demographically comparable at baseline. In 17 (46%) one or more demographic characteristics were not comparable, but in the remaining 13 (35%) it was not possible to assess comparability.

There was a comparison of baseline smoking prevalence between intervention and comparison communities in 14 studies (38%).

Evaluation and analyses

For most studies, the evaluation examinations or surveys were done by investigators associated with the research team undertaking the project. In five studies (14%) a separate organization undertook some or all of the survey work and database preparation. It was unclear to what extent the analyses in these trials were undertaken by these separate organizations.

Statistical analysis

In 30 studies (81%) the individual was the unit for analysis, although the community was the unit of assignment. In one of these appropriate adjustments were made to inflate the variance of the community means and another used multilevel analysis. In only six studies (16%) did the unit of analysis match the design. In two there were separate analyses at both the individual and the community level. In one study it was not clear which unit of analysis had been used.

Sample size and power calculations were explicitly described in 16 (43%) studies. In nine of these, the power to detect specified effect sizes for smoking prevalence or quit rate ranged from 75% to 90%.

The majority of studies used two-sided P-values, either explicitly (eight studies, 22%), or presumptively (22 studies, 59%). Five studies (14%) hypothesized favourable outcomes and so used one-sided P-values to assess the levels of significance of their results. One study used both one- and two-sided P-values, and for one study no statistical test for the outcome comparisons was reported.

Effects of interventions

Smoking behaviour

Smoking prevalence

In 13 studies (35%), smoking prevalence results were presented for women and men combined, in 14 (38%) for women and men

separately, and in four (11%), for women and men separately and also combined. Change in smoking prevalence was not reported in five studies. Among the 23 studies with cross-sectional follow-up data, there were 21 in which changes in smoking prevalence could be estimated. To give an indication of the effect sizes observed at the community level in these 21 studies, we estimated the net decline in smoking prevalence per year, i.e., the decline in prevalence in the intervention groups minus that in the comparison groups, per intervention year, for all adults, for women and for men. For all adults, the net decline in smoking prevalence ranged from -1.0% to +3.0% per year (11 studies). For women, the decline ranged from -0.2% to + 3.5% per year (11 studies), and for men the decline ranged from -0.4% to +1.6% per year (12 studies).

We used data from 12 studies with cohort follow-up data to estimate the effect sizes at the individual level. For all adults, the net decline in smoking prevalence ranged from -0.4% to +1.9% per year (seven studies). For women, the decline ranged from +0.2% to + 3.8% per year (five studies), and for men the decline ranged from -0.3% to +3.6% per year (five studies).

Cigarette consumption

In five studies (14%), results for cigarette consumption, or tobacco use, were presented for women and men combined, and in another five (14%) for women and men separately. Cigarette consumption was not reported in 27 (73%) studies. Because cigarette consumption was reported on a per capita basis in some studies and for smokers in others, we have not prepared any estimates of the range of changes in tobacco consumption, but the individual results can be seen in the Results of Included Studies table.

Quit rates

In eight studies (22%), quit rates were reported for both women and men combined, in another seven (19%) for women and men separately and in two studies (5%) for women and men separately and combined. Quit rates were not reported in 17 studies (46%). Because quit rates were reported in many different ways (point estimates, or quit for seven days, for three months, or for six months), and also over different time periods, we have not prepared any estimates of the range of quit rates. The individual results can be seen in the Results of Included Studies table.

Initiation rates

Only five (14%) studies reported initiation rates for tobacco use; one for women and men combined, two for women and men separately, and one for women and men separately and combined.

Mediating variables and Intermediate outcomes

Predisposing Factors

Knowledge-related outcomes: Among the six studies with knowledge-related outcomes concerning cardiovascular risk factors or the harmful effects of smoking, three, Stanford Three-City (Maccoby 1977), CORIS (Roussow 1993), and Stanford Five-City (Fortmann 1993), of the four studies which assessed gains in knowledge of cardiovascular risk factors showed significant net intervention effects. The fourth study (North Karelia, Puska 1985) showed a slight effect. No net intervention effects were seen in

the two studies which assessed knowledge of the harmful effects of smoking.

Attitudinal outcomes: Among the seven studies which assessed attitudes to quitting smoking, only one (Alliance of Black Churches, Schorling 1997) showed a net intervention effect: a significant progression through the stages of change. One other study (COMMIT, COMMIT 1995) showed net intervention effects for heavy smokers in the independent surveys, and for light-to-moderate smokers in the cohort follow up, concerning smoking as a public health problem.

Enabling factors

Quit attempts: Among the nine studies which assessed quit attempts, only one (North Karelia, Puska 1985) showed a significant net intervention effect.

Smoking environment: Of the two studies with pre- and post-intervention measures related to the smoking environment, one assessed household and friends smoking, and the other passive smoking. Neither showed a significant net intervention effect.

Reinforcing factors

Social influences or support for quitting: Neither of the two studies which had pre- and post-intervention assessments of social pressures to quit showed a net intervention effect. In the only study with a pre- and post-intervention assessment of social support for quitting smoking, there was no net intervention effect. The study of general emotional support and social networks showed no apparent intervention effect for either variable, but significance was not tested.

Norms concerning smoking: Of the two studies which assessed intervention effects on norms concerning smoking, one (COMMIT 1995) showed no net intervention effect, and the other (Breathe Easy, Secker-Walker 2000) showed a significant net intervention effect for women smokers' perceptions of community norms, but not for their perceptions of family or friends' norms.

Process Evaluation:

We note here comparisons between intervention and comparison communities for two aspects of process evaluation: programme exposure or awareness, and dose-response. Programme exposure or awareness was compared between conditions in 11 (30%) studies (four cardiovascular risk reduction and seven smoking reduction). In three cardiovascular risk reduction studies, North Karelia (Puska 1985), Schleiz (Heinemann 1986), and Danish Municipality Project (Osler 1993), exposure or programme awareness was significantly higher in the intervention communities. In the fourth, the Minnesota Heart Health Program (Lando 1995), programme exposure was significantly higher in the intervention cities in years one and three, but not in years five and six. In six smoking reduction studies, COMMIT (COMMIT 1995), Breathe Easy (Secker-Walker 2000), Neighbors for a Smoke-free Northside (Fisher 1998), Vietnamese Men 1 (McPhee 1995) and 2 (Jenkins 1997), and Alliance for Black Churches (Schorling 1997), exposure or programme awareness was also significantly

higher in the intervention communities, but not in the other study, the Dutch Community Study (Mudde 1995). Four of these projects, including the Dutch Community Study, had no smoking behavioural effects. Only one study, COMMIT, compared dose-response between conditions. The receipt index used to measure dose was significantly higher in the intervention communities for the cohort of light-to-moderate smokers followed up, and among smokers and ex-smokers in the cross-sectional follow-up survey.

Economic Evaluation

Cost-effectiveness or cost-benefit analyses were reported for six (16%) studies, one of which (Heartbeat Wales, Tudor-Smith 1998) included both, and another (Norsjo Project, Weinehall 1999) also included a 'willingness to pay' analysis. All six reported favourable cost-effectiveness or cost-benefit ratios, indicating that these studies were economically attractive. Only one of these (Breathe Easy, Secker-Walker 2000) focused solely on smoking, while the other five were cardiovascular risk reduction projects. Two projects, the Stanford Five-city Project (Fortmann 1993) and the Pawtucket Heart Health Program (Carleton 1995), reported on the cost-effectiveness of their smoking cessation interventions. Programme costs, or per capita costs, were reported for five (14%) studies. No mention of costs was found in the other 24 (65%) studies.

Findings of individual studies

These descriptions highlight the major features and smoking-related outcomes of each study and are presented in the order in which they were undertaken, starting with the North Karelia project. More details about each project can be found in the Characteristics of Included Studies table and in the Results of Included Studies table. In these tables, each study is identified by the name of the first author and year of publication of the article describing the main results, and the studies are presented in alphabetical order of this first author. The Included Studies reference list is in the same alphabetical order as the tables, with the lead article indicated by an asterisk, and articles pertaining to that study in alphabetical order of their first author. In the descriptions which follow, we indicate the lead author and year of publication of the main results for each study in parentheses.

The North Karelia Project (Puska 1985) was initiated in Finland in 1972 to decrease mortality and morbidity from cardiovascular disease through a comprehensive community-based programme to reduce the major cardiovascular risk factors: smoking, high serum cholesterol and high blood pressure. In a quasi-experimental design, the investigators compared cardiovascular risk factor changes in North Karelia with those in the adjacent county of Kuopio. After five years, compared with Kuopio, there was a lower prevalence of smoking among women in North Karelia, but not among men. In contrast, per capita cigarette consumption was lower among men, but not among women. After 10 years, per capita cigarette consumption in North Karelia was lower among men, but not among women. Follow up has continued for 25 years.

The Stanford Three-city Project (Maccoby 1977) was started in

the United States in 1972 to reduce the cardiovascular risk factors of smoking, high cholesterol and high blood pressure through the use of mass media and community programmes. Weight and physical activity were also targeted. In a quasi-experimental design one town, Watsonville, was exposed to both mass media and community programmes, while another town, Gilroy, was exposed to the mass media component alone, and the third town, Tracy, received no intervention and was the comparison community. After two years, compared with Tracy, the non-intervention town, there was a lower per capita cigarette consumption among both men and women in Watsonville, which received the mass media campaign and the community intervention, with an even lower level among the intensive intervention group. An intermediate reduction in per capita cigarette consumption was observed in Gilroy, the town exposed to the mass media campaign alone.

The Schleiz Study (Heinemann 1986) was initiated in the Democratic Republic of Germany in 1973, and was designed to reduce the cardiovascular risk factors of smoking, high cholesterol, high blood pressure and sedentary lifestyle. The quasi-experimental design compared cardiovascular risk factor changes in the district of Schleiz with those in the district of Dippoldiswalde. After five years, there was a 7% lower prevalence of smoking in the district of Schleiz compared with the district of Dippoldiswalde.

The Eberbach-Wiesloch Study (Nussel 1985) was initiated in the Federal Republic of Germany in 1976, to reduce cardiovascular morbidity and mortality through reductions in smoking, serum cholesterol and high blood pressure. The quasi-experimental design compared cardiovascular risk factor changes in Eberbach with those in Wiesloch. After four years, components of the intervention were introduced in Wiesloch, and further comparisons of risk factor changes in Eberbach were made with the town of Neckargemund. From shortly before the intervention was introduced in Wiesloch to four year follow up, the prevalence of smoking in the cohort of women being followed increased to a similar extent in Eberbach and Wiesloch (9.0% and 12.0% respectively). Among the cohort of men being followed, the prevalence of smoking decreased 14.0% in Eberbach, but increased 4.0% in Wiesloch. Four years later, in 1988, the prevalence of smoking in the cohort of women in Eberbach had decreased 13.0%, while it increased 11.0% in Neckargemund. Among the cohort of men, the prevalence of smoking increased 5.0% in Eberbach, but decreased by 7.0% in Neckargemund.

The National Research Programme in Switzerland (Gutzwiller 1985) was initiated in 1977 to reduce cardiovascular morbidity and mortality through reductions in smoking, cholesterol, high blood pressure and sedentary lifestyles. The community-based intervention took place in two cities, Aarau and Nyon. Two similar cities, Solothurn and Vevey, served for comparison. After three years of intervention activity, there was a reduction in the prevalence of smoking among both men and women, an increase in the quit rate and a reduction in the initiation rate of smoking in Aarau and Nyon compared with Solothurn and Vevey. Low response

rates to both the baseline and follow-up screenings temper these results.

The North Coast Quit for Life Programme (Egger 1983) took place in three small towns in New South Wales, Australia. It began in 1978, and was part of a cardiovascular risk reduction programme 'The North Coast Healthy Lifestyle Programme'. The main aim of North Coast Quit for Life Programme was to reduce the prevalence of smoking. In a quasi-experimental design the effects of a mass media programme alone in one community, Coffs Harbour, were compared with the same mass media programme combined with a community programme in another community, Lismore. A third community, Tamworth, was the reference area. After two years of intervention, compared with Tamworth, there was a reduction in the prevalence of smoking among both women and men in Coffs Harbour and Lismore, and the reduction was better sustained in Lismore, the town exposed to both the mass media and community interventions.

The Coronary Risk Factor Study (CORIS) (Roussow 1993), which started in 1979, took place in South Africa, modelled on the Stanford Three-City Project. The goal was to reduce cardiovascular risk factors, high blood pressure, high blood cholesterol, stress, sedentary life style and smoking. One town, Robertson, received a mass media intervention and a community-based intervention; a second town, Swellenden, received the mass media intervention alone, and a third town, Riversdale, was the comparison community. Cross-sectional surveys were done at baseline, and then follow-up surveys at the end of the planned intervention and again eight years later. A cohort, identified at baseline, was followed up at the end of the intervention. At the end of the four-year intervention, smoking prevalence and per capita cigarette consumption were reduced to a similar extent in Robertson and Swellenden. At this four-year follow-up, the quit rates among women in both intervention communities were greater than in Riversdale. At the long-term follow-up, conducted 12 years after the interventions began, smoking prevalence and cigarette consumption were still lower in Swellenden, the low intensity intervention community, but not in Robertson, the high intensity intervention town, where they were comparable to Riversdale, the comparison community. The Stanford Five-City Project (Fortmann 1993) took place in the United States, starting in 1980. It was designed to reduce cardiovascular mortality and morbidity through a comprehensive community and mass media intervention to reduce smoking, high serum cholesterol, high blood pressure, sedentary lifestyles and weight. In a quasi-experimental design, two cities, Monterey and Salinas, received the interventions, while two others, Modesto and San Luis Obispo, were the comparison cities, and a fifth city, Santa Maria, was used to monitor cardiovascular mortality and morbidity data. There were baseline measurements for two years before the intervention began, at alternate year intervals during the intervention and again two years after the intervention was completed. Cross-sectional follow-up and cohort follow-up analyses were undertaken. In the cross-sectional follow-up analyses, smok-

ing prevalence fell to a comparable extent in both the intervention and comparison cities. The cohort follow-up analyses showed a greater rate of decline in smoking prevalence in the two intervention cities compared with the two comparison cities. Both cross-sectional follow-up and cohort follow-up analyses showed greater quit rates in the two intervention cities compared with the two comparison cities.

The Minnesota Heart Health Program (Lando 1995) also started in 1980 and was designed to reduce cardiovascular mortality and morbidity through a comprehensive community intervention to reduce smoking, high cholesterol, high blood pressure and sedentary lifestyles. The project ran in three pairs of cities in the mid-western United States, Mankato and Winona, Fargo-Morehead and Sioux Falls, and Bloomington and Roseville, with the first city of each pair receiving the educational interventions and the other city acting as a comparison community. There were baseline measurements for four years before the interventions began, annually during the intervention and again two years after the planned withdrawal of project support for the community programmes. Cross-sectional follow-up and cohort follow-up analyses were undertaken. For men, although the prevalence of smoking fell, neither the cross-sectional follow-up analyses nor the cohort follow-up analyses showed any intervention effect. For women, a significant intervention effect was seen in the cross-sectional follow-up analyses, with a steady decline in smoking prevalence compared with the comparison communities, but no effect was detected in the cohort follow-up analyses.

The Pawtucket Heart Health Program (Carleton 1995) took place in the United States, starting in 1982, targeting cardiovascular mortality and morbidity through a comprehensive community intervention to reduce smoking, high cholesterol, high blood pressure, obesity and physical inactivity. Using a quasi-experimental design, the intervention community in Pawtucket was compared with an anonymous control community. Baseline assessments, assessments during the intervention and two years after their completion were undertaken. Both cross-sectional follow-up and cohort follow-up analyses were done. The prevalence of smoking fell in both Pawtucket and the reference community, with no significant difference between the two.

The Tessin Cantonal Prevention Programme (Domenighetti 1991) started in 1982 in Switzerland. The programme's goal was to prevent cardiovascular disease. It used a quasi-experimental design, with the Canton of Tessin receiving the community interventions and two other Cantons, Vaud and Fribourg, acting as comparison communities. The outcome was assessed through MONICA (Monitoring of trends and determinants in Cardiovascular Disease Project) surveys. In the Canton of Tessin, a reduction in smoking prevalence was seen among men but not women, and the proportion of ex-smokers increased, both at the population level and among men, but not among women. No changes in any of these measures of smoking behaviour were seen in the Cantons of Vaud and Fribourg.

Sezze District Community Project ([Giampaoli 1997](#)) took place in Italy, starting in 1982. The aim was to prevent cardiovascular disease. In a quasi-experimental design, the Sezze Health District, which included the municipalities of Sezze, Roccaforte and Bassiano, was assigned to receive the intervention, and the municipality of Priverno was selected as the comparison community. After 10 years, reductions in the prevalence of smoking were seen among men in both intervention and comparison districts, but there was no difference between the districts. Among women, the prevalence of smoking decreased in the Sezze Health District, but increased in the municipality of Priverno.

The German Cardiovascular Prevention Study ([Hoffmeister 1996](#)) started in West Germany in 1984. The main goal was to reduce the four cardiovascular risk factors, hypertension, hypercholesterolemia, smoking, and obesity through primary prevention. A quasi-experimental design was used with six communities, the city districts in Berlin, Bremen, Stuttgart, the city of Karlsruhe, two small neighbouring communities, Bruchsal and Mosbach, and the rural district of Traunstein, assigned to receive the intervention, while comparison was made with randomly selected samples drawn from the rest of West Germany. After seven years of programme activities, there was an overall decline in the prevalence of smoking in the intervention communities compared with the nationwide trend. The reduction in prevalence was seen among men, but not among women.

The Vasterotten Intervention Programme in Norsjo municipality ([Weinehall 1999](#)), which took place in Sweden, began in 1985, and aimed to reduce cardiovascular risk factors. Smoking, diet, high blood pressure and weight were targeted. In a quasi-experimental design the rural municipality of Norsjo was assigned to receive the intervention. Comparison of risk factors was made with the population in MONICA Northern Sweden. After six years of intervention activity, the prevalence of smoking increased slightly among both women and men in Norsjo, but was unchanged among the comparison samples of women and men. In cohorts of women and men followed in Norsjo, the prevalence of smoking fell 3.7 % among the women and 2.7 % among the men.

The Texas-Mexican Border Study ([McAlister 1992](#)) took place in two cities in Texas U.S.A., Eagle Pass and Del Rio, and in one in Mexico, Piedras Negras. The project began in 1985 with the aims of promoting good health by reducing smoking, alcohol use, and weight, and increasing seat-belt use and participation in annual check-ups. A quasi-experimental design was used, with Eagle Pass and Piedras Negras assigned to receive the intervention, and Del Rio to act as the comparison community. After 4.3 years, the quit rate among the cohort followed in Eagle Pass was greater than that in Del Rio. No additional benefit was found associated with the higher intensity intervention. The self-reported quit rate in Piedras Negras was similar to that in Eagle Pass.

Heartbeat Wales ([Tudor-Smith 1998](#)) started in 1985 as a demonstration project to reduce cardiovascular disease and mortality through health education and policy changes designed to modify

smoking, diet, physical activity and weight. A quasi-experimental design was used, with Wales as the intervention area, and four counties in North East England serving as the comparison area. After five years, no intervention effect was detected, the prevalence of smoking having decreased significantly and to a similar extent in both Wales and the comparison counties in England. Detailed process data showed rapid diffusion of many of the intervention activities to the reference areas and to other parts of the United Kingdom.

The Heart to Heart project, ([Goodman 1995](#)), a five-year community intervention to reduce cardiovascular risk factors, took place in South Carolina, U.S.A., starting in 1986. A quasi-experimental design was used, with one city, Florence, designated the intervention community, and another, Anderson, the comparison community. After five years, the prevalence of smoking had declined in both communities, but there was no difference between them. However, among men there was a significant decline in Florence compared with Anderson, but not among women. The authors describe in detail the difficulties associated with building an effective coalition to run this project.

The Anti-Tobacco Education Project ([Anantha 1995](#)) took place in India and aimed to reduce tobacco consumption. The project began in 1986 and used a quasi-experimental design with villages in the purview of three Primary Health Centres: Dibbur with 177 villages was assigned to receive the intervention, and two other areas, Malur with 136 villages and Gudibanda with 120 villages, were the comparison communities. Evaluation was by personal interview, and both cross-sectional follow-up and cohort follow-up analyses were done. After six years of this health education initiative, reductions in the prevalence of tobacco use were seen among both women and men in the villages in the intervention district compared with those in each of the comparison districts, for both cross-sectional follow-up and cohort follow-up analyses. Tobacco use quit rates among women and men were also greater in the intervention district than in each of the comparison districts, and tobacco use initiation rates were lower.

The Kilkenny Project ([Shelley 1995](#)) took place in County Kilkenny, Ireland, and started in 1987. The major aim was the reduction of risk factors for cardiovascular disease, namely smoking, high blood pressure, high cholesterol, obesity and sedentary lifestyle. A quasi-experimental design was used, with Kilkenny County chosen as the intervention community because the local Health Board was willing to collaborate with the programme. The comparison county was County Offaly. After five years, there was no difference in the prevalence of cigarette smoking between County Kilkenny and County Offaly, prevalence having fallen among both women and men in each county.

The Batsfjord Finnmark Intervention ([Lupton 2003](#)) started in 1987, and was designed to change cardiovascular risk factors. The intervention aimed to reduce smoking, cholesterol, blood pressure and weight, and to increase physical activity. Further aims included reducing coffee and alcohol consumption, and promot-

ing health and well-being. The intervention was implemented in the coastal community of Batsfjord, in Norway, with three smaller communities, Loppa, Gamvik and Masoy, assigned to the comparison condition. Evaluation was through baseline assessment of a cohort of adults, ages 20-62, in the intervention and comparison communities in 1987, with a follow-up assessment in 1993, after six years. Each assessment included three mailed questionnaires, then screening with a physical exam, and blood tests. At the six-year follow up, there was no significant effect on smoking prevalence among either women or men.

The Community Intervention Trial for Smoking Cessation, COMMIT (COMMIT 1995) took place in 11 pairs of communities, 10 pairs in the United States and one pair in Canada, starting in 1988. The trial was designed to reduce the prevalence of smoking among heavy smokers, i.e. men and women smoking 25 or more cigarettes per day. It used a randomized controlled design, one of each matched pair of communities being randomly assigned to receive the intervention, and the other acting as the comparison community. After five years of intervention activity, cross-sectional follow-up analyses showed falls in the prevalence of smoking in the intervention and comparison communities, but no significant difference between them. The cohort follow-up study showed no significant difference between intervention and comparison communities in the quit rates among heavy smokers, but among light and moderate smokers (those smoking less than 25 cigarettes per day) the quit rate was significantly greater in the intervention communities. Estimates of the population quit rates for the intervention and comparison communities, calculated from the data for heavy smokers and from light/moderate smokers, showed a significantly greater quit rate in the intervention communities.

The North Cape Finnmark Intervention (Lupton 2002) was started in 1988, and was designed to reduce cardiovascular risk factors and accidents at work, as well as improve working conditions among the workers in the fishing industry. The intervention, planned to last 10 years, aimed to reduce smoking, cholesterol, and blood pressure, and increase physical activity. Further aims included reducing work-related accidents and sick leave, coffee and alcohol consumption, and myocardial infarction risk score. The intervention was implemented in the coastal community of North Cape, in Norway, with three smaller coastal communities, Loppa, Gamvik and Masoy, assigned to the comparison condition. (These communities were also the comparison group for Lupton 2003). Evaluation was through baseline assessment of cohorts ages 40-62 years and 15% of 20-39 year-olds, in the intervention and comparison communities, with follow-up assessments after two and six years. Each assessment included a personal interview, physical exam, and blood tests. At the six-year follow up, there was a significant reduction in smoking prevalence among women, but not among men. Despite this positive result it seems more likely that the reduction in women's smoking was a secular one, rather than a result of the intervention. The intervention was largely directed to fishermen and the men in the fishing industry, with

little emphasis on smoking, and no additional smoking cessation resources were made available, except from health professionals. Furthermore, the prevalence of smoking among women in North Cape, prior to the intervention, 53.4%, was substantially higher than that among women in the three comparison municipalities, 47.5%, and women in Batsfjord, 46.6%, the site of the other Finnmark intervention. During the five-year intervention the prevalence of smoking among women in North Cape fell to 47.5%, a level comparable to that among women in the comparison municipalities, 46.8%, and among women in Batsfjord, 45.4%.

The Dutch Study to reduce the prevalence of smoking took place in two communities in Holland (Mudde 1995), and began in 1989. The intervention community, Den Bosch, was randomly selected from a demographically matched pair of cities. The other city, Apeldorn, became the comparison community. A national anti-smoking media programme was launched unexpectedly during the intervention, contaminating the experiment. After 14 months, no effect was shown in either smoking prevalence or quit rates in Den Bosch compared with Apeldorn.

The Community Coalitions to Help Women Quit Smoking Project (Breathe Easy), (Secker-Walker 2000) took place in four counties in the north-eastern United States beginning in 1989. The aim was to reduce the prevalence of smoking among women. A quasi-experimental design was used, with two adjacent counties, Windham County, Vermont, and Cheshire County, New Hampshire designated the intervention counties, and Rutland County, Vermont, and Belknap County, New Hampshire, the comparison counties. After five years, cross-sectional follow-up analyses showed a significantly lower prevalence of smoking among women in the intervention counties (Windham and Cheshire). There was also a significantly greater quit rate, particularly among younger women and women with lower incomes, and also among heavy smokers in these counties, compared with Rutland and Belknap counties.

The Danish Municipality Project (Osler 1993) took place in the municipalities of Slangerup and Helsingør in Denmark, and started in 1989. The project aimed to improve several behaviours related to increased risk of cardiovascular disease, such as smoking, little or no exercise, and high fat consumption. A quasi-experimental design was used, with the municipality of Slangerup assigned to receive the intervention and the municipality of Helsingør to serve as the comparison community. After one year, no differences were found in the prevalence of smoking, number of quit attempts or quit rates in Slangerup compared with Helsingør.

The Otsego-Schoharie Healthy Heart Program (Nafziger 2001), took place among a rural population in New York state, in the United States, between 1989 and 1995. The cardiovascular risk reduction intervention took place in Otsego and Schoharie counties, with Herkimer county as the comparison county. The health education intervention aimed to reduce smoking, cholesterol, blood pressure and weight, and to increase physical activity. In addition, a school-based cardiovascular risk reduction curriculum was also

developed and implemented. Evaluation at baseline was through a cross-sectional survey of adults, aged 20-69 years, selected through random digit telephone dialling. The telephone interviews were followed by a clinical evaluation of cardiovascular risk factors. A second cross-sectional survey, using the same methodology was undertaken five years later. In addition, a panel of baseline respondents was followed up at this time. Cigarette smoking was assessed by questionnaire and also by exhaled carbon monoxide (CO). After five years of intervention, there was a significant reduction in smoking among adult women and men, in both the cross-sectional and panel studies, whether measured by self-report, CO levels greater than 8 parts per million, or actual exhaled CO levels.

The Action Heart Project (Baxter 1997), which took place in England beginning in 1990, aimed to modify the following cardiovascular risk factors: smoking, diet, high blood pressure and physical activity. A quasi-experimental design was used, with two adjacent communities, Swinton and Wath, assigned to receive the intervention and another community, Maltby, selected as the comparison community. After four years of intervention activity, there was a decrease in the prevalence of smoking in Swinton and Wath and a slight increase in Maltby.

The Neighbors Smoke-Free North Side (Fisher 1998) took place in St. Louis and Kansas City in the United States beginning in 1990. The aim was to reduce the prevalence of smoking, with particular emphasis on African Americans. A quasi-experimental design was used with three neighbourhoods in St. Louis assigned to receive the intervention programme. Four demographically similar zip code areas in Kansas City served as comparison. Evaluation was by random digit dialling telephone interviews of independent samples at baseline and two years later. There was a reduction in the prevalence of smoking among all respondents in the St. Louis neighbourhoods compared with those in the zip code areas in Kansas City. This reduction was seen among whites, women aged 35 years or less, and those with incomes of US\$20,000 or more, but not among African Americans or men.

The Vietnamese-American Men Projects took place in the United States starting in 1990. Both projects focused on changing the smoking behaviour of Vietnamese-American men, both used quasi-experimental designs, similar interventions and the same comparison community. One project targeted Vietnamese-American men living in San Francisco and Alameda counties in California (Jenkins 1997), and the other, Vietnamese-American men living in Santa Clara County, California (McPhee 1995). The comparison community for both projects was Vietnamese-American men living in Houston, Texas. At the completion of the intervention, the odds of being a smoker were lower, and the odds of being a quitter in the previous two years were higher in San Francisco and Alameda counties than in Houston (Jenkins 1997). In Santa Clara County, after 24 months of intervention activities, the prevalence of smoking remained unchanged, and was also unchanged in Houston (McPhee 1995).

The Bootheel Project (Brownson 1996), which aimed to reduce cardiovascular disease risk factors including smoking, took place in six counties in southern Missouri, in the United States, and began in 1990. A quasi-experimental design was used, with the six counties selected to take part in the intervention because of their high prevalence of cardiovascular disease. There was no comparison community, but data from the six counties were compared with the Missouri Behavioural Risk Factor Surveillance System data for rural counties, at baseline and for the final survey. After four years, smoking prevalence had fallen in the six counties and in the rest of rural Missouri, but there was no difference between them.

The Healthy Bergeyk Project (Van Assema 1994) took place in Holland and started in 1990. The main aim of the project was to reduce the prevalence of cancer-related risk behaviours, especially smoking and high fat consumption. The municipality of Bergeyk was randomly selected from six potential municipalities to be the intervention community and the comparison municipality selected from three of the others located in a separate media market from Bergeyk. After 18 months of intervention programme activities, the prevalence of smoking fell 3.3 % among the cohort followed in Bergeyk compared with 0.4 % in the comparison community, but the difference in prevalence was not significant.

The Alliance of Black Churches Project (Schorling 1997) took place in the state of Virginia, in the United States, beginning in 1991, and aimed to increase the smoking cessation rate among rural African Americans. The project used a quasi-experimental design, with Buckingham County assigned to receive the intervention, and Louisa County to act as the comparison county. After 18 months, the quit rate during that time was 9.6% in Buckingham County and 5.6% in Louisa County, a non-significant difference. The Epernon Study (Bruckert 1999) took place in the town of Epernon, France, from 1991 to 1996 and aimed to reduce cardiovascular risk factors. Two similar towns, Moret sur Loing and Magny en Vixin, were the comparison communities. The health education intervention was designed to reduce smoking, cholesterol, blood pressure and weight, and to increase physical activity. The evaluation used a cohort design. Randomly selected participants, 20-65 years of age, completed an interview, and had their blood pressure, height and weight measured, and blood tests done at baseline, and again after five years. There was no significant effect on smoking prevalence, quit rates, or initiation rates.

The 'Coeur en Santé St-Henri' Project (O'Loughlin 1999) took place in two disadvantaged urban neighbourhoods, St-Henri and Centre-Sud, in Montreal, Canada. The major aim of the project, which started in 1992, was to reduce cardiovascular risk factors, smoking, high-fat diet, high blood pressure, lack of physical activity, and weight. It was targeted towards women. A quasi-experimental design was used, with the neighbourhood of St-Henri being designated the intervention community. Cross-sectional follow-up and cohort follow-up analyses were done. After four years, no differences in smoking prevalence were found between St-Henri

and Centre-Sud. Process analyses indicated that although awareness of the programme reached 37.4%, participation rates were low, about 2 to 3%.

The Cancer Action in Rural Towns Project (CART) (Hancock 2001), which started in 1992, took place in 10 pairs of rural towns in New South Wales, Australia. The primary aim of this project was to evaluate the effectiveness of a community action programme in increasing community rates of preventive and screening behaviours relating to breast, cervical, smoking-related and skin cancer in rural Australian towns. A randomized design was used with 10 pairs of towns matched on demographic, infrastructure and geographic variables. One town from each pair was randomly allocated to either the experimental or the comparison condition. A cohort follow-up analysis was undertaken, which included both smokers and non-smokers. After 3 to 3½ years of intervention activity, there was a significantly greater quit rate among men in the intervention towns compared with the comparison towns, but not among women. Smoking initiation rates did not differ significantly for women or men.

The Dutch Heart Health Community Intervention, 'Hartslag Limburg' (Ronda 2004), started in 1998, and was designed to reduce cardiovascular risk factors. The intervention, which aimed to reduce smoking and cholesterol and increase physical activity, took place in the Dutch province of Limburg, with an unnamed province as the comparison area. The PRECEDE/PROCEED model was used to plan and evaluate the intervention, which used the theories of self-efficacy, planned behaviour change and stages of change as guiding principles. Evaluation was by telephone interview of a cohort of adult smokers identified in 1998, and followed up on two occasions, in 2000 and 2001. There was a substantial decrease in number of smokers, almost 29% quitting smoking between 1998 and 2001, but no significant difference between Maastricht and the comparison region. A national mass media-led smoking cessation campaign was implemented in the Netherlands during the time of the intervention, and probably contributed to the decrease in smokers in both regions.

Summary of smoking behavioural outcomes

For this summary, we define a favourable outcome as a significant difference in smoking behaviour, either lower prevalence, lower per capita cigarette consumption, or greater quit rate, for either women or men or both, in the intervention condition compared with the comparison condition, as reported by the investigators. Overall, in 23 studies (62%) the investigators reported at least one favourable outcome in smoking behaviour, whilst there was no significant difference in 14 (38%) (Brownson 1996; Bruckert 1999; Carleton 1995; Lupton 2003; McPhee 1995; Mudde 1995; O'Loughlin 1999; Osler 1993; Ronda 2004; Schorling 1997; Shelley 1995; Tudor-Smith 1998; Van Assema 1994; Weinehall 1999).

In six studies the community was both the unit of assignment and the unit of analysis, and two others used appropriate methods to allow for clustering. Among these eight studies, at least one significant smoking behavioural intervention effect was reported in five

(62.5%), and none in three (37.5%), whereas in the remaining 29 studies, in which the individual was the unit of analysis, and hence the significance levels deflated, at least one favourable intervention effect was reported in 18 (62%), and none in 11 (38%).

Two studies with treated comparison communities

We comment here on two other community projects. These did not meet inclusion criteria because each compared a more intense community-based intervention with a less intense one, neither using an untreated comparison community.

The Heart, Body and Soul Project (Stillman 1993) took place in East Baltimore, Maryland, United States, and began in the 1990s. The study used an experimental design with 22 churches randomly assigned to receive either an intensive culturally-specific smoking cessation intervention for African Americans or a minimal self-help smoking cessation intervention. Both interventions included community organization, community staff members and planning groups, and an initial health fair at which smokers were recruited to participate in the interventions, and given feedback on their exhaled carbon monoxide levels. The intensive intervention included sermons on smoking, testimony from individuals in the process of quitting, training volunteers as lay smoking cessation counselors, and individual and group support supplemented with spiritual audiotapes containing gospel music, and a scripturally guided stop smoking booklet. The minimal intervention consisted of the provision of the American Lung Association's pamphlet 'Don't let your dreams go up in smoke', designed for African Americans, given to smokers at the initial health fair. After one year of intervention activities, the self-reported quit rate among the cohort of smokers participating in the intensive intervention (n=199) was 27.1% (biochemically validated 19.6%), and among the cohort of smokers participating in the minimal intervention (n=93), 21.5% (biochemically validated 15.1%). Neither the self-reported quit rates, nor the validated quit rates differed significantly. Both these quit rates differed significantly from the spontaneous quit rate reported by churchgoers in the community reference population (2.9%). This reference population had a markedly different prevalence of smoking (35.5%) from the churchgoers identified at the health fairs (22%).

The Four Cities Project (Darity 1997), which started in 1988, took place in four cities in the United States: Hartford, Connecticut; Springfield, Massachusetts; Durham, North Carolina; and Columbia, South Carolina, and used a quasi-experimental design. Two middle-income and two lower-income areas of predominantly African American populations were identified in each city, and one of each pair assigned to either a passive intervention or the same passive intervention plus an active intervention. The passive intervention consisted of mass media, including radio public service announcements supplemented by paid advertisements about the health and social advantages of not smoking using local role models; television public service announcements and an occasional spot produced by the project; local and indige-

nous newspapers with news releases, letters, guest columns and special features; feature articles in a local magazine, and a logo. The active intervention included community organization, formation of advisory councils, health and smoking committees, site co-ordinators, health educators and involvement of churches, fraternal organizations and neighbourhood associations. In addition there were household surveys, with feedback on carbon monoxide levels, educational materials (fact sheet, self-help kit, resource list), newsletters, a telephone hotline staffed by a health educator, neighbourhood representatives, trained to respond to residents' requests for information, and to make referrals, quit nights, National Smokeout Week events, ex-smokers' clubs and a smoke-free community campaign. Although the interventions were planned to last three years, final results were presented after 18 months of intervention activity. Follow up of a cohort of smokers identified at the initial household surveys was done by telephone (n=1344). The non-smoking rate among the active intervention areas was 16.7%, versus 11.8% in the passive intervention areas, a difference of 4.9%. Three other smoking behavioural outcomes were reported: at least one quit attempt in the prior six months (active intervention 33.8% versus 26.2%, a difference of 7.6%), smoke-free days in past six months (active intervention 28.1 days versus 19.4 days, difference 8.7 days), and reduction in cigarettes per day among smokers (active intervention 2.0 cigarettes versus 0.4 cigarettes, difference 1.6 cigarettes). All these differences were statistically significant at the $P < 0.05$ level.

DISCUSSION

The marked heterogeneity of these studies precludes any formal statistical comparisons or meta-analyses. Some of this heterogeneity relates to the different approaches used for these community interventions, but some of it also relates to the method of reporting. Thus, our comments are, for the most part, of a qualitative nature. We note aspects of the design and analyses that compromise the validity of conclusions from these studies. We also discuss the relationship of individual components of the interventions to smoking-related outcomes, but are unable to suggest which, alone or in combination, are more effective than others.

Design issues: The non-random assignment of the intervention and comparison groups in almost all these studies, even when attempts were made to select communities matched on demographic criteria, required analyses which adjusted for baseline differences. For several studies only a few variables, such as age and gender, were used for these adjustments. Other differences not measured could have confounded the results.

Two studies stand out in terms of validity through their randomized design and adequate power. COMMIT, which also had comparable baseline characteristics among intervention and comparison communities, found no intervention effect for the changes in

smoking prevalence in the cross-sectional follow up, or independent samples. The significant increase in the quit rate seen among the cohort of light-to-moderate smokers followed up, and also in the weighted estimate of the quit rate among all smokers (derived from the data for light-to-moderate and heavy smokers), indicates some success for the COMMIT interventions among individuals, but not at the community level, where no intervention effect was found for the prevalence of smoking. The CART study (Hancock 2001) showed a significantly greater quit rate among men, but not among women, also indicating some success at the individual level, but community level changes in prevalence were not found.

Unit of analysis: Perhaps of greater importance was the frequent use of the individual as the unit of analysis, when the unit of assignment was the community. We have described these studies, but note that their reported significance levels, shown in the Comparisons and Data Table, are likely to be misleading, because without adjustment for the intraclass correlations within communities the P-values are artificially deflated. Several studies examined the intraclass correlations within communities, and finding them small and often insignificant, ignored them to conserve power. But, as Murray and others have pointed out, the unit of analysis must match the design if valid conclusions are to be drawn (Donner 1996; Murray 1998). Studies of only two communities are particularly difficult to interpret as no statistical assessment is possible if these are analysed at the cluster level.

Sample size and power calculations: For most of these studies, no power calculations were reported, making it somewhat difficult to interpret negative findings. However, with the additional problem that these studies used the individual as the unit of analysis, it is unlikely that these results are falsely negative.

Secular trends in smoking prevalence: Another important confounding circumstance is the secular trend in smoking prevalence, both prior to the interventions, and especially during them. In all but three studies (Stanford Five-City Project, Minnesota Heart Health Program, and Pawtucket Heart Health Program), no measures of prior secular trends were included. It is interesting to note that it is likely that secular trends obscured the effects of the COMMIT programme (Bauman 1999).

Risk factors addressed: The number of risk factors addressed as part of an intervention may influence smoking behavioural outcomes. Projects which addressed smoking alone (6/9, 67%) were a little more effective than those which addressed smoking as part of cardiovascular risk reduction or cancer risk reduction (16/28, 57%).

Site of project: A larger proportion of the 15 projects undertaken in North America, 10/15 (67%) reported at least one favourable smoking behavioural outcome, compared with 9/18 (50%) of those undertaken in Europe. All four undertaken elsewhere, two in Australia (1978 and 2001), and one each in South Africa (1979) and India (1986) reported at least one favourable outcome. The setting of the interventions, whether in towns or cities, or coun-

ties, or health districts, had no clear effect on smoking behavioural outcomes, nor did an urban setting compared with a rural one.

Length of intervention: The four projects which lasted less than two years had no demonstrable effect, but among those lasting two to five years or more than five years, the proportion of studies reporting at least one favourable outcome was greater in the studies lasting more than five years, (16/24 (67%) versus 7/9 (78%) respectively).

Theoretical basis for interventions: There was no clear influence of any of the theoretical models on the outcomes of these interventions, either individually or in combination.

Involvement of community members: The use of community organization, community staff members, coalitions of planning groups, or task forces was not clearly related to the smoking behavioural outcomes.

Channels for intervention delivery: We examined the use of each of the different channels for intervention delivery with the outcomes of each study. Intervention delivery through volunteers, or health professionals or educators, did not appear to be related to a favourable outcome. Nor were the different types of organization involved in the delivery of the interventions, such as worksites, churches, schools, community agencies, local health departments, hospitals or local government, related to success. Neither the use of mass media in general, nor newsprint, radio or television individually, were clearly related to smoking behavioural outcomes.

Smoking-specific interventions: The use of smoking-specific interventions, such as quit lines, quit contests, self-help kits, videotapes, slides or film, group cessation classes or individual counselling also did not appear to be related to outcome; nor did advocacy for restricting smoking in public buildings, worksites or schools.

Mediating variables and intermediate outcomes

We note the remarkable paucity of data concerning these mediating variables, with published results related to intervention effects for one or more intermediate outcomes in 17 studies. For specific mediating variables, assessment of intervention effects were found in less than a third of the studies. Furthermore, there was substantial variability in the measures used for conceptually similar mediating variables, so that any comparisons are difficult and fraught with uncertainty.

Among the 17 studies with results available for at least one intermediate outcome, nine (53%) used data from cross-sectional follow-up surveys, four (24%) used data from cohort follow-up surveys, and four (24%) used data from both types of follow-up survey. In these latter four studies, the results from the cross-sectional follow-up and cohort follow-up analyses were generally similar. Eleven of these 17 studies (65%) had at least one positive smoking behavioural change outcome, a rate similar to that among all studies in this review, suggesting that the success of an intervention was not a factor in reporting intermediate outcomes.

The small number of observations for any one of these intermediate outcomes, and the variability of the measures used for specific mediating variables preclude any firm conclusions. We note, however, as shown in Table 1, that among the studies reporting intervention effects for knowledge (six), attitudes (eight) or quit attempts (nine), there was no apparent relationship between net intervention effects for these predisposing and enabling factors and smoking behavioural change. In most of these studies similar changes attributable to secular trends were seen in the comparison group. With fewer studies reporting results for social influences (four), norms (two), and smoking environment (two), we can say even less.

Table 1. Intermediate outcomes versus smoking behavioural outcomes

Mediating variables	Numbers showing:	Smoking - Significant effect	Smoking - No effect
Knowledge	Significant effect:	3	0
	No effect:	3	0
Attitudes	Significant effect:	1	1
	No effect:	4	2
Quit attempts	Significant effect:	1	0
	No effect:	3	5
Smoking environment	Significant effect:	0	0
	No effect:	1	1
Social influences	Significant effect:	0	0
	No effect:	2	2

Table 1. Intermediate outcomes versus smoking behavioural outcomes (Continued)

Norms	Significant effect:	1	0
	No effect:	1	0

We conclude that the intermediate outcome results for the mediating variables reported for these community interventions contribute little to our understanding of why some interventions were more effective than others. This is partly because there were so few net intervention effects for any of these mediating variables, but also because, for the majority of studies, no intermediate outcome data was available. Nor, for these same reasons, do these observations help focus future intervention activities to address these conceptually important factors mediating smoking behaviour change.

The lack of published results for those community studies in which mediating variables were assessed at baseline but post-intervention outcomes were not found, may reflect publication bias, as it seems likely, based on this review, that many of these also would have had negative results.

Process evaluation

As with our comments on mediating variables and intermediate outcomes, the variability in type and scope of the process measures reported, and the lack of standardization among them, preclude any firm conclusions. We note that in the 10 studies which used formative research and pilot testing of intervention components, six (60%) had at least one favourable smoking behavioural outcome, and in the eight which used ongoing evaluation and feedback during the intervention, five (63%) had at least one favourable smoking behavioural outcome. These favourable outcome percentages are similar to that of all the studies in this review. The fact that several studies, using formative research, pilot testing and ongoing feedback were unsuccessful does not argue against using these methods during intervention development and implementation, but rather points to the need to understand what other factors related to programme delivery might explain their lack of success.

Participation and smoking behavioural outcomes

In 12 (32%) of the studies, there was some measure of the extent of participation in intervention activities, although these were not necessarily concerned with smoking. Among these 12 studies, four of five with programme participation rates of 30% or more (Stanford Five-City Project (Fortmann 1993) 33%, Minnesota Heart Health Program (Lando 1995) 30%, A Su Salud (McAlister 1992) 58%, Heart to Heart 57% (Goodman 1995)), had at least one successful smoking behavioural outcome. The fifth was Pawtucket Heart Health Program (Carleton 1995) 59%, where secular trends in declining smoking prevalence in the comparison community exceeded the fall in Pawtucket. Of the other seven studies, the

Alliance of Black Churches Project (Schorling 1997) had a participation rate of 29% for the participation measure 'being spoken to by a church member about smoking', but the participation rate in the comparison county for the same smoking-related activity was 20%, for a difference of 9% and the difference in cessation rates was nonsignificant. The Otsego/Schoharie project (Nafziger 2001) had a participation rate of 18% and a successful outcome. The other five studies had lower programme participation rates, about 15% or less, and none of these had a successful smoking behavioural outcome (Lupton 2003; Mudde 1995; O'Loughlin 1999; Osler 1993; Ronda 2004).

In the Northcoast Quit for Life study (Egger 1983), the number of quit kits, fact sheets and tip packs distributed, and quitline telephone messages provided, suggest that a substantial proportion of smokers took part, although no estimated participation rate was found. In the Vietnamese-American Men-2 (Jenkins 1997) study, the intervention was described as having 'broad penetration', but no details were provided. In COMMIT 1995, the measure of programme participation, receipt indices, did not allow an estimation of actual participation rates, but differences in the receipt indices between intervention and comparison communities, although significant, were reported as small. Each of these studies had at least one successful smoking behavioural outcome.

Programme awareness and smoking behavioural outcomes

In 12 studies (Tessin Cantonal Prevention programme (Domenighetti 1991), Norsjo Project (Weinehall 1999), Kilkenny Project (Shelley 1995), Dutch Community Study (Mudde 1995), Breathe Easy (Secker-Walker 2000), Danish Municipality Project (Osler 1993), Neighbors for a Smoke-free Northside (Fisher 1998), Vietnamese-American Men-1 (McPhee 1995), Bootheel Project (Brownson 1996), Healthy Bergeyck (Van Assema 1994), Alliance of Black Churches (Schorling 1997), Coeur en Santé St-Henri (O'Loughlin 1999)) levels of programme awareness in the intervention communities, which ranged from 24% to 93%, were not associated with a favourable smoking behavioural outcome. Only three of these studies (Tessin Project 80%; Breathe Easy 68%; Neighbors for a Smoke-free Northside 59%) had favourable smoking behavioural outcomes. In six of these studies, levels of programme awareness were also assessed in the comparison communities: Dutch Community Study: Intervention (I) 85% Comparison (C) 84%, difference 1%; Breathe Easy: I 68% C 22%, difference 46%; Danish Municipality Project: I 82% C 67%, difference 15%; Neighbors for a Smoke-free Northside: I 59% C 6%,

difference 53%; Vietnamese-American Men-1: I 60% C 32%, difference 28%; Alliance of Black Churches: I 43% C 40%, difference 3%. The two studies with measured differences in programme awareness of greater than 30% (Breathe Easy and Neighbors for a Smoke-free Northside) had favourable smoking behavioural outcomes.

We suggest, somewhat speculatively, that several observations derived from this review of process evaluations may help our understanding of why some projects were successful, as judged by at least one favourable smoking behavioural outcome, and others were not. We note that significantly higher levels of programme exposure or programme awareness in the intervention communities than in the comparison communities were accompanied by a successful smoking behavioural outcome in eight of the 10 projects from which these data were derived. Participation rates in programme activities of 30% or more tended to be accompanied by a favourable smoking behavioural outcome, whereas no favourable outcomes were seen with participation rates of about 10% or less. Favourable smoking behavioural outcomes were also seen when programme awareness levels of 30% or greater were found in the intervention communities compared with the comparison communities. Although the evidence is even more tenuous, the larger the intervention dose, the greater the smoking behavioural change observed.

We have examined how some of these process measures may explain the lack of success in the 14 studies in this review which did not have a significant net effect on smoking behaviour. Secular trends in smoking in the comparison communities kept pace with or exceeded those in the intervention communities in three studies (Pawtucket, Heartbeat Wales, Kilkenny). In Heartbeat Wales, there was good evidence of diffusion of intervention components to other parts of the United Kingdom, including the comparison areas, while the intervention was in progress. In two studies (Norsjo Project, Bootheel Project), there were very low levels of programme exposure in relation to smoking, because these interventions placed little or no emphasis on smoking reduction. In four of the five studies with low participation rates (Dutch Study, Danish Municipality Project, Health Bergeyk, Alliance of Black Churches Project) intervention implementation time was 18 months or less, allowing insufficient time for people to become involved with intervention activities. In two of these (Dutch Study, Danish Municipality Project), there was also difficulty in engaging local organizations in these projects. The Dutch study was also severely compromised by a national anti-smoking media programme launched during the course of the intervention, which led to the high level of programme awareness in the comparison community. The fifth project with a low participation rate (Coeur en Santé St-Henri, 2-3%), lasted four years, and used intervention components that were known to be effective. The reasons for such a low participation rate were not clear, as programme awareness was much higher at 37%, but the low participation rate explains the lack of effect. The remaining study with no net effect on

smoking behaviour, the Vietnamese-American Men-1 study, had a comparatively low level of programme awareness, and may have had less penetration than the otherwise similar but successful Vietnamese-American Men-2 study (Jenkins 1997). The latter study was preceded by a 15-month pilot anti-smoking media campaign, and also sought to involve students and their families, so that the major media component of that intervention lasted longer and was more intensive at the community level.

Concerning programme sustainability, we note that among the 18 studies with some information about the maintenance of programme activities after completion of the planned intervention, 16 (88%) (11 cardiovascular risk reduction, three smoking reduction and two cancer reduction), continued some programme activity beyond that time. Eleven (73%) of these 15 had at least one favourable smoking behavioural outcome. Of the two studies that were unable to maintain their interventions, one (smoking reduction) had a favourable smoking behavioural outcome and the other (cardiovascular risk reduction) did not. However, all comments about mediating variables must be put into the context of the very limited effectiveness seen in the largest and best designed studies, the COMMIT and CART trials.

Other reviews:

Several previous reviews and editorials have considered community-based interventions (Fincham 1992; Fisher 1995; Shea 1990a; Shea 1990b; Sorensen 1998; Susser 1995; Pyorala 1995). Most have avoided, as we did, formal meta-analysis because of the heterogeneity among the available studies. We are aware of only one review that has used a meta-analytic approach to determine which aspects of study design, setting and intervention were significantly related to outcome (Sellers 1997).

Sellers and her colleagues reviewed 29 community heart health programmes, but were only able to use seven of these in their meta-analysis, for which they required a reference group and independent cross-sectional follow-up results. In that analysis, for changes in smoking prevalence, the setting, city versus rural or small town, had no effect; there was a smaller effect for women, and also a smaller effect for later studies. Concerning intervention components, a population plus high risk approach was no more effective than a population approach alone; print plus broadcast media were no more effective than print media alone; involvement of community members in intervention development was more effective than no involvement; and the inclusion of some environmental change (smoking policy or physical change) as a part of the intervention was more effective than none.

In relation to methodological characteristics, the number of units involved in a study, whether the communities were matched or not, the length of follow up, and the survey response rate had no effect on the outcome. In studies which adjusted for covariates the effect size was smaller than in those with no adjustment.

Several papers have commented on the methods used to evaluate community-based interventions (Fincham 1992; Glasgow 1999; Mittelmarm 1993; Murray 1998; Shea 1990a; Smith 1997). An

important component of the evaluation of community studies, and one that has received less prominence in the literature, is process evaluation. Glasgow and colleagues have proposed a useful framework, RE-AIM, for evaluating such public health interventions (Glasgow 1999). This framework, which, in addition to assessing efficacy, also assesses reach, adoption, implementation and maintenance of the intervention (Reach, Efficacy, Adoption, Implementation, Maintenance). As proposed by Glasgow and colleagues, numerical values for each RE-AIM component are multiplied together to give a score which can be used to rank public health interventions. Use of this framework may help our understanding of the significance of the results of community-based interventions, by linking the details of what went on with the behavioural outcomes. It may also give an indication of the likely future benefits from the extent to which the intervention is maintained in the community.

The studies in this review were completed before the RE-AIM framework was published. We note that of the five components, seven (22%) studies addressed two components, nine (28%) addressed three, 12 (38%) addressed four, and four (12%) addressed all five. However, except for efficacy, addressed adequately by all but one study (Tessin), the numerical detail required for the other four components was rarely found.

AUTHORS' CONCLUSIONS

Implications for practice

The failure of the largest and best conducted studies to detect an effect on prevalence of smoking is disappointing. A community approach will remain an important part of health promotion activities, but designers of future programmes will need to take account of this limited effect in determining the scale of projects and the resources devoted to them.

If community initiatives are undertaken, community organization, assessment of community capacity and the identification of individuals and organizations interested in supporting the smoking-related aims of the project are important during project development. Smoking needs to be recognized by the community as an important issue. Recruitment of community members to staff coalitions and task forces, and to supervise programme implementation, with skills in working with diverse groups and in health education, is strongly recommended.

Coalitions take several months to form, and a year or more to become effective change agents in their community. Interventions to reduce smoking among adults need to continue for several years, and should aim to make resources for smoking cessation and support for staying quit readily available throughout the community, and to develop these services if necessary. The use of mass media (print, radio and television) is especially useful for modelling behaviour change, and for changing community norms concerning smoking. It is also important to involve, train and provide smoking

cessation referral services and resources for health professionals. The provision of nicotine replacement therapy or other effective medication for helping smokers quit smoking at little or no cost is becoming increasingly important.

Implications for research

We see several major research issues to be addressed in future community-based studies to reduce adult smoking. The first of these relates to design. Sample size and power calculations must be done, and should account for the intraclass correlations associated with cluster design. The community must be the unit of analysis.

Independent cross-sectional follow-up surveys best reflect intervention effectiveness at the community level, and are the method of choice for this. Cohort follow-up studies indicate intervention effectiveness at the individual level. In addition to assessing changes in smoking prevalence and quit rates during the time the intervention is in progress, smoking initiation rates should also be considered.

Another issue relates to secular trends in smoking. These need to be taken into account prior to the start of the interventions, and assessed again after the trial has been completed, or after the intervention programmes have been taken on by the community.

Although biochemical measures of smoking are not essential, an assessment of deception rates in a subsample of respondents can be reassuring, especially in the future as smoking becomes less socially acceptable and response bias more likely.

We recommend that the measures used to assess mediating variables become standardized, and also that the results of intermediate outcomes of ongoing and future community interventions be made available, if not in formal publications then on the world wide web.

We also recommend that process measures should be collected and reported, especially descriptions of community organization and project management, intervention implementation including details of organizations and services involved, programme exposure and reach, participation by community members and target groups in intervention activities, and levels of programme awareness. Descriptions of the steps taken to maintain or institutionalize programme components should also be reported.

Finally, we recommend that a uniform and comprehensive format be developed for reporting the results of community-based interventions, so that reviews of future trials can use a quantitative, rather than a qualitative approach.

ACKNOWLEDGEMENTS

Lindsay Stead did the initial literature search and screening of projects for inclusion in this review. She also prepared the tables

in the Cochrane review format and provided editorial assistance. Kate Hey gave editorial assistance. The data extraction form was modified from one provided by Amanda Sowden.

Farouk T. Abdul-Wahid, Emma E. Strahs and Clare Secker-Walker checked the data abstractions.

Deiter W. Gump translated the Schleiz Project papers, Ellie Wei translated papers in Chinese.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Anantha 1995

Methods	<p>Country: India</p> <p>Objective: To reduce tobacco consumption.</p> <p>Study Sites: Villages in Dibbur, Malur and Gudibanda in Kolar District in Karnataka State.</p> <p>Programme name: Anti-tobacco community education program.</p> <p>Design: Quasi-experimental, in villages in 3 Primary Health Centers: Dibbur with 177 villages was assigned to receive the intervention, and Malur with 136 villages and Gudibanda with 120 villages were assigned as the reference or comparison communities.</p> <p>Analysis: Cohort and cross-sectional analyses, t-tests, chi squared, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Dibbur - 66,447, Malur - 64,202, Gudibanda - 46,878</p> <p>Age: all ages.</p> <p>Sex: female and male</p> <p>Ethnicity: Indian</p>
Interventions	<p>Theoretical basis: none mentioned.</p> <p>Components: The health education intervention made use of 25 junior health workers who visited the villages weekly, and 3 senior health workers who visited the villages monthly, discussing the dangers of tobacco use, illustrated with pictures of tobacco-related illnesses, especially of the mouth. Posters and booklets were used, and group and individual health education discussions were held regularly in each of the intervention villages.</p> <p>Year started: 1986</p> <p>Duration: 6 yrs</p> <p>Maintenance: No evidence was found.</p>
Outcomes	<p>Questionnaire: in-person interview at home</p> <p>Biochemical measure of tobacco use: none</p> <p>Baseline: 1986, immediately preceding the intervention</p> <p>Outcome: 1988 and 1991, 2 and 5 yrs after the intervention began.</p> <p>Further follow up: not reported.</p>
Notes	<p>No reports concerning mediating variables were found.</p>

Baxter 1997

Methods	<p>Country: United Kingdom.</p> <p>Objective: To modify the following cardiovascular risk factors: smoking, diet, high blood pressure and physical activity.</p> <p>Study Sites: Maltby, and Swinton and Wath.</p> <p>Programme name: Action Heart.</p> <p>Design: Quasi-experimental, with 2 adjacent communities, Swinton and Wath, assigned to receive the intervention and another community, Maltby, selected as the reference or comparison community.</p> <p>Analysis: Cross-sectional analyses, logistic regression, 2-sided P-values, individual as the unit of analysis. The sample size was sufficient to detect a 2% difference in smoking prevalence, but the value for beta was not reported.</p>
Participants	<p>Population of study sites: not reported.</p> <p>Age: 18-64 years</p> <p>Sex: female and male</p>
Interventions	<p>Theoretical basis: none specified.</p> <p>Components: The health education intervention used general principles of community health promotion, and included health professionals, smoking cessation groups, information leaflets and library resources, an Action Heart Club, check ups and a nicotine patch scheme.</p> <p>Year started: 1991</p> <p>Duration: 4 yrs</p> <p>Maintenance: No evidence was found.</p>
Outcomes	<p>Questionnaire: administered by mail.</p> <p>Biochemical measure of smoking: none.</p> <p>Baseline: 1991, immediately preceding the intervention</p> <p>Outcome: 1995, 4 yrs after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	<p>Economic evaluation: A cost-effectiveness analysis of the overall programme was conducted. Estimated cost per life year gained was £31. The authors concluded that this represented good value compared with other healthcare interventions.</p>

Brownson 1996

Methods	<p>Country: USA</p> <p>Objective: To reduce CVD risk factors, including smoking.</p> <p>Study Sites: The Bootheel, a 6-county area in southeastern Missouri (Dunklin, New Madrid, Stoddard, Mississippi, Scott and Pemiscot counties), and other rural parts of Missouri.</p> <p>Programme name: The Bootheel Project</p> <p>Design: Quasi-experimental, with the 6 counties in southeastern Missouri selected to take part in the intervention because of their high prevalence of cardiovascular disease. Data from these counties were compared with data from other rural counties in Missouri, using the Missouri Behavioral Risk Factor Surveillance System.</p> <p>Analysis: Cross-sectional analyses, t-tests, SUDAAN, ANCOVA, individual as the unit of analysis.</p>
Participants	<p>Population of study sites: not stated</p> <p>Age: 18+</p> <p>Sex: female and male</p> <p>Ethnicity: African American - 11.4%</p>

Brownson 1996 (Continued)

Interventions	Theoretical basis: social cognitive theory, diffusion of innovation theory, community participation. Components: The intervention used community organization principles. Coalitions and subcoalitions were formed in each county. Although the intervention made use of volunteers, churches, schools, community agencies, local government, public events, newspapers and posters, none of the coalitions targeted smoking. Year started: 1990 Duration: 4 yrs
Outcomes	Questionnaire: administered by telephone Biochemical measure of smoking: none. Baseline: 1990, immediately preceding the intervention Outcome: 1994, 4 yrs after the intervention began. Further follow up: none found.
Notes	No reports concerning mediating variables were found.

Bruckert 1999

Methods	Programme name: Epernon Town Study Country: France Objective: To prevent CVD by reducing cardiovascular risk factors. Design: Quasi-experimental design with 1 town assigned to receive the intervention, and 2 similar towns to the comparison condition Analysis: T-tests, chi squared and Fisher's exact test, with the individual as the unit of analysis. Sample size estimates of 450 persons per group were based on alpha and beta at 0.05, for a 5% difference in cholesterol levels.
Participants	Population: The population of Epernon was 5,092, and of the comparison towns, Monet sur Loing, 4,174, and Magny en Vexin, 5,059. Sex: female and male Ethnicity: Caucasian.
Interventions	Theoretical basis: none stated. Components: The health education intervention aimed to reduce cardiovascular risk by reducing smoking, cholesterol, blood pressure and weight, and increasing physical activity. Community involvement included local government, the local health department and sport associations. Intervention channels included health professionals, doctors and paramedics, teachers, schools, public events, newspaper articles and news features on radio and television, municipal displays and billboards, booklets, cartoon strips, and discussions. Year started: 1991 Duration: 5 yrs Maintenance: No evidence was found concerning maintenance of the intervention.
Outcomes	Cohort design. Randomly selected participants, 20-65 years of age, completed an interview, and had their blood pressure, height and weight measured, and blood tests done at baseline, and again after 5 yrs. Baseline: Prevalence of smokers, ex-smokers, and nonsmokers. Outcome: Prevalence of smokers, ex-smokers, new smokers, and nonsmokers.
Notes	The intervention was largely informational, with no component of skills training

Carleton 1995

Methods	<p>Country: USA</p> <p>Objective: To reduce cardiovascular mortality and morbidity through a comprehensive community intervention to reduce smoking, high cholesterol, high blood pressure, obesity and physical inactivity.</p> <p>Study Sites: Pawtucket, in Rhode Island, and an unnamed comparison city.</p> <p>Programme name: Pawtucket Heart Health Program</p> <p>Design: Quasi-experimental, with Pawtucket chosen as the intervention city and an unnamed southeastern New England city as the comparison city.</p> <p>Analysis: Cohort and cross-sectional analyses, ANOVA, logistic regression, individual as the unit of analysis, but standard errors were appropriately inflated to account for the batch-related component of variance, 2-tailed P-values. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Pawtucket - 71,204, Comparison city - 98,478.</p> <p>Age: 18-64 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: Mixed.</p>
Interventions	<p>Theoretical basis: social cognitive theory, diffusion of innovation theory, communication theory, behaviour change theory, community behavioural psychology, and community participation.</p> <p>Components: Grass-roots community-wide intervention which included community organization and coalition formation and involved schools, most religious and social organizations, large worksites, supermarkets, grocery stores, and city government. Extensive use was made of newspaper articles and stories, as well as newsletters, church bulletins and worksite publications. Radio and television carried news items about the programme. Trained volunteers played a prominent part in programme delivery. Physicians and teachers were also involved. Activities to reduce smoking included a quitline, quit contests, quit kits and smoking cessation groups.</p> <p>Year started: 1981</p> <p>Duration: 7 yrs of intervention programming, 1984-1991</p> <p>Maintenance: The establishment and maintenance of programme activities by the community on a permanent basis was a specified programme goal. However, no evidence was found in relation to this.</p>
Outcomes	<p>Questionnaire: in-person interview at home, in English, Portuguese, or Spanish</p> <p>Biochemical measure of smoking: serum cotinine.</p> <p>Baseline: 1981-1982 and 1983-1984, preceding the intervention</p> <p>Outcome: 1987-1989 and 1990-1991, for peak intervention effects, and 1992-1993, post-intervention.</p> <p>Further follow up: not reported.</p>
Notes	<p>Economic evaluation: No analysis was found at project level. However, a cost-effectiveness analysis of smoking cessation contests is reported and a methodological paper reports on cost-effectiveness analysis based on a cholesterol change programme.</p>

COMMIT 1995

Methods	<p>Country: USA and Canada</p> <p>Objective: To reduce the prevalence of smoking among heavy smokers, i.e. men and women smoking 25+ cigarettes per day.</p> <p>Study Sites: 11 pairs of communities, 10 pairs in the United States and 1 pair in Canada. The USA sites, with the intervention communities named first for each pair, were: Vallejo and Hayward, California; Cedar Rapids and Davenport, Iowa; Fitchburg/Leominster and Lowell, Massachusetts; Paterson and Trenton, New Jersey; Santa Fe and Las Cruces, New Mexico; Yonkers and New Rochelle, New York; Utica and Binghamton/Johnson City, New York; Raleigh and Greensboro, North Carolina; Medford/Ashland and Albany/Corvallis, Oregon; Bellingham and Longview/Kelso, Washington. The Canadian sites were Brantford and Peterborough, Ontario.</p> <p>Programme name: Community Intervention Trial for Smoking Cessation (COMMIT).</p> <p>Design: a randomized controlled design, one of each matched pair of communities being randomly assigned to receive the intervention, and the other acting as the comparison or reference community.</p> <p>Analysis: Cross-sectional and cohort analyses, SUDAAN and logistic regression, 1-sided P-values, communities as the unit of analysis. For the cohort analyses, unknown outcomes were analyzed as if missing at random (a complex stratification system was used to impute the missing outcomes), and also as if missing completely at random by omitting those with missing data in 1993. For the independent samples, beta=0.10, or 90% power to detect a 6.4 percentage point difference in smoking prevalence; for the cohort samples, there was 90% power to detect a 10% difference in quit rates.</p>
Participants	<p>Population of study sites: Intervention communities - 1,028,925, average population/community, 93,539; Comparison communities - 1,009,954, average population/community, 91,814</p> <p>Age: 18-64 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: White - 73.6%</p>
Interventions	<p>Theoretical basis: community organization and community participation.</p> <p>Components: The intervention included community organization, community boards and staff, and task forces in each of the 11 intervention communities. Each community formed 4 task forces, public education, healthcare providers, worksites, and cessation resources, each with a set of key mandated activities. Intervention channels included volunteers, health professionals, teachers, worksites, churches, business, schools, public events, mass media (news and stories in newspapers, and on radio and television), posters and billboards, mailings, quit contests, self-help materials, and smoking cessation resource guides. Smoke-free policies were advocated.</p> <p>Year started: 1988</p> <p>Duration: 5 yrs</p> <p>Maintenance: Although continuation of COMMIT activities was not a major programme goal, all communities made plans to continue some tobacco control activity. A tobacco coalition, board or other structure was found to be operating in 9/11 communities, 12-16m after the formal end of the programme and 10 communities had some level of paid staff dedicated to smoking control. Substantial activity was ongoing in 3 of the programme's 4 original channels (worksites, public education and cessation resources) and considerable smoking control activity aimed at youth was also being undertaken a year after funding was withdrawn.</p>
Outcomes	<p>Questionnaire: administered by telephone interview</p> <p>Biochemical measure of smoking: taken, but only used for subanalyses of deception rates among heavy and light smokers in the intervention and comparison communities.</p> <p>Baseline: 1988, immediately preceding the intervention</p> <p>Outcome: 1993, 5 yrs after the intervention began.</p> <p>Further follow up: not reported.</p>

COMMIT 1995 (Continued)

Notes	Economic evaluation: A cost-effectiveness analysis of the overall programme was included in the evaluation design. The intended outcome measure was the estimated marginal societal costs of increased smoking cessation. However, this was not calculable in the absence of an effect on smoking cessation.
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Domenighetti 1991

Methods	<p>Country: Switzerland</p> <p>Objective: To prevent CVD through a canton-wide prevention programme designed to reduce hypertension, smoking, and sedentary lifestyle, to improve nutrition, and also reduce the time between symptoms of myocardial infarction and hospitalization.</p> <p>Programme name: Programme du Canton du Tessin</p> <p>Design: Quasi-experimental, with the canton of Tessin receiving the community interventions and 2 other cantons, Vaud and Fribourg, acting as comparison communities.</p> <p>Analysis: Cross-sectional analyses, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Populations of the 3 cantons not reported</p> <p>Age: not specified.</p> <p>Sex: female and male</p>
Interventions	<p>Theoretical basis: none stated.</p> <p>Components: The intervention program targeted smoking, high cholesterol, high blood pressure and physical activity, and included a comprehensive community intervention with participation from many organizations within the canton, as well as health professionals and schools. Mass media (newspapers, radio, television and cinemas), direct mailing, public events, stickers, posters, brochures, leaflets and T-shirts were all used.</p> <p>Year started: 1984</p> <p>Duration: 6 yrs</p> <p>Maintenance: No evidence was found, but the encouraging results were expected to lead to similar interventions spreading to other regions and cantons in Switzerland.</p>
Outcomes	<p>Questionnaire: in-person interview</p> <p>Biochemical measure of smoking: not reported</p> <p>Baseline: MONICA I, 1984-1985 in the Vaud-Fribourg region, and 1985-1986 in Canton du Tessin.</p> <p>Outcome: MONICA II, 1988-1989 in both intervention and comparison cantons.</p> <p>Further follow up: not reported.</p>
Notes	No economic evaluation found.

Egger 1983

Methods	<p>Country: Australia</p> <p>Objective: To reduce cigarette smoking over a 2-yr period.</p> <p>Study Sites: Lismore, Coffs Harbour and Tamworth in Queensland.</p> <p>Programme name: North Coast Quit for Life programme.</p> <p>Design: Quasi-experimental, with 2 intervention towns, Lismore receiving the mass media programme combined with a community programme, Coffs Harbour receiving the same mass media programme alone, and Tamworth acting as the comparison town.</p> <p>Analysis: Cross-sectional analyses, logistic regression, chi squared, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Lismore 22,083, Coffs Harbour 12,197, and Tamworth 27,280.</p> <p>Age: 18+</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: communication theory combined with social marketing.</p> <p>Components: The mass media intervention made use of newspapers, radio and television, with news stories, testimonials, and specially designed paid advertisements. Stickers, posters, T-shirts, balloons, and self-help quit kits were also part of the mass media intervention. The community intervention involved health professionals, kits handed out by doctors, quit fact sheets, quitter tips packs, a quitline telephone message, a variety of smoking cessation groups, and public events such as fun runs.</p> <p>Year started: 1978</p> <p>Duration: 2 yrs</p> <p>Maintenance: No evidence was found.</p>
Outcomes	<p>Questionnaire: in-person interview at a central screening centre, or at home.</p> <p>Biochemical measure of smoking: Plasma thiocyanate in yrs 2 and 3 on a randomly selected 5% subsample.</p> <p>Baseline: 1978, immediately preceding the intervention</p> <p>Outcome: 1980 and 1981, 1 and 2 yrs after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	<p>Knowledge of the effects of smoking and attitudes to smoking were each assessed by 6 questions. Social pressure to quit was also assessed.</p>

Fisher 1998

Methods	<p>Country: USA</p> <p>Objective: To reduce the prevalence of smoking, with particular emphasis on African Americans.</p> <p>Study Sites: St. Louis and Kansas cities, Missouri.</p> <p>Programme name: Neighbors for a Smoke-Free Northside.</p> <p>Design: Quasi-experimental, with 3 neighbourhoods in St. Louis assigned to receive the intervention program. 4 demographically similar zip code areas in Kansas City served as comparison.</p> <p>Analysis: Cross-sectional analyses, chi squared and logistic regression, 2-sided P-values, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: St. Louis neighbourhoods: Grace Hill - 8,149, Water Tower - 14,162, West End - 15,495; Kansas City zip code areas: 13,769; 22,583; 18,249; 30,330.</p> <p>Age: 18+.</p> <p>Sex: female and male</p>

Fisher 1998 (Continued)

	Ethnicity: predominantly African American (57%-98%)
Interventions	<p>Theoretical basis: community participation.</p> <p>Components: Volunteer steering committees were formed in each neighbourhood, staffed by part-time community workers. Central planning was carried out by a 'Nuts and Bolts' committee, and there was also a city-wide advisory committee. Volunteers were recruited and trained to implement programme activities. These included self-help manuals and smoking cessation classes modified for low-income African Americans, door-to-door campaigns, wellness fairs, parades, a 'gospelfest', presentations, billboards, newspaper and television coverage and radio interviews.</p> <p>Year started: 1990</p> <p>Duration: 2 yrs</p> <p>Maintenance: programme activities continued beyond the formal end of the research programme 'out of interest in maintenance of the programme and its benefits'. No further detail was given.</p>
Outcomes	<p>Questionnaire: administered by telephone</p> <p>Biochemical measure of smoking: none.</p> <p>Baseline: 1990, immediately preceding the intervention</p> <p>Outcome: 1992, two yrs after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	The baseline assessment included questions concerning knowledge of tobacco-related health risks, social and community support, and respondents' estimates of community attitudes about these issues. No details about responses to these questions were found.

Fortmann 1993

Methods	<p>Country: USA</p> <p>Objective: To reduce cardiovascular mortality and morbidity through a comprehensive community and mass media intervention to reduce smoking, high serum cholesterol, high blood pressure, sedentary lifestyles and weight.</p> <p>Study Sites: Monterey, Salinas, Modesto, San Luis Obispo and Santa Maria, California.</p> <p>Programme name: Stanford Five-City Project</p> <p>Design: Quasi-experimental, with Monterey and Salinas chosen as the intervention cities, and Modesto and San Luis Obispo as the comparison cities. Santa Maria was used to monitor cardiovascular mortality and morbidity data.</p> <p>Analysis: Cross-sectional and cohort analyses, t-tests, chi squared, repeated measures ANOVA, logistic regression, 1-sided and 2-sided P-values, individual and community as the units of analysis.</p> <p>For the independent samples, beta=0.10, or 90% power to detect an 8 % point difference in smoking prevalence; for the cohort samples, there was 90% power to detect a 4.72 % point difference.</p>
Participants	<p>Population of study sites: Monterey 40600, Salinas 82200, Modesto 161,600, San Luis Obispo 35900.</p> <p>Age: 25-74 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: Mixed</p>
Interventions	<p>Theoretical basis: social cognitive theory, communication theory, social marketing and community organization.</p> <p>Components: Television-based smoking cessation programme, public service announcements on television, a radio smoking cessation series, newspaper articles and booklets about smoking, worksite smoking cessation efforts, group smoking cessation programs, a self-help quit kit, smoking cessation contests, and a school-based smoking prevention curriculum. Smoking cessation seminars and smoking cessation materials for health professionals.</p> <p>Year started: 1980</p>

Fortmann 1993 (Continued)

	<p>Duration: 6 yrs, followed by 4 yrs education maintenance activity.</p> <p>Maintenance: A 2-yr 'maintenance phase' was included in the design of the project from 1986 to 1988. Widespread application of the project methods were adopted by the treatment communities and over 50% of the large-scale programmes were maintained by community groups at least in the first few years after the formal end of the research programme. Programme materials and methods have been widely distributed to other areas.</p>
Outcomes	<p>Questionnaire: in-person interview at survey centres in each city.</p> <p>Biochemical measure of smoking: expired-air CO and plasma thiocyanate.</p> <p>Baseline: 1979-1980, preceding the intervention</p> <p>Outcome: Independent sample 1981-1982, 1983-1984, and 1985-1986.</p> <p>Cohort sample 1980-1981, 1982-1983, and 1984-1985.</p> <p>Further follow-up: 6 additional yrs of surveillance, through 1992.</p>
Notes	<p>Economic evaluation: No analysis was found at project level. However overall project costs are presented and the cost-effectiveness of 3 smoking cessation programmes is reported. The per capita costs were estimated to be approximately US\$4 per year excluding research costs.</p>

Giampaoli 1997

Methods	<p>Country: Italy</p> <p>Objective: To reduce cardiovascular risk factors through a community intervention directed toward modifying levels of risk factors for chronic disease in the general population, identifying and treating high risk subjects and re-orienting health services toward prevention.</p> <p>Study Sites: The Sezze Health District, which included the municipalities of Sezze, Roccamare and Bassiano, and the municipality of Priverno, all in the province of Latina.</p> <p>Programme name: Di.S.Co. Project (Sezze District Community Control)</p> <p>Design: Quasi-experimental, with the Sezze Health District, including the municipalities of Sezze, Roccamare and Bassiano, chosen as the intervention communities and the municipality of Priverno as the comparison community.</p> <p>Analysis: Cohort and cross-sectional analyses, t-tests, ANCOVA, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Sezze Health District - 25,706, municipality of Priverno - 12,655.</p> <p>Age: 20-69 yrs</p> <p>Sex: female and male</p>
Interventions	<p>Theoretical basis: none specified.</p> <p>Components: The health education intervention addressed smoking, diet, high blood pressure, physical activity, and weight, and included anti-smoking propaganda, the preparation and distribution of printed materials, setting up consulting rooms, lectures and exhibitions, and theoretical and practical courses for health professionals and teachers. Special attention was paid to worksites and schools.</p> <p>Year started: 1983</p> <p>Duration: 10 yrs</p>
Outcomes	<p>Questionnaire: in-person interview at screening centres.</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1983, immediately preceding the intervention</p> <p>Outcome: 1986 and 1993, 3 and 10 yrs after the intervention began.</p> <p>Further follow up: not reported.</p>

Giampaoli 1997 (Continued)

Notes	No economic evaluation found
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Goodman 1995

Methods	Country: USA Objective: To reduce cardiovascular risk factors through community-based programmes Study Sites: Florence and Anderson, South Carolina. Programme name: Heart to Heart Project Design: Quasi-experimental, with Florence designated as the intervention community and Anderson as the comparison community. Analysis: Cohort analyses, ANCOVA, 1-sided P-values, individual as the unit of analysis. Greater than 99% power for serum cholesterol and blood pressure changes, but no estimate for smoking behaviour change.
Participants	Population of study sites: Florence - 56,240, Anderson - 51,014 Age: 18+ Sex: female and male Ethnicity: White and African American
Interventions	Theoretical basis: social cognitive theory, communication theory, and community organization and participation. Components: The health education intervention included community organization, community staff members, a coalition, volunteers, churches, restaurants and retailers, a speakers bureau, local health fairs, quit contests, mass media (newspapers, radio and television), posters, billboards, and self-help kits for smoking cessation. Presentations concerning guidelines for cardiovascular conditions were made to health professionals and a health promotion resource directory was distributed to worksites. Year started: 1986 Duration: 5 yrs Maintenance: Certain components were sustained after the formal end of the research programme. However, no further details were found.
Outcomes	Questionnaire: in-person interview at home and physical assessment at clinic. Biochemical measure of smoking: none. Baseline: 1987, immediately preceding the intervention Outcome: 1991, 4 yrs after the intervention began. Further follow up: not reported.
Notes	

Gutzwiller 1985

Methods	<p>Country: Switzerland</p> <p>Objective: To reduce cardiovascular morbidity and mortality through reductions in smoking, cholesterol, high blood pressure and sedentary lifestyles.</p> <p>Study Sites: Aarau, Nyon, Solothurn and Vevey</p> <p>Programme name: National Research Program (NRP 1A)</p> <p>Design: Quasi-experimental, with Aarau and Nyon chosen as the intervention towns and Solothurn and Vevey as the comparison towns.</p> <p>Analysis: Cohort analyses, t-tests, chi squared, Mantel-Haenzel and McNemar tests, individual as the unit of analysis. Sample size and power calculations were reported for changes in serum cholesterol, with beta=0.01, or a power of 90%.</p>
Participants	<p>Population of study sites: Aarau - 16,000, Nyon - 12,000, Solothurn - 16,000, Vevey - 12,000</p> <p>Age: 16+</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: None reported, but the intervention was a community-oriented lifestyle intervention programme.</p> <p>Components: community organization, local action committees and coordinators, health professionals, teachers, community and business associations, sports clubs, health agencies, local government, newspaper articles, public discussions, posters, slide shows, and smoking cessation groups.</p> <p>Year started: 1977/78</p> <p>Duration: 3 yrs</p> <p>Sustainability: Citizen action in the intervention areas was taken up on a political level to ensure continuation of the project. The project enjoyed continued support after the formal end of the study. No further details were given.</p>
Outcomes	<p>Questionnaire: in-person interview at home</p> <p>Biochemical measure of smoking: serum thiocyanate</p> <p>Baseline: 1977/78, immediately preceding the intervention</p> <p>Outcome: 1980/81, after 3 yrs of intervention.</p> <p>Further follow up: not reported.</p>
Notes	<p>Economic evaluation: A cost-benefit analysis of the overall programme was conducted. Calculations showed that the health benefits well outweighed programme costs.</p>

Hancock 2001

Methods	<p>Country: Australia</p> <p>Objective: to decrease community adult smoking rates in rural towns in Australia.</p> <p>Study Sites: 10 pairs of rural towns in New South Wales.</p> <p>Programme name: Cancer Action in Rural Towns (CART) project.</p> <p>Design: Randomized design with 10 pairs of rural towns, matched on demographic, geographic and infrastructure variables, randomly assigned to intervention or comparison groups</p> <p>Analysis: Cohort analyses, logistic regression, communities used as the unit of analysis. Sample size estimates for beta=0.10, or 90% power to detect a reduction in smoking from 25% to 20%.</p>
Participants	<p>Population of study towns ranged from 5,000 - 15,000</p> <p>Age: 18-70 yrs</p> <p>Sex: female and male</p>

Hancock 2001 (Continued)

Interventions	<p>Theoretical basis: community action.</p> <p>Components: The intervention used community organization, community committees, and community members with responsibility for the activities of each of 6 access points: schools, workplaces, retailers, community organizations, healthcare providers and media. Standard strategy packages and resource packages were used to assist with programme implementation, and modified through community feedback during the interventions. Non-smoking policies were encouraged in sporting organizations, workplaces, clubs and community organizations, and quit kits, posters, and brochures were distributed in workplaces. Newsprint was used extensively to cover intervention activities, and public events were also used. Quit smoking classes were held in 1 town.</p> <p>Year started: 1992</p> <p>Duration: 5 yrs.</p> <p>Maintenance: No direct evidence was found. However, most towns indicated that they were ready to move on from the project by the agreed programme end.</p>
Outcomes	<p>Questionnaire: administered by telephone interview.</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1992, immediately preceding the intervention</p> <p>Outcome: 1997, 5 yrs after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	<p>Economic evaluation: A comprehensive economic appraisal using 3 methods (cost-effectiveness analysis, the travel-cost method, and a contingent valuation technique) was included in the overall evaluation design. However, outcomes for these 3 approaches were not found.</p>

Heinemann 1986

Methods	<p>Country: Democratic Republic of Germany</p> <p>Objective: To reduce cardiovascular risk factors, namely smoking, high cholesterol, high blood pressure and sedentary lifestyle.</p> <p>Study Sites: Schleiz and Doppoldiswade</p> <p>Programme name: The Schleiz Project</p> <p>Design: Quasi-experimental, with Schleiz chosen as the intervention district and Doppoldiswade as the comparison district.</p> <p>Analysis: Cohort analyses, individual as the unit of analysis. Sample size estimates made.</p>
Participants	<p>Population of study sites: Schleiz - 33,000, Doppoldiswade - 46,000</p> <p>Age: adults, age range not specified</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: none specified</p> <p>Components: improvement of the comprehensive healthcare system and optimization of use of existing resources. The programme involved health professionals, teachers, local businesses, local government, schools and sports groups, and also public lectures, and health education materials. Community leaders were expected to model healthy lifestyles, and health personnel could not smoke at work. For people at high risk for heart disease, there were individual consultations, and health education materials were distributed directly to them.</p> <p>Year started: 1976</p> <p>Duration: 5 yrs</p> <p>Sustainability: No direct evidence was found. However, the programme was extended to other areas in the region</p>

Heinemann 1986 (Continued)

	and the launch of a number of national activities including CANON were attributed to the project.
Outcomes	Questionnaire: in-person interview Biochemical measure of smoking: none Baseline: 1976, immediately preceding the intervention Outcome: 1981, 5 yrs after the intervention began. Further follow up: None reported.
Notes	Economic evaluation: A cost-effectiveness analysis of the overall programme was conducted. Results were 'favourable', but no further information was provided.

Hoffmeister 1996

Methods	Country: Federal Republic of Germany (FRG). Objective: To reduce the four cardiovascular risk factors, hypertension, hypercholesterolaemia, smoking, and obesity through primary prevention. Study Sites: Berlin, Bremen, Stuttgart, Karlsruhe, Bruchsal and Mosbach, and the rural district of Traunstein. Programme name: The German Cardiovascular Prevention Project. Design: Quasi-experimental, with 6 communities in former West Germany, the city districts in Berlin, Bremen, Stuttgart, the city of Karlsruhe, two small neighbouring communities, Bruchsal and Mosbach, and the rural district of Traunstein, assigned to receive the intervention, while comparison was made with randomly selected samples drawn from the rest of West Germany. Analysis: Cross-sectional analyses, linear regression and logistic regression, individual as the unit of analysis. Power estimates (beta) not found.
Participants	Population of study sites: Berlin-Spandau - 208,600, Bremen North and West - 190,100, Stuttgart West and Vaihingen - 338,900, Karlsruhe with Bruchsal and Mosbach - 348,200, and the county of Traunstein/Bavaria - 142,600; Federal Republic of Germany - 61,175,000. Age: 25-69 yrs Sex: female and male
Interventions	Theoretical basis: social cognitive theory and diffusion of innovation theory. Components: The intervention included community organization, local planning groups and task forces, volunteers, health professionals (physicians, medical assistants, pharmacists), teachers, worksites, businesses, restaurants, schools, community agencies, public health services, screening, public events, mass media (newsprint, radio and television), posters, booklets, a self-help brochure and smoking cessation groups. Year started: 1984 Duration: 7 yrs
Outcomes	Questionnaire: in-person interview Biochemical measure of smoking: none Baseline: May 1984 - March 1986, preceding the intervention Outcome: February 1988 - April 1989 and April 1991 - April 1992, 3.5 and 7 yrs after the intervention began. Further follow up: not reported.
Notes	Health attitudes were included in a 91 item questionnaire, and were assessed at baseline and after 3.5 yrs. No results for these assessments were found, and health attitudes were not mentioned in the 7-yr results.

Jenkins 1997

Methods	<p>Country: USA</p> <p>Objective: To change the smoking behaviour of Vietnamese-American men.</p> <p>Study Sites: San Francisco and Alameda counties, California, and Houston, Texas.</p> <p>Programme name: Smoking Cessation among Vietnamese-American Men - II.</p> <p>Design: Quasi-experimental, with San Francisco and Alameda counties chosen as the intervention area and Houston, Texas as the comparison area.</p> <p>Analysis: Cross-sectional analyses, chi squared, logistic regression, individual as the unit of analysis.</p>
Participants	<p>Population of study sites: Not specified</p> <p>Age: 18+</p> <p>Sex: male</p> <p>Ethnicity: Vietnamese</p>
Interventions	<p>Theoretical basis: none mentioned.</p> <p>Components: The media-led intervention included articles published in Vietnamese-language newspapers, a Vietnamese-language videotape broadcast on Vietnamese-language television, and Vietnamese-language health education materials, including a calendar, bumper stickers, lapel buttons, posters, brochures and a quit kit. An anti-tobacco counteradvertising campaign was conducted through billboards, newspaper advertisements and paid television advertisements. Anti-tobacco activities were also organized for students attending Vietnamese 'Saturday' schools. Presentations were made at community events and a continuing medical education course on smoking cessation counselling methods was held for Vietnamese physicians. The intervention was preceded by an uncontrolled pilot anti-tobacco media campaign, which lasted 15 months.</p> <p>Year started: 1990</p> <p>Duration: 2 yrs</p>
Outcomes	<p>Questionnaire: administered by telephone.</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1990, immediately preceding the intervention</p> <p>Outcome: 1992, 2 yrs after the intervention began.</p> <p>Further follow up: none found.</p>
Notes	<p>Motivation to quit, confidence in quitting (self-efficacy in Project I), ever tried to quit and number of quit attempts were assessed at baseline and post-intervention.</p>

Lando 1995

Methods	<p>Country: USA</p> <p>Objective: To reduce cardiovascular mortality and morbidity through a comprehensive community intervention to reduce smoking, high cholesterol, high blood pressure and sedentary lifestyles.</p> <p>Study Sites: Mankato, Winona, Morehead, Sioux Falls, Bloomington and Roseville, in Minnesota.</p> <p>Programme name: The Minnesota Heart Health Program</p> <p>Design: Quasi-experimental, with paired cities, Mankato and Winona, Fargo-Morehead and Sioux Falls, and Bloomington and Roseville; the first city of each pair received the educational interventions while the other city was the comparison community</p> <p>Analysis: Cohort and cross-sectional analyses, stratified ANCOVA, Cox proportional hazards analysis. The unit of analysis was city-year means.</p> <p>For the independent samples, beta=0.15, or 85% power to detect a 4.7 % point difference in quit rates; for the cohort samples, there was 85% power to detect a 7.5 % point difference.</p>
Participants	<p>Population of study sites: Mankato 37,812, Winona 25,075; Fargo-Morehead 111,579, Sioux Falls 81,343; Bloomington 81,831, Roseville 74,731.</p> <p>Age: 25-74 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: Predominantly white</p>
Interventions	<p>Theoretical basis: social cognitive theory, diffusion of innovation theory, communication theory, and community participation.</p> <p>Components: community organization, community advisory boards, and citizen task forces supported by Heart Health Program staff; mass media use involved newspapers, radio and television, posters, brochures, videotapes and slide shows; education for health professionals, including physicians, dentists, dieticians, pharmacists and health educators; and staff training in work sites and churches in health promotion programs; risk factor screening, Quit and Win contests, community and worksite smoking cessation classes, telephone support, self-help materials, home correspondence programmes, and community-wide efforts to effect smoking policy changes in the workplace. A smoking prevention curriculum was also introduced in the schools.</p> <p>Year started: 1980</p> <p>Duration: 4 yrs preintervention observation and 6 yrs intervention, for a total of 10 yrs.</p> <p>Maintenance: The establishment and maintenance of programme activities in the community on a permanent basis was a specified programme goal. In 1989, when external grant-based funding was withdrawn, 70% of all intervention programmes were continued by local sponsors. 3 yrs after the withdrawal of funds this figure had decreased to approximately 60%. Thus a substantial proportion of programmes survived in the communities for several years following the withdrawal of external grants.</p>
Outcomes	<p>Questionnaire: in-person interview at home followed by visit to survey center for risk factor measurement.</p> <p>Biochemical measure of smoking: serum thiocyanate.</p> <p>Baseline: 1980-1983, preceding the intervention</p> <p>Outcome: for cross-sectional surveys - 1984, 1986, 1988, 1989, at 1,3, 5 and 6 yrs after the intervention began; for cohort study - 1985, 1987, 1990, at 2, 4, and 7 yrs after the intervention began.</p> <p>Further follow up: not reported</p>
Notes	<p>Data were collected on health attitudes and beliefs at baseline, but no outcome results for these were found.</p>

Lupton 2002

Methods	<p>Country: Norway</p> <p>Objective: To prevent CVD by reducing cardiovascular risk factors, and accidents at work and improving working conditions among the workers in the fishing industry.</p> <p>Programme name: Finnmark Intervention Study in North Cape</p> <p>Design: Quasi-experimental, with the coastal community of North Cape receiving the intervention, and 3 other coastal communities, Loppa, Gamvik and Masoy, acting as comparison communities.</p> <p>Analysis: Cohort analysis, individual as the unit of analysis. Statistical analyses used chi squared, analysis of variance and Mantel-Haenzel tests. Sample size set by the main Finnmark study. With a power 0.8 and a significance level of 0.05, the sample size could detect a difference in smoking prevalence of 10 % points.</p>
Participants	<p>Population of North Cape, 4,000, and of Loppa, Gamvik and Masoy, 5,000 combined.</p> <p>Age: All persons aged 40-62 yrs, and 15% random sample of 29-39 yr-olds.</p> <p>Sex: female and male</p> <p>Ethnicity: Caucasian and Sami.</p>
Interventions	<p>Theoretical basis: none stated.</p> <p>Components: The intervention aimed to reduce work-related accidents and sick leave, and smoking, cholesterol, and blood pressure, and increase physical activity. Further aims included reducing coffee and alcohol consumption, and myocardial infarction risk score.</p> <p>The health education and policy intervention was designed to change the working environment to influence health directly and health behaviour indirectly, and targeted the fishing industry. The intervention was implemented through risk factor screening, health professionals, general practitioners, nurses and occupational health nurses, educators, schools, work sites and newspaper articles. Health professionals provided individual counseling.</p> <p>Year started: 1988</p> <p>Duration: Planned for 10 yrs.</p> <p>Maintenance: As planned, the project had 4 more yrs to run at the time of 2nd follow up.</p>
Outcomes	<p>Questionnaire: in-person interview</p> <p>Biochemical measure of smoking: not reported</p> <p>Baseline: Smoking prevalence among women and men</p> <p>Outcome: Change in smoking prevalence among women and men after 5 yrs.</p>
Notes	<p>Implementing the intervention, visiting target groups at work sites, was described as mixed top-down bottom-up</p>

Lupton 2003

Methods	<p>Country: Norway</p> <p>Objective: To prevent CVD by reducing cardiovascular risk factors.</p> <p>Programme name: Finnmark Intervention Study in Batsfjord</p> <p>Design: Quasi-experimental, with the coastal community of Batsfjord receiving the intervention, and 3 other coastal communities, Loppa, Gamvik and Masoy, acting as comparison communities.</p> <p>Analysis: Cohort analysis, individual as the unit of analysis. Statistical analyses used chi squared, analysis of variance and Mantel-Haenzel tests. Sample size set by the main Finnmark study. With a power 0.8 and a significance level of 0.05, the sample size could detect a difference in smoking prevalence of 9.5 % points.</p>
Participants	<p>Population of Batsfjord, 2,500, and of Loppa, Gamvik and Masoy, 5,000 combined.</p> <p>Age: All persons aged 40-62 yrs, and 15% random sample of 29-39 yr-olds.</p> <p>Sex: female and male</p>

Lupton 2003 (Continued)

	Ethnicity: Caucasian and Sami.
Interventions	<p>Theoretical basis: Community empowerment.</p> <p>Components: The intervention aimed to reduce smoking, cholesterol, blood pressure, and weight, and to increase physical activity. Further aims included reducing coffee and alcohol consumption.</p> <p>The intervention was aimed at influencing the whole population to be more health conscious. Community empowerment was an important element of the intervention. This involved community organization, planning and working groups, with participation of local municipality administration, and voluntary organizations, so that members of the population set priorities, developed project manuals, made decisions, planned strategies and implemented them. The intervention was largely health educational, but with a policy component; smoke-free public buildings, worksites and schools. Implementation was through volunteers, health professionals, teachers, worksites, schools, community agencies and businesses, local government, the local medical officer, public events and the media, which included newspaper articles, and radio and television news features. General practitioners provided individual counseling. Individuals at high risk for cardiovascular disease were targeted.</p> <p>Year started: 1987</p> <p>Duration: 3 yrs.</p>
Outcomes	<p>Questionnaire: in-person interview</p> <p>Biochemical measure of smoking: not reported</p> <p>Baseline: Smoking prevalence among women and men</p> <p>Outcome: Change in smoking prevalence among women and men between 1987 and 1993.</p>
Notes	Implementing the intervention was described as bottom-up: project manual strategy to rank problems/activities.

Maccoby 1977

Methods	<p>Country: USA</p> <p>Objective: To decrease the risk of CVD through community health education. Smoking, diet, blood pressure and weight were targeted.</p> <p>Study Sites: Watsonville, Gilroy and Tracy, California</p> <p>Programme name: Stanford 3-City Project</p> <p>Design: Quasi-experimental, with Watsonville and Gilroy as intervention cities and Tracy the comparison city. Subjects at high risk for cardiovascular disease were identified in each city, and in Watsonville a randomly selected subset were provided with face-to-face counseling.</p> <p>Analysis: Cohort analyses, t-tests, and multiple logistic function of risk for 12-yr event probability, 1-sided P-values, individual as the unit of analysis. Power estimates not found.</p>
Participants	<p>Population of study sites: Watsonville - 14,569, Gilroy - 12,665, Tracy - 14,724</p> <p>Age: 35-59 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: social cognitive theory and communication theory.</p> <p>Components: mass media, including television and radio spots modelling behaviour change skills, television and radio programming, newspaper advertisements and stories, billboards, posters, and printed materials mailed to participants. Individual risk reduction counseling for high risk subjects in Watsonville constituted the community component of this intervention. There was no attempt at community organization.</p> <p>Year started: 1972</p>

Maccoby 1977 (Continued)

	<p>Duration: 2 yrs Maintenance: The 2-yr programme was followed by a 3rd 'maintenance year' of reduced effort. No further details found.</p>
Outcomes	<p>Questionnaire: in-person interview at survey centres in each community. Biochemical measure of smoking: plasma thiocyanate. Baseline: 1972, immediately preceding the intervention Outcome: 1973 and 1974, 1 and 2 yrs after the intervention began. Further follow up: none.</p>
Notes	

McAlister 1992

Methods	<p>Country: USA and Mexico Objective: To promote good health by reducing smoking, alcohol use, and weight, and increasing seat belt use and participation in annual check ups. Study Sites: Eagle Pass and Del Rio in Texas, and Piedras Negras in Mexico. Programme name: A Su Salud Design: Quasi-experimental, with Eagle Pass and Piedras Negras assigned to receive the intervention, and Del Rio to act as the comparison community. Analysis: Cohort (panel) analyses, chi-square, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Eagle Pass - 25,000, Piedras Negras - 200,000, Del Rio - 30,000. Age: 16-60 yrs Sex: female and male Ethnicity: Mexican Americans</p>
Interventions	<p>Theoretical basis: social cognitive theory, stages of change. Components: The health education intervention made use of volunteers and teachers and included churches, businesses, schools and local government, and was conducted in English and Spanish. Extensive use was made of mass media, including local newspapers, radio and television, local citizens modeling behaviour change, testimonials and public service announcements. The intervention also included newsletters, brochures, self-help materials, and an intensive program of individual face-to-face and telephone counseling offered to half the subjects in Eagle Pass. Year started: 1985 Duration: 4.3 yrs Maintenance: No evidence relating to sustainability was found.</p>
Outcomes	<p>Questionnaire: in-person interview at home and telephone interview Biochemical measure of smoking: exhaled CO Baseline: 1985/1986, preceding the intervention Outcome: 1987/1988 and 1989, 2 and 4.3 yrs after the intervention began. Further follow up: none reported.</p>
Notes	

McPhee 1995

Methods	Country: USA Objective: To change the smoking behaviour of Vietnamese-American men. Study Sites: Santa Clara County, California, and Houston, Texas. Programme name: Smoking Cessation among Vietnamese-American Men - I. Design: Quasi-experimental, with Santa Clara County chosen as the intervention area and Houston, Texas as the comparison area. Analysis: Cross-sectional analyses, chi squared, logistic regression, individual as the unit of analysis.
Participants	Population of study sites: Santa Clara County - 54,212 Vietnamese; Houston - 33,035 Vietnamese. Age: 18+ Sex: male Ethnicity: Vietnamese
Interventions	Theoretical basis: none specified. Components: The media-led intervention included articles published in Vietnamese-language newspapers, a Vietnamese-language videotape broadcast on Vietnamese-language television, and Vietnamese-language health education materials, including a calendar, bumper stickers, lapel buttons, posters, brochures and a quit kit. An anti-tobacco counteradvertising campaign was conducted through billboards, newspaper advertisements and paid television advertisements. Anti-tobacco activities were also organized for students attending Vietnamese "Saturday" schools. Presentations were made at community events and a continuing medical education course on smoking cessation counseling methods was held for Vietnamese physicians. Year started: 1990 Duration: 2 yrs
Outcomes	Questionnaire: administered by telephone. Biochemical measure of smoking: none Baseline: 1990, immediately preceding the intervention Outcome: 1992, 2 yrs after the intervention began. Further follow up: none found.
Notes	

Mudde 1995

Methods	Country: The Netherlands Objective: To reduce the prevalence of smoking. Study Sites: Den Bosch and Apeldorn Programme name: Dutch Community-based Smoking Cessation Intervention Design: The intervention community, Den Bosch, was randomly selected from a demographically matched pair of cities; the other city, Apeldorn, became the comparison community. Analysis: Cohort analysis, logistic regression, individual as the unit of analysis. Power estimates (beta) not found.
Participants	Population of study sites: Not stated, but Den Bosch and Apeldorn were selected from among 23 Dutch cities with populations of between 80,000 and 160,000. Age: 25-65 yrs Sex: female and male

Mudde 1995 (Continued)

Interventions	<p>Theoretical basis: theory of learned behaviour.</p> <p>Components: The intervention involved local mass media (newspaper, radio and television), posters and leaflets, health professionals, a local quitline, and self-help materials, smoking cessation groups, and individual telephone counseling.</p> <p>Year started: 1989</p> <p>Duration: 14m</p> <p>Maintenance: No evidence was found.</p>
Outcomes	<p>Questionnaire: Telephone interview.</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: October, 1989, 5m before the intervention started</p> <p>Outcome: June, 1990 and December, 1990, 3m and 9m after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	<p>Assessment of beliefs concerning the pros and cons of smoking, social support for not smoking, and self-efficacy to refrain from smoking in several situations were obtained at baseline, but no post-intervention results were found. Proportion of smokers attempting to quit assessed.</p>

Nafziger 2001

Methods	<p>Country: USA</p> <p>Objective: Cardiovascular risk factor reduction</p> <p>Programme name: Otsego-Schoharie Healthy Heart Program</p> <p>Design: Quasi-experimental, with 2 counties assigned to receive the intervention, and 1 county assigned to the comparison condition.</p> <p>Analysis: Analysis of variance and McNemar's test. No sample size estimates were found.</p>
Participants	<p>Population. The population of the 3 rural counties in upper New York State was 158,000.</p> <p>Sex: female and male, aged 20-69</p> <p>Ethnicity: Caucasian</p>
Interventions	<p>Theoretical basis: None stated.</p> <p>Components: The health education intervention aimed to reduce smoking, cholesterol, blood pressure and weight, and to increase physical activity. A school-based cardiovascular risk reduction curriculum was also developed and implemented. In-depth community organization led to the formation of 2 countywide Advisory Councils, risk factor specific task forces and programmes for nutrition, physical activity and tobacco awareness. Outreach activities were directed sequentially at every town and village, where 24 health committees were established to plan activities, such as risk factor screening, exercise events, school programmes, slide presentations, and restaurant/grocery store programmes. Implemented through volunteers, medical and dental health professionals, teachers, and community leaders, including representatives of county health departments, local hospitals, the extension service and other voluntary organizations. Channels: cardiovascular risk factor screening, worksites, churches, businesses, grocery stores, restaurants, schools, local health fairs and village festivals. Newspaper and radio were used, including articles, news items and paid advertisements, but television was not. In addition, brochures, posters, healthy heart tips, and low-literacy fact sheets were widely distributed. Components especially for smoking were smoking cessation education, referral to smoking cessation groups, the school-based smoking prevention programs, and home poster contests.</p> <p>Duration: 5 yrs.</p> <p>Maintenance: Many parts of the intervention were continued in the community: healthy recipe contests, senior exercise programmes, nutrition councils and others. There has been a demand for heart healthy information, the</p>

Nafziger 2001 (Continued)

	Tips have continued under another programme, and physicians note more people asking for information about their serum lipids. A local programme turned the workplace screening programme into a larger safety and health programme.
Outcomes	<p>Evaluation at baseline was through a cross-sectional survey of adults, aged 20-69 yrs, selected through random digit telephone dialling. The telephone interviews were followed by a clinical evaluation of cardiovascular risk factors. A 2nd cross-sectional survey, using the same methodology was undertaken 5 yrs later. In addition, a panel of baseline respondents was followed up at this time.</p> <p>Baseline: Smoking prevalence was assessed by questionnaire and also by exhaled CO.</p> <p>Outcome: Changes in smoking prevalence, by self-report and exhaled CO levels <8ppm, and by exhaled CO levels, between baseline and follow up in the cross-sectional surveys and also in the panel follow up.</p>
Notes	Very few community studies have used a biochemical measure of smoking to assess changes in smoking behaviour.

Nussel 1985

Methods	<p>Country: Federal Republic of Germany</p> <p>Objective: To reduce cardiovascular morbidity and mortality through reductions in smoking, serum cholesterol, and high blood pressure.</p> <p>Study Sites: Eberbach, Wiesloch and Neckargemund</p> <p>Programme name: Eberbach-Weisloch Study</p> <p>Design: Quasi-experimental, with Eberbach chosen as the intervention town and Weisloch as comparison town. After 5 yrs, the intervention programme was introduced in Weisloch and Neckargemund became the comparison town.</p> <p>Analysis: Cohort analyses, individual as the unit of analysis. Power estimates (beta) not found.</p>
Participants	<p>Population of study sites: Eberbach - 16,000, Weisloch - 21,000, Neckargemund - 15,000</p> <p>Age: 30-60 yrs</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: community participation for health promotion.</p> <p>Components: piloted over 3 yrs in Weisloch and begun in earnest in 1980, included population screening (98%) , community organization, a local planning group, task forces, health professionals (physicians, nurses, laboratory technicians), worksites, businesses, schools, and public events, individual and group counseling (mainly concentrated on eating habits).</p> <p>Year started: 1976</p> <p>Duration: 5 yrs</p> <p>Maintenance: The 'self-sustainment' of the programme was reported to be highly convincing. Withdrawal of advisory activities and direct assistance by the research institute did not notably affect activities. Projects with the same objectives derived from the study have been initiated in more than 20 communities nationally, and the communities involved joined the WHO's CINDI programme in 1986</p>
Outcomes	<p>Questionnaire: in-person interview at their physician's office</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1976-1977,</p> <p>Outcome: 1984 and 1988, 4 and 8 yrs after the intervention began.</p> <p>Further follow up: none found.</p>

Nussel 1985 (Continued)

Notes	No reports concerning mediating variables were found.
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O'Loughlin 1999

Methods	<p>Country: Canada</p> <p>Objective: to reduce cardiovascular risk factors, smoking, high-fat diet, high blood pressure, lack of physical activity, and weight.</p> <p>Study Sites: 2 disadvantaged urban neighborhoods, St- Henri and Centre-Sud, in Montreal,</p> <p>Programme name: Coeur en sante St-Henri.</p> <p>Design: Quasi-experimental, with the neighborhood of St-Henri being designated the intervention community, and Centre-Sud the comparison community.</p> <p>Analysis: Cross-sectional and cohort analyses, t-tests, chi squared, ANOVA, logistic regression, individual as the unit of analysis.</p>
Participants	<p>Population of study sites: St-Henri - 25,000, Centre-Sud, similar in size.</p> <p>Age: 18-65 yrs</p> <p>Sex: female and male; females targeted</p>
Interventions	<p>Theoretical basis: social cognitive theory, theory of reasoned action, community participation.</p> <p>Components: The intervention, which was especially targeted towards women, was developed with considerable input from community members, and involved volunteers, health professionals, the local health department, community agencies, health fairs, screening, quit contests, mass media (newsprint and cable television), self-help kits, a smoking cessation videotape, smoking cessation groups, and support groups for those who had quit.</p> <p>Year started: 1992</p> <p>Duration: 3 yrs (intervention implementation was precede by feasibility testing of components of the intervention during the previous 5 yrs, since 1987).</p> <p>The need to maximize potential for eventual institutionalization was considered at the outset of the project. Some activities including activities directed at smoking cessation were integrated into the ongoing programmes of existing organizations and therefore outlived the formal end of the study. However, no further details were found.</p>
Outcomes	<p>Questionnaire: administered by telephone interview.</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1992, immediately preceding the intervention</p> <p>Outcome: 1995 and 1997, 3 and 5 yrs after the intervention began.</p> <p>Further follow up: none reported.</p>
Notes	

Osler 1993

Methods	Country: Denmark Objective: To improve several behaviours related to increased risk of cardiovascular disease, such as smoking, little or no exercise, and high fat consumption. Study Sites: The municipalities of Slangerup and Helsingør Programme name: The Danish Municipality Study Design: Quasi-experimental, with the municipality of Slangerup assigned to receive the intervention and the municipality of Helsingør to serve as the comparison community. Analysis: Cross-sectional analyses, logistic regression, 2-sided P-values, individual as the unit of analysis. Power estimates (beta) not found.
Participants	Population of study sites: Slangerup - 8,000, Helsingør, not reported. Age: 20-64 yrs Sex: female and male Ethnicity: White
Interventions	Theoretical basis: communication theory. Components: The intervention was disseminated in Slangerup by 6 teams of volunteers, and included lectures on heart health, smoking cessation programmes, a Heart Day, health spots during commercials in the local cinema, and reports about the campaign in the local newspaper and on local radio. Year started: 1989 Duration: 1 yr Maintenance: The programme did not succeed in integrating activities into community social organizations and primary care services and was therefore not sustainable. This may have been partly due to a lack of funds available for involving local healthcare services.
Outcomes	Questionnaire: mail survey Biochemical measure of smoking: none Baseline: 1989, immediately preceding the intervention Outcome: 1990, 1 yr after the intervention began. Further follow up: not reported.
Notes	Economic evaluation: No evidence was found although costs were 'minimal'.

Puska 1985

Methods	Country: Finland Objective: To decrease cardiovascular mortality and morbidity by reducing major risk factors for CVD, smoking, high cholesterol and high blood pressure. Study Sites: North Karelia and Kuopio Programme name: North Karelia Project Design: Quasi-experimental, with North Karelia chosen as the intervention county and Kuopio as the comparison county. Analysis: Cross-sectional analyses, t-tests, ANOVA, 1-sided P-values, individual as the unit of analysis. Power estimates (beta) not found
Participants	Population of study sites: North Karelia - 180,000, Kuopio - 250,000 Age: 25-64 yrs Sex: female and male Ethnicity: White

Puska 1985 (Continued)

Interventions	<p>Theoretical basis: social cognitive theory, diffusion of innovation theory, communication theory, and community organization linked in a unified model.</p> <p>Components: community organization, involvement of many sectors of the community, mass media, screening, practical skills training, social support for behaviour change and environmental modification. For smoking: special training of public health nurses to provide smoking cessation advice and counseling.</p> <p>Year started: 1972</p> <p>Duration: 10 yrs</p> <p>Maintenance: Integration into the community was very successful. In 1983, over 10 yrs after onset half of those trained as lay workers were found still to be active. The programme, in an evolved and expanded form, has been continued to the present, mostly by the community itself. The innovative approach, activities and methods originating in North Karelia have been adopted by the rest of Finland as well as internationally.</p>
Outcomes	<p>Questionnaire: in-person interview at home</p> <p>Biochemical measure of smoking: serum thiocyanate in 1982</p> <p>Baseline: 1972, immediately preceding the intervention</p> <p>Outcome: 1977 and 1982, 5 and 10 yrs after the intervention began.</p> <p>Further follow up: 25 yrs.</p>
Notes	<p>Economic evaluation: Not conducted although the estimated costs of CVD in the target population was compared with total project costs.</p>

Ronda 2004

Methods	<p>Country: The Netherlands</p> <p>Objective: To prevent CVD by reducing cardiovascular risk factors.</p> <p>Programme name: The Dutch Heart Healthy Community Intervention 'Hartslag Limburg'</p> <p>Design: Quasi-experimental, with the Maastricht region of the province of Limburg as the intervention community, and an unnamed comparable region as the comparison community.</p> <p>Analysis: Cohort study, using multiple level regression analyses and logistic regression analyses. Although the individual was the unit of analysis, the multiple level regression analysis was able to take into account possible dependencies among individuals within the same municipality. No sample size estimates were found.</p>
Participants	<p>Population of the Maastricht region, 180,000.</p> <p>A cohort of 1200 smokers, aged 18+, was recruited from a stratified random sample of 6500 adults in each region.</p> <p>Sex: female and male</p> <p>Ethnicity: Caucasian</p>
Interventions	<p>Theoretical basis: The PRECEDE/PROCEED model was used to plan and evaluate the intervention, which used the theories of self efficacy, planned behaviour change, and transtheoretical stages of change as guiding principles.</p> <p>Components: The intervention aimed to reduce smoking and cholesterol and increase physical activity. Community organization, community staff members and planning groups, and the Regional Public Health Institute, were used to develop the health education intervention. Implementation was through local health committees, volunteers, health professionals, retailers, community agencies, local government, public events, and mass media. The latter included paid advertisements in newspapers, and on radio and television, and also billboards. A regional smoking cessation campaign and a non-smoking campaign for parents of children in playgroups were also implemented.</p> <p>Year started: 1998</p> <p>Duration: 3 yrs.</p> <p>Maintenance: No evidence was found concerning maintenance of the intervention.</p>

Ronda 2004 (Continued)

Outcomes	Questionnaire: Administered by telephone interview Biochemical measure of smoking: not reported Baseline: All subjects were smokers at baseline. Outcome: Change in smoking behaviour among the cohort of smokers between 1998 and 2001.
Notes	

Roussow 1993

Methods	Country: South Africa Objective: To reduce cardiovascular risk factors, high blood pressure, high blood cholesterol, stress, sedentary life style and smoking. Study Sites: Robertson, Swellenden and Riversdale in the South-Western Cape Province. Programme name: The Coronary Risk Factor Study (CORIS) Design: Quasi-experimental, with 2 intervention towns, Robertson receiving a mass media intervention and a community-based intervention, Swellenden receiving a similar mass media intervention alone, and Riversdale acting as the comparison town. Analysis: Cohort and non-cohort analyses, t-tests, 2-sided P-values, individual as the unit of analysis. Power estimates (beta) not found.
Participants	Population of study sites: Robertson 5526, Swellenden 6176, Riversdale 6049. Age: 15-64 yrs Sex: female and male Ethnicity: White - Afrikaners
Interventions	Theoretical basis: none specified. Components: The mass media health education intervention consisted of programmes addressing each of the risk factors on a regular basis through posters, billboards, mailings, items in the local newspapers and an annual special supplement. Blood pressure screening stations with educational materials were also set up. The community intervention consisted of public lectures, liaison with community organizations, community committees to coordinate and encourage health activities, development and testing of educational materials, and interpersonal small group intervention with high risk individuals, and smoking cessation seminars. Year started: 1979 Duration: 4 yrs Maintenance: Responsibility for the programme was progressively transferred to the communities. After the initial 4-yr intervention period, a maintenance programme run mainly by the community was established. (The researchers acted as consultants).
Outcomes	Questionnaire: in-person interview. Biochemical measure of smoking: none Baseline: 1979, immediately preceding the intervention Outcome: 1983, 4 yrs after the intervention began. Further follow up: 1991, 12 yrs after the intervention began.
Notes	Economic evaluation: Estimated per capita costs are presented, but not a cost-effectiveness analysis.

Schorling 1997

Methods	<p>Country: USA</p> <p>Objective: To increase the smoking cessation rate among rural African Americans.</p> <p>Study Sites: Buckingham County and Louisa County, Virginia.</p> <p>Programme name: The Alliance of Black Churches Health Project.</p> <p>Design: Quasi-experimental, with Buckingham County assigned to receive the intervention, and Louisa County to act as the reference or comparison county.</p> <p>Analysis: Cohort analyses, t-tests and chi squared, repeated-measures ANOVA, logistic regression, 2-sided P-values, individual as the unit of analysis.</p>
Participants	<p>Population of study sites: Buckingham County - 11,496, Louisa County - 20,325.</p> <p>Age: 18+</p> <p>Sex: female and male</p> <p>Ethnicity: African American, 26-39%.</p>
Interventions	<p>Theoretical basis: transtheoretical model of stages of change, community participation.</p> <p>Components: community organization, formation of coalitions among the black churches, training volunteers as smoking cessation counselors from each church to provide individual advice and support, a self-help manual, smoking cessation devotional booklets, county-wide Gospel Quit Nights, annual smoking cessation contests, and poster and essay contests in the schools. In Louisa County, a similar approach was taken, but the main health issue addressed was hypertension, with training of volunteers in dietary and exercise counseling. By design, smoking was not addressed in this county.</p> <p>Year started: 1991</p> <p>Duration: 1.5 yrs</p> <p>Maintenance: Coalitions were still active 12m after the formal completion of the project.</p>
Outcomes	<p>Questionnaire: in-person interview at home</p> <p>Biochemical measure of smoking: none taken, but permission to check on smoking status using a biochemical test was obtained.</p> <p>Baseline: 1990, immediately preceding the intervention</p> <p>Outcome: 1991, 18m after the intervention began.</p> <p>Further follow up: none found.</p>
Notes	<p>Baseline data on mediating variables included beliefs (smoking has affected health, quitting will improve health, pros and cons of smoking), confidence would be a non-smoker in 1 yr, previous quit attempts, smoking environment (spouse or partner smokes, friends smoke), family would help to quit, friends would help to quit, and majority of people think respondent should quit. Smokers were classified into their stage of change, pre-contemplation, contemplation, and preparation, and at the follow up, action and maintenance.</p>

Secker-Walker 2000

Methods	<p>Country: USA</p> <p>Objective: To reduce the prevalence of smoking among women.</p> <p>Study Sites: Rutland and Windham counties in Vermont, and Belknap and Cheshire counties in New Hampshire.</p> <p>Programme name: Breathe Easy</p> <p>Design: Quasi-experimental, with 2 adjacent counties, Windham County, Vermont, and Cheshire County, New Hampshire designated the intervention counties, and Rutland County, Vermont, and Belknap County, New Hampshire, the comparison counties.</p> <p>Analysis: Cross-sectional analyses, t-tests, chi squared, SUDAAN, logistic regression, 1-sided P-values, county as the unit of analysis. 75% power for a 3.5 % point difference in smoking prevalence.</p>
Participants	<p>Population of study sites: Windham County - 41,588, Cheshire County - 70,121, Rutland County - 62,141, Belknap County - 49,216.</p> <p>Age: 18-64 yrs</p> <p>Sex: female</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: social cognitive theory, diffusion of innovation theory, communication theory, stages of change theory, and community participation.</p> <p>Components: community organization, coalition formation, task forces and community staff in each intervention county. Intervention channels included volunteers, health professionals, teachers, worksites, businesses, schools, public events, mass media (news, stories and paid advertisements in newspapers, on radio and television), newsletters, brochures, quit kits, a smoking cessation videotape, smoking cessation and support groups and individual face-to-face and telephone peer-support for quitting. Smoke-free policies were also advocated.</p> <p>Year started: 1989</p> <p>Duration: 5 yrs</p> <p>Maintenance: Coalitions formed non-profit organizations to continue intervention activities after the formal end of the research programme. Although certain components were sustained, one-to-one support could not be maintained and smoking cessation classes and support groups were held less regularly. Within 6 and 9m the not-for-profit organizations were disbanded, as they were unable to raise monies locally. 2 yrs after external funding was withdrawn, provision of specific smoking cessation activities reverted to pre-intervention levels. Significant differences reported by health professionals in relation to the level of activity in experimental and control areas during the main study period were no longer observable.</p>
Outcomes	<p>Questionnaire: administered by telephone</p> <p>Biochemical measure of smoking: urinary cotinine 'bogus pipeline' in 1989</p> <p>Baseline: 1989/90, immediately preceding the intervention</p> <p>Outcome: 1993/94 and 1995/96, 4 and 6 yrs after the intervention began.</p> <p>Further follow up: results of the 1995/96 survey not reported. yet.</p>
Notes	<p>Economic evaluation: A cost-effectiveness analysis of the overall programme was conducted. Costs per life yr gained using either intervention costs alone or intervention and research costs were both economically attractive.</p>

Shelley 1995

Methods	<p>Country: Ireland</p> <p>Objective: To reduce risk factors for CVD, namely smoking, high blood pressure, high cholesterol, obesity and sedentary lifestyle.</p> <p>Study Sites: County Kilkenny and County Offaly</p> <p>Programme name: Kilkenny Health Project</p> <p>Design: Quasi-experimental, with County Kilkenny selected as the site for the intervention and County Offaly as the comparison county.</p> <p>Analysis: Cross-sectional analyses, ANOVA, 2-tailed P-values, individual as the unit of analysis. 80% power for a 20% change in smoking prevalence.</p>
Participants	<p>Population of study sites: County Kilkenny - 73,186, County Offaly - not reported</p> <p>Age: 35-64 yrs</p> <p>Sex: female and male</p>
Interventions	<p>Theoretical basis: learning theory, health communication-behaviour change, diffusion theory and community organization for health.</p> <p>Components: The intervention included health professionals (physicians and dentists), teachers, schools, the local health department, mass media, including newsprint and radio, public events, quit smoking contests and educational materials.</p> <p>Year started: 1985</p> <p>Duration: 5 yrs</p> <p>Maintenance: No direct evidence was found. However, programme materials and methods have been distributed to other areas.</p>
Outcomes	<p>Questionnaire: in-person interview administered by survey nurse.</p> <p>Biochemical measure of smoking: serum thiocyanate in 1982</p> <p>Baseline: 1985 in County Kilkenny and 1986 in County Offaly.</p> <p>Outcome: 1990 in County Kilkenny, 5 yrs after the intervention began, and 1991 in County Offaly.</p> <p>Further follow up: not reported.</p>
Notes	<p>Economic evaluation: Project costs were reported.</p>

Tudor-Smith 1998

Methods	<p>Country: United Kingdom</p> <p>Objective: To reduce CVD and mortality through health education and policy changes designed to reduce several risk factors for heart disease. Smoking, diet, physical activity and weight were targeted.</p> <p>Study Sites: Wales and 4 counties in North East England</p> <p>Programme name: Heartbeat Wales</p> <p>Design: Quasi-experimental, with Wales as the intervention area, and 4 counties in North East England (Tyne and Wear, Cleveland, Durham, North Yorkshire) serving as the comparison area.</p> <p>Analysis: Cross-sectional analyses, t-tests, SUDAAN, weighted least squares linear regression, 2-tailed P-values, community and individual as the units of analysis. Sample size and power calculations referred to, but values not found.</p>
Participants	<p>Population of study sites: Wales - 2.88 million, the four counties - 3.00 million.</p> <p>Age: 18-64 yrs</p> <p>Sex: female and male</p>

Tudor-Smith 1998 (Continued)

Interventions	<p>Theoretical basis: social cognitive theory, diffusion of innovation theory, communication theory, social marketing and community organization.</p> <p>Components: The intervention made extensive use of mass media and also involved health professionals, worksites, businesses and schools, and made use of public events. The use of existing self-help materials, stop smoking groups and smoking cessation counseling were promoted.</p> <p>Year started: 1985</p> <p>Duration: 5 yrs</p> <p>Maintenance: No direct evidence was found. However, many of the key elements of the programme have been taken up and used both in the UK and overseas.</p>
Outcomes	<p>Questionnaire: brief in-person interview at home and self-completion questionnaire</p> <p>Biochemical measure of smoking: none</p> <p>Baseline: 1985, immediately preceding the intervention</p> <p>Outcome: 1990, 5 yrs after the intervention began.</p> <p>Further follow up: not reported.</p>
Notes	<p>Economic evaluation: A cost-benefit analysis of the overall programme was conducted. The net present value of benefits was considerably greater than costs in terms of both the National Health Service and the Welsh economy as a whole. The net costs per working life yr saved compared favourably with other healthcare interventions.</p>

Van Assema 1994

Methods	<p>Country: The Netherlands</p> <p>Objective: to reduce the prevalence of cancer-related risk behaviors, especially smoking and high fat consumption.</p> <p>Study Sites: The municipality of Bergeyk and a comparison municipality in the provinces of Limburg and Noord-Brabant.</p> <p>Programme name: Healthy Bergeyk Project</p> <p>Design: A randomized controlled design with the municipality of Bergeyk being randomly selected from 6 potential municipalities and the comparison municipality from 3 of the others, located in a separate media market from Bergeyk.</p> <p>Analysis: Cohort analyses, ANOVA and Mantel-Haenzel, 1-sided P-values, individual as the unit of analysis.</p>
Participants	<p>Population of study sites: Approximately 10,000 in municipality of Bergeyk and a similar number in the comparison community.</p> <p>Age: 18+</p> <p>Sex: female and male</p> <p>Ethnicity: White</p>
Interventions	<p>Theoretical basis: transtheoretical model of stages of change and a model of behavioural change.</p> <p>Components: The intervention used community organization principles and included volunteers, the health sector, worksites, businesses, restaurants, community agencies and associations, local government, public events, newsprint, posters, pamphlets, mailings, stop smoking self-help manuals and smoking cessation groups.</p> <p>Year started: 1990</p> <p>Duration: 1.5 yrs</p> <p>Maintenance: After a break (March to August 1991) the programme was continued with a local government grant. Continuation of the project after the first yr did not proceed easily; planning group members did not want to invest as much time as in the prior yr and continuation without the programme co-ordinator was not feasible. The co-ordinator's post was funded for a further 2 yrs with the aim of fully integrating the programme with community</p>

Van Assema 1994 (Continued)

	structures. No further evidence was found.
Outcomes	Questionnaire: in-person interview at home Biochemical measure of smoking: serum thiocyanate in 1982 Baseline: March, 1990, immediately preceding the intervention Outcome: February 1991 and September 1991, 12 and 18m after the intervention began. Further follow up: none found.
Notes	Attitudes, social influences, self efficacy and intention to change risk for each of the targeted behaviours (smoking, nutrition, alcohol consumption and solarium use) were assessed, but no results pertaining to these mediating variables were found for baseline or follow-up surveys.

Weinehall 1999

Methods	Country: Sweden Objective: To reduce cardiovascular risk factors, by targeting smoking, diet, high blood pressure and weight. Study Sites: The municipality of Norsjo in Northern Sweden. Programme name: Vasterbotten Intervention Program Design: Quasi-experimental, with the rural municipality of Norsjo assigned to receive the intervention. Comparison of risk factor changes was made with the population surveyed by MONICA, Northern Sweden. Analysis: Cohort and cross-sectional analyses, t-tests, chi squared, repeated measures ANOVA, individual as the unit of analysis. Power estimates (beta) not found.
Participants	Population of study sites: Municipality of Norsjo - 5500, Counties of Norrbotten and Vasterbotten, in Northern Sweden - 510,000. Age: 30-60 yrs Sex: female and male
Interventions	Theoretical basis: community participation. Components: Community organization, a local collaborative committee and a university advisory group. Messages about lifestyle factors were disseminated by local associations, sports clubs, media and food retailers. Drama, music and informal meetings were also encouraged as a way to spread these messages. A major aspect of the intervention was risk factor screening with individual counseling by family physicians, district nurses and dieticians. In addition local government, dental services, schools and daycare centres were involved, and there was much publicity through mass media - newspapers, radio, and television. Little emphasis was placed on reducing smoking. Year started: 1985 Duration: 6 yrs Maintenance: It is reported that intervention activities have been continued after the formal end of the programme and were still ongoing in 2000. No further information was found.
Outcomes	Questionnaire: in-person interview Biochemical measure of smoking: none Baseline: 1985, immediately preceding the intervention Outcome: 1988 and 1990, 3 and 5 yrs after the intervention began. Further follow up: not reported.
Notes	Economic evaluation: A cost-effectiveness analysis of the overall programme was conducted. Additionally cost-benefit analysis utilising 'willingness to pay' was undertaken. The programme was found to be cost-effective and 'willingness to pay' outweighed costs by at least 3 to 1.

CO: carbon monoxide
 CVD: cardiovascular disease
 m: month(s)

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

Study	Reason for exclusion
Abramson 1981	The CHAD Project, which took place in Jerusalem, Israel, was initiated in 1971. It was excluded because the intervention was implemented entirely through physicians' offices, although the evaluation was of individuals throughout the communities.
Brownson 1997	The Ozark Heart Health Project, Missouri, U.S.A., initiated in 1995, was excluded because the study is still in progress, and no outcome data are available.
Cheng 2001	Community Intervention Trial for Chronic Obstructive Pulmonary Disease and Chronic Cor Pulmonale. Insufficient detail on methods and outcomes to include. Reported higher quit rates in intervention villages.
Darity 1997	Compared 2 intensities of community intervention. Discussed in results section.
Fang 1999	The intervention, mainly pharmacological treatment of hypertension, and lifestyle modification (weight reduction, increased physical activity, and moderation of sodium and alcohol intake) was implemented through doctors' offices and local health stations. Information related to stroke prevention was disseminated door-to-door. Reducing smoking was not a specified aim, and smoking was unchanged during the study.
Feruglio 1983	The Martignacco Project, Italy, a CVD risk reduction project, initiated in 1977, was excluded because of inadequate sample size in the comparison community.
Gyarfas 1981	The Hungarian Cardiovascular Disease Prevention Programme was started in 1976 in Budapest and extended to other areas later. Although comparison areas were a part of this study, baseline measurements in these areas were obtained 6 yrs after the main programme had begun.
Holm 1989	The Stockholm Cancer Prevention Project, Sweden, initiated in the 1980s, was excluded because no final outcome results have been found.
Jiang 2003	The Community-based Antismoking Intervention in 3 cities in China was initiated in 1997 and 2000. Insufficient detail on methods and outcome to include. Reported higher quit rates in intervention communities.
Kornitzer 1980	The Belgian Heart Disease Prevention Project, a multifactorial intervention trial among middle-aged men, initiated in the late 1970s, was excluded because it was undertaken in worksites, not communities.
Marin 1994	Programma Latino Para Dejar de Fumar (PLDF), a community-wide smoking cessation intervention developed for Spanish-speaking Hispanics, and initiated in 1987, was excluded because there was no comparison community.
McAlister 2004	Media and Community Campaign Effects on Adult Tobacco Use in Texas. Primarily a mass media campaign to increase availability and use of cessation services. Only 7m follow up.

(Continued)

Muntoni 1999	The ATS-Sardegna Campaign, a 5-yr community-based programme for CVD prevention initiated in 1990, and undertaken in Sardinia, was excluded because there was no comparison community.
Oganov 1985	The USSR Population Study on Multifactorial CVD Prevention was started in 1977, and took place in 6 cities in the former USSR. An intensive intervention, delivered by specially trained personnel was compared with preventive measures carried out by physicians in the existing network of health services in each of the cities. This study was excluded because the interventions did not involve other elements in the communities, but was implemented through the specially trained personnel and physicians offices.
Pierce 1986	Sydney 'Quit for Life' Study, in Sydney Australia, was a media-based programme to reduce adult smoking. It was excluded because it did not have a community organization component.
Rhomberg 1991	The Cardiovascular Diseases Prevention Community Programme in Austria, initiated in 1977, took place in a Tyrolean village, and was excluded because there was no comparison community.
Schechter 1982	The CHIP Project, USA, a CVD risk reduction project, initiated in 1977, was excluded because there was no final outcome comparisons made, due to lack of funding.
Shea 1992	The Washington Heights-Inwoods Healthy Heart Project, which aimed to reduce CVD risk factors in a disadvantaged and culturally diverse urban setting, was conducted in New York, USA, and started in 1988. It was excluded because no final outcome assessment was undertaken due to lack of funding.
Spiegel 2003	The intervention in Havana, Cuba was designed to improve quality of life and health largely through infrastructure projects, and social and cultural activities. Reducing smoking was not a specified aim.
Stillman 1993	The Heart, Body and Soul programme, a church-based smoking cessation programme for urban African Americans compared 2 levels of community intervention and is discussed in the results section.
Tretli 1985	The Finnmark County study, a cardiovascular risk reduction intervention, conducted in Norway and initiated in 1974, was excluded because there was no comparison community.
Wei 1995	Evaluation of smoking intervention in Tianjin NCD community sites. In 1991, an anti-smoking intervention was introduced in 8 communities, with 8 as comparison sites. The effects of the intervention were evaluated in 1993. No details of the intervention, nor of the analytic methods were provided in the paper. Although changes in smoking prevalence, quit rates and several mediating variables, with differences between intervention and comparison sites, were described and tabulated, no tests of statistical significance were reported.
Xu 2003	Intervention similar to Fang 1999; main focus was reducing hypertension, heart disease and diabetes as risk factors for stroke; smoking reduction was not a specified aim.

CVD: cardiovascular disease

m: month(s)

DATA AND ANALYSES

Comparison 1. Results

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Baseline data and smoking outcomes			Other data	No numeric data
2 Effects on mediating variables and process outcomes			Other data	No numeric data

Analysis 1.1. Comparison 1 Results, Outcome 1 Baseline data and smoking outcomes.

Baseline data and smoking outcomes

Study	Baseline/follow-up	No of participants	Smoking prevalence	Tobacco consumption	Other outcomes
Anantha 1995	Method of selection: Surveys were done in two sets of villages in each of the three Primary Health Centers. The first set of villages constituted the panel sample, 10 villages in Dibbur, 5 villages in Malur and 11 villages in Gudibanda. The population of these villages was surveyed at the baseline, first follow up and final surveys. The second set of villages constituted the non-panel sample. In Dibbur, 19, 14, and 14 villages were surveyed at the baseline, first follow up and final surveys, respectively. For Malur, the number of villages was 10, 7, and	Number of participants: Non-panel sample Dibbur Women Men '86 B'line 3913 4051 '88 1st f-up 1826 1868 '91 Final 1899 2021 Malur / Gudibanda Women (W) Men (M): '86 3477 3769 / 3448 3608 '88 1512 1538 / 1626 1666 '91 4437 4708 / 2585 2727 Panel sample Dibbur W/M: '86 1323 1413 '88 1386 1462 '91 1361 1433 Malur / Gudibanda W/M: '86 1428 1600/	Prevalence of tobacco use (tobacco chewing and tobacco smoking): reported for 1986, 1988 and 1991: Non-panel sample Dibbur / Malur / Gudibanda W/M: '86 38.0 31.1/ 30.4 26.5/ 28.2 27.5 '88 21.0 18.1/ 29.7 26.2/ 28.0 30.1 '91 25.0 23.0/ 25.9 23.7/ 26.9 26.5 Panel sample Dibbur / Malur / Gudibanda W/M: '86 40.1 30.5/ 24.6 28.3/ 36.7 33.6 '88 21.6 21.5/ 22.7 26.0/ 33.7 30.5 '91 18.2 17.4/ 25.5 28.3/ 34.2 32.7 Among women and men in both non-panel and panel	Not reported	Quit rate: Non-panel sample Dibbur / Malur / Gudibanda W/M: '88 38.0 26.2/ 1.0 3.0/ 0.0 0.2 '91 25.6 17.0/ 0.0 0.0/ 0.4 0.3 Panel sample Dibbur / Malur / Gudibanda W/M: '88 43.6 26.9/ 3.8 3.6/ 0.4 2.0 '91 51.2 40.2/ 6.0 3.7/ 0.8 2.3 Among women and men in both non-panel and panel samples, the self-reported quit rates in Dibbur, at the first follow up and at the final survey, are significantly greater than in the 2 comparison areas, P<0.0001.

Baseline data and smoking outcomes (Continued)

	15, and for Gudibanda, 17, 8, and 9, respectively. A stratified random sampling method was used to select the villages.	1229 1285 '88 1377 1505/ 1388 1469 '91 1425 1582/ 1417 1442 Comparability of demographic data at baseline for intervention and comparison participants: The villages were chosen on the basis of a fair degree of comparability of the prevalence of the tobacco habit, availability of educational facilities and the socio-economic infrastructure.	samples, the reduction in prevalence rates in Dibbur, at the first follow-up and at the final survey, were significantly greater than in the 2 comparison areas, $P < 0.0001$ (using individual as unit of analysis).		Initiation rate among 10-24 yr age-group: Dibbur / Malur / Gudibanda W/M: '86 1.6 0.2/ 0.6 0.2/ 1.4 0.1 '88 0.1 0.0/ 1.1 0.8/ 4.7 0.7 '91 0.6 0.4/ 1.1 0.8/ 2.5 1.7 Among women and men in the 10-24 yr age-group, initiation rates in Dibbur are lower than in the 2 comparison areas.
Baxter 1997	Method of selection: Questionnaires were mailed to a random sample of named adults chosen from the Rotherham Family Health Services Authority population age-sex register at baseline, July 1991, and to a different random sample post-intervention, in June 1995.	Number of participants: Not reported, but the required sample size was estimated to be 1509 in each area. 1887 questionnaires were mailed to intervention and comparison areas at baseline and a similar number post-intervention. Response rates were 82% to 86% for both surveys. Comparability of demographic data at baseline for intervention and comparison participants. Not reported.	Reported for 1991 and 1995. Adults 18-64 Swinton/Wath / Maltby 1991 32.2 / 36.4 1995 28.8 / 38.0 The OR for smoking in the intervention area (Swinton/Wath) in 1995, compared to 1991 was 0.83 (95% CI 0.71 to 0.97), while in the comparison area (Maltby), the OR was 1.1 (95% CI 0.95 to 1.29). The difference in these ORs was statistically significant, $P = 0.01$ (using individual as unit of analysis).	Not reported	Quit rate not reported Initiation rate not reported
Brownson 1996	Method of selection: Random digit dialing telephone sur-	Number of participants (response rate %)	Reported for 1990 and 1994 Bootheel / Missouri	Not reported	Quit rate not reported Initiation rate not

Baseline data and smoking outcomes (Continued)

	veys of non-institutionalized adults in the Bootheel region at baseline (1990) and again in 1994. Blacks were over-sampled in the 1994 survey.	Bootheel / Missouri 1990 1006 (89) / 437 1994 1510 (76) / 381	1990 20.8 / 22.7 P>0.1 1994 18.1 / 19.3 P>0.1 (using individual as unit of analysis).		reported
Bruckert 1999	Method of selection: Participants were selected by random digit dialing telephone surveys in each town. Smoking status was obtained from responses to a questionnaire at baseline and again after 5 yrs. Biochemical test was not used to confirm smoking status.	There were 961 participants for the baseline interview in 1991), and 660 (68.5%) of that cohort were re-interviewed at the follow up in 1996, 343 in Epernon (66.6%) and 315 (70.6%) in the comparison towns. The attrition rate was 31.5%, and did not differ significantly between Epernon and the comparison towns. Compared to participants, non-participants were significantly younger (40 vs 43 yrs), lower SES, and fewer had read health-related articles. Non-participants were a little more dependent on nicotine, and more were in the first quartile of the cardiovascular risk function, i.e. at lower risk for heart disease.	Epernon/ Comparison towns N= 343/ 315 in 1996 Quit smoking (%) 8.5/ 8.3 Started smoking (%) 2.0/ 3.5 (ns for this 2x4 table) Current smoker (%) 20.7/ 19.7 Non-smoker (%) 68.8/ 68.6 Change in smoking prevalence (%) -6.5/ -4.8		No significant difference in smoking behaviour was seen between Epernon and the comparison towns after this 5-yr health information campaign.
Carleton 1995	Method of selection: The sampling frame consisted of 6-10 randomly selected	Number of participants (response rates and cohort retention rates, %):	Prevalence: Cross-sectional analysis reported for baseline (1981/82 and 1983/	Not reported	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

	batches of households in each city-survey unit. A single age-eligible resident was chosen from each household adapted from the method of Kish and Deming.	Cross-sectional surveys '81/82 '83/84 Int: 1163(70) 1360 (67) C: 1279(70) 1439 (68) '85/86 '87/89 '90/91 1479(68) 1460 (68) 1015(65) 1476 (68) 1493(67) 1022 (64) 1992/93 1052 (68) 1023 (70) Cohort Baseline / After 8-9 yrs Pawtucket 2523 / 1,260 (50) Comparison 2718 / 1665 (61) Comparability of demographic data at baseline for intervention and comparison participants: These differed in level of education and ethnicity, but not in age and sex.	84), peak intervention effects (1987/89 and 1990/91) and post-intervention (1992/93). Base / Peak / Post Int: 40.0 / 35.1 / 35.5 C: 39.6 / 34.4 / 32.5 Cohort analysis Base/ After 8-9 yrs/ Change Int: 36.1 / 27.1 / -8.9 C: 36.5 / 28.9 / -8.2 Both the cross-sectional and cohort analyses showed declines in smoking prevalence in each city, but the differences were not significant.		
COMMIT 1995	Method of selection: Modified random digit dialing technique with community-specific geographic screening to identify households in targeted areas. Survey data were collected in 2 stages. During the first stage, a roster of age-eligible persons in each household was obtained and an in-	Number of participants Prevalence study (response rate, %) Intervention communities 1988 32143, community mean 2922 (83) 1993 25106, community mean 2282 (72) Comparison communities 1988 29364, mean 2668 (83) 1993 25705, mean	Cross-sectional surveys Prevalence reported for 1988 and 1993: Adults 25-64 Int / Comp 1988 27.6 / 28.6 1993 24.1 / 25.4 change 3.5 / 3.2 P=0.36 (1-sided) Heavy smokers Adults 25-64 Int / Comp 1988 10.2 / 11.0 1993 7.3 / 8.2 change 2.9 / 2.9 P=	Per capita consumption of cigs reported for 1988 and 1993: Adults 25-64 Int / Comp 1988 5.64 / 6.02 1993 4.45 / 4.89 change 1.19 / 1.13 P=0.37 (1-sided)	Quit ratio (quit in past 5 yrs): Adults 25-64 Int / Comp 1993 0.198 / 0.185 P=0.09 (1-sided) Cohort Study: Quit ratio (quit in past 5 yrs) among adults ages 25-64 in 1993: Int / Comparison communities: Heavy smokers 0.180 / 0.187 P=

Baseline data and smoking outcomes (Continued)

	<p>dividual, 18+, who served as a proxy, identified the age, sex and smoking status of all individuals 18+ in that household. In the second stage, an extended interview was conducted with each smoker, aged 25-64 yrs, and with a quota sample of recent ex-smokers who had quit in the past 5 yrs. Similar methodology was used for the final prevalence survey (1993). A cohort of heavy smokers (>25 cigs per day) and a cohort of light/moderate smokers (<=25 cig per day) were identified in each community from among the smokers identified at baseline (1988) and followed up 5 yrs later.</p>	<p>2337 (73) Cohort study (retention rate, %) Int /Comp '88 Heavy smokers 4976 (68)/ 5043 (68) Light/moderate smokers 5177 (64)/ 5151 (65) Comparability of demographic data at baseline for intervention and comparison participants: Intervention and comparison communities were comparable in age, sex, level of education, household income and ethnicity.</p>	<p>0.51 (1-sided)</p>		<p>0.68 (1-sided) Light/moderate smokers 0.306 / 0.275 P=0.004 (1-sided) Heavy smokers 0.185 0.190 P=0.63 (1-sided) Light/moderate smokers 0.309 0.280 P=0.004 (1-sided) Mean combined quit ratio* 0.265 / 0.247 P=0.031 (1-sided) (* weighted by baseline prevalence of heavy and light/moderate smokers) Initiation rate, not reported</p>
Domenighetti 1991	<p>Method of selection: MONICA I and MONICA II survey methodology.</p>	<p>Number of participants (response rate, %): Cross-sectional analyses Tessin Vaud/Friburg MONICA I 1984-1986 1554 (78) 1201 (57) MONICA II 1988-1989 1455 (73) 1279 (61) Comparability of demographic data at baseline for inter-</p>	<p>Results are presented as significant increases or decreases within conditions. Actual prevalence not reported. Tessin, Vaud/Friburg Smokers (cigs only): Men decreased P<0.001, NS Women no change NS, NS total popn. decreased P<0.01, NS</p>	Tobacco consumption, quit rates, and initiation rates not reported	

Baseline data and smoking outcomes (Continued)

		vention and comparison participants not reported.	Heavy smokers (>20 cigs/day) men increased NS, NS women no change NS, NS total population increased NS, NS Ex-smokers men increased P<0.01, NS women no change NS, NS total popn. increased P<0.001, NS (All Ps using individual as unit of analysis).		
Egger 1983	Method of selection: A systematic random sample of women and men aged 18+ from each community, with up to 2 adults per household.	Number of participants (response rate, %): Lismore / Coffs H. / Tamworth '78 601(69)/ 612 (71)/ 589(72) '80 1278(73)/ 1272 (73)/ 1239(74) '81 1152(70)/ 1195 (73)/ 1195(74) Comparability of demographic data (age and sex) for intervention and comparison participants: Not comparable - age and sex differences were found across towns and yrs.	Prevalence: reported for 1978, 1980 and 1981 by town, yr, age and sex. The % point declines in prevalence between 1978 and 1981 ranged from 15.7 to 2.1: Lismore/ Coffs H./ Tamworth Women: 15.6-6.1/ 11.1-6.0/ 5.1-2.1 Men: 15.7-8.9/ 11.2-7.1/ 5.0-4.1 In each town, younger women and men tended to have the greater declines in prevalence, and those >65 the least. The declines in the 2 intervention towns, Lismore and Coffs Harbour, between 1978 and 1981, were significantly greater than in	Not reported	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

			Tamworth, P<0.05, and more sustained in Lismore, the town exposed to the media and community programs, over the 2-yr period. (All Ps using individual as unit of analysis).		
Fisher 1998	Method of selection: Simple random digit dialing of adult residents, aged 18+. Neighbourhoods in St. Louis were defined by block, while those in Kansas City, were defined by zip code (64109, 64127, 64128, 64130).	Number of participants (response rate, %): St. Louis / Kansas City 1990 504 (80)/ 1040 (82) 1992 457 (82)/ 1034 (73) Com- parability of demographic data at baseline for intervention and comparison participants. Participants differed in age, marital status, and ethnicity, but not in sex, level of education, unemployment rate and household income.	Reported for 1990 and 1992 St. Louis/ Kansas City / '90 '92 P/ '90 '92 P/ P * All 34 27 0.028/ 34 33 0.641/ 0.028 A-A 33 28 0.139/ 33 32 0.643/ 0.201 WH 40 24 0.031/ 37 38 0.967/ 0.033 Women: 33 25 0.027/ 30 29 0.764/ 0.167 Men: 36 33 0.581/ 41 40 0.763/ 0.129 (A-A=African-American, WH=White) * P-values for comparisons across cities (using individual as unit of analysis). There were no significant differences for these comparisons at baseline in 1990. For all respondents, multivariate logistic regression analysis showed a city and yr interaction. For St. Louis in 1992 compared to all other (St. Louis 1990 and	Not reported	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

			Kansas City 1990 and 1992), the OR for smoking prevalence was 0.71 (95% CI 0.50 to 1.02), P=0.64 (2-sided).		
Fortmann 1993	Method of selection: Independent surveys of randomly selected households from commercial directories, on 4 occasions. All persons aged 12-74 living in these households were eligible for recruitment into the survey samples.	Number of participants (independent sample response rates and cohort retention rates, %): Independent sample 1979-1980 905 (68) 798 (69) 1981-1982 920 (76) 774 (76) 1983-1984 897 (70) 932 (72) 1985-1986 930 (59) 825 (63) Cohort sample Intervention Comparison All 4 surveys 413 (39) 392 (39) Com- parability of demographic data for intervention and comparison participants: Intervention cities differed significantly from comparison cities in ethnicity and mean yrs of education, but not in age, sex, or family income.	Prevalence reported for 1979/80, 1980/81, 1982/83, and 1984/85: Independent sample '79/80 '80/81 '82/83 '84/85 Int: 33.8 31.5 27.1 23.3 C. 32.8 29.1 27.8 22.1 The declines in smoking over time were not significantly different, P>0.2 Cohort sample '79/80 '80/81 '82/83 '84/85 Int: 28.1 25.4 23.2 20.6 C: 26.5 26.3 25.5 22.5 The decline in smoking tended to be greater in the intervention cities compared to the comparison cities, P=0.1 (2-tailed). The average slope of the decline in smoking prevalence in the intervention cities was -1.51 % points per yr, compared to -0.78 % points per yr in the comparison cities, P=0.007.	Not reported	Quit rates shown graphically for both cohort and independent samples, were significantly greater in the intervention cities for the cohort sample, P=0.007, and the independent sample, P=0.04. Initiation rate not reported

Baseline data and smoking outcomes (Continued)

<p>Giampaoli 1997</p>	<p>Method of selection: Independent random samples of 200 subjects in each decade of age and sex, selected from the electoral roles. In 1986, a second screening was conducted on those examined in 1983. In addition, in 1986 and 1993/96, new independent samples were enrolled.</p>	<p>Number of participants (screening response rates, %): Sezze / Priverno Women/Men: '83 859(63) 739 (55) / 1045(77) 942 (75) '86 (2nd screen) 648(42) 570(39) / 725(42) 553(33) New independent samples '86 443(54) 353 (51) / 553(55) 512 (57) '93/96 *305 307 / 748 704 * response rates not reported. Comparability of demographic data at baseline for intervention and comparison participants not reported.</p>	<p>Cross-sectional (unpaired) results reported for 1983, 1986 and 1993. Sezze / Priverno '83 '86 '93 '83 '86 '93 W: 18.3* 11.8 14.4 / 17.7* 12.8 20.4 M: 54.5* 46.0 43.0 / 55.6* 45.3 40.3 The numbers with * for the 1983 cross-sectional results are from the 10-yr results paper, and differ from those reported for the short-term results. Between 1983 and 1993, there was a significant net reduction in smoking prevalence among women (-6.6%, 95% CI -12.6 to -0.6), but not among men (+3.8%, 95% CI -4.3 to +11.9). Cohort (paired) results: Sezze / Priverno '83 '86 '83 '86 W: 12.5 9.0 ns / 10.1 7.8 ns M: 48.4 40.6 P<0.05/ 49.7 41.6 P<0.01 Cross-sectional (unpaired) results: Sezze / Priverno Short-term ' 83 86 83 86 W: 17.7 11.8 P<0.01 13.1 12.8 ns</p>	<p>Per capita consumption of cigs, reported for 1983 and 1986. Cross-sectional (unpaired) results Sezze Priverno '83 '86 '83 '86 W:1.80 1.20 P<0.01 1.20 1.20 ns M: 10.60 8.20 P<0.001 8.90 8.00 ns Cohort (paired) results W: 1.14 0.70 P<0.001 0.65 0.64 ns M:8.5 07.66 P<0.05 7.73 7.43 ns</p>	<p>Quit rate not reported Initiation rate not reported</p>
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Baseline data and smoking outcomes (Continued)

			<p>M: 53.7 46.0 P<0.01 50.2 45.3 ns 10-yr: 83 98 Change 83 93 Change W: 18.3 14.4 - 3.9 17.7 20.4 + 2.7 M: 54.5 43.0 - 11.5 55.6 40.3 - 15.3 Between 1983 and 1993, there was a significant net reduction in smoking prevalence among women (-6.6%, 95% CI -12.6 to -0.6), but not among men (+3.8%, 95% CI -4.3 to +11.9). (All Ps using individual as unit of analysis).</p>		
Goodman 1995	<p>Method of selection: By random digit dialing for households with telephones or by random selection from city directories for households without telephones.</p>	<p>Number of participants (the response rate in 1987 at baseline was 84%, and the retention rates in 1991 were 63.5% and 62.1% in Florence and Anderson, respectively): 1987 Florence - 2896, Anderson - 2538 1991 Florence - 1838, Anderson - 1576 Comparability of demographic data at baseline for intervention and comparison participants: reported as matched by population size and race (African-Americans Florence</p>	<p>Reported for 1987 and 1991 All respondents Florence / Anderson '87 '91 / '87 '91 25.5 24.3 / 25.9 25.5 For all respondents, there was no significant difference between the decline in prevalence of smoking in Florence and that in Anderson, P=0.8. Among women, smoking prevalence fell 0.8% in Florence and 1.5% in Anderson, P=0.26 Among men, smoking prevalence fell 2.1% in Flo-</p>	Not reported	<p>Quit rate not reported Initiation rate not reported</p>

Baseline data and smoking outcomes (Continued)

		35%, Anderson 24%), income, education and vital statistics.	rence, but increased 1.4% in Anderson, P=0.02. (Using individual as unit of analysis).		
Gutzwiller 1985	Method of selection: A stratified random sample based on each of the towns population registries, with 30 individuals allocated to each stratum according to the following variables: nationality, age, sex, date of arrival in the town for persons living alone; nationality, average age of couple, date of arrival in the town, and number of children for married couples.	Number of participants (1977/78 response rate, %; 1980/81 retention rate, %): Aarau/ Nyon/ S'thurn/ Vevey '77/78 921(53)/ 823(49)/ 1245(69)/ 937(47) '80/81 500(33) / 348(22)/ 875(54)/ 483(26) Comparability of demographic data at baseline for intervention and comparison participants not available.	Reported for 1977/78 and 1980/81 Prevalence among adults, ages 16-69. Aarau/Nyon S'thurn/Vevey '77/78 32.8 37.1 '80/81 27.4 35.3 P<0.05 (Using individual as unit of analysis).	Cigarettes, pipes and cigars, as grams of tobacco per day Aarau/Nyon S'thurn/Vevey '77/78 5.0 6.7 '80/81 4.2 6.3 ns	Quit rate: Aarau/Nyon S'thurn/Vevey '80/81 26.2 18.1 Initiation rate: '80/81 4.7 7.8. The proportion of smokers and non-smokers who changed categories between 1977/78 and 1980/81 was significant in Aarau/Nyon, P<.001, but not in Solothurn/Vevey.
Hancock 2001	Method of selection: Random selection of households in each town. In eligible households, the adult with the next birthday was selected for interview.	Baseline 1992 Intervention Towns/ Comp. Towns Smokers 1280/ 1103 Non-smokers 3984/ 3528 Follow up 1997 Smokers 876 (68%) 760 (69%) (retention rate) Non-smokers *1751 (44%) 1706 (48%)	Prevalence: reported at baseline 1992 Intervention/ Comparison Adults (18-70) 24.3/ 23.8 Women 23.1/ 22.1 Men 26.2/ 26.9		Quit rate at follow up in 1997 Int Comp Diff (95% CI) Adults 20.4 16.9 3.5 (-0.3 to +7.2) Women 20.0 18.7 1.3 (-3.3 to +5.9) Men 21.0 14.0 7.1 (+0.6 to +13.5) Initiation rate at follow up in 1997 Int Comp Diff (95% CI) Adults 3.8 4.2 -0.3 (-2.2 to +1.6) Women 4.3 4.5 -0.3 (-2.4 to +1.8) Men 3.1 3.4 -0.3 (-2.4 to +1.9)

Baseline data and smoking outcomes (Continued)

Heinemann 1986	Method of selection: Initial sample, 5300 females and males selected without reference to age, which amounted to 20% of the entire population during the intervention phase.	Number of participants (specific involvement ranged from 63-90%): Follow up: 1981 Schleiz - 337, Doppoldiswade - 336 Comparability of demographic data (age and sex) for intervention and comparison participants not available.	There was a net decrease of 7%.	Cigs per day among smokers, increased 11%	Quit rate not reported Initiation rate not reported
Hoffmeister 1996	Method of selection: Simple random sampling of individual residents the FRG, aged 25-69 yrs, in each of the intervention regions. The reference area primary sample of 8000 persons was chosen from 200 sample points in the FRG, excluding the intervention regions.	Number of participants (response rate for total samples, %) : Pooled Int. Communities Total Women (W) Men (M) '85 11,548(75) 6084 5464 '88 8743(73) 4575 4168 '91 8636(72) 4502 4134 National Ref. Sample Total W M '85 4790 (67) 2373 2417 '88 5335 (71) 2686 2649 '91 5311 (69) 2688 2623 Comparability of demographic data at baseline for intervention and comparison participants: % aged 25-59 yrs, gender and % unemployed were similar.	Prevalence: reported for 1985, 1988, and 1991 Pooled Intervention '85 '88 '91 All: 35.4 34.0 32.5* W: 26.8 27.3 27.8 M: 44.5 41.2 37.4* National Reference '85 '88 '91 All: 34.0 35.3 33.5 W: 26.6 27.4 28.0 M: 41.8 43.7 39.2 * For all respondents and for men, the net changes in smoking prevalence between 1985 and 1988, and between 1985 and 1991 were significant (using individual as unit of analysis). No significant net changes were seen for women.	Not reported	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

<p>Jenkins 1997</p>	<p>Method of selection: Telephone surveys of randomly selected Vietnamese men. Telephone numbers were chosen randomly from the 23 most common Vietnamese names listed in area telephone books. All men aged 18+ in the household were enumerated, and 1 subject per household, among those who understood Vietnamese, was selected for interview according to a modified Kish procedure.</p>	<p>Number of participants (response rate, %): San Francisco/Alameda / Houston 1990 1133 (84) / 1581 (82) 1992 1202 (94) / 1209 (88) Comparability of demographic data at baseline for intervention and comparison participants. Participants differed in level of education, unemployment rate and household income, but not in age.</p>	<p>Reported for 1990 and 1992. Prevalence among Vietnamese men: SF+Alameda / Houston 1990 36.1 / 39.6 1992 33.9 / 40.9 There was a significant intervention effect, $P < 0.01$ (using individual as unit of analysis). In 1992, the odds of being a smoker were significantly lower in San Francisco/Alameda counties than in Houston, 0.82 (95% CI 0.68 to 0.99).</p>	<p>Cigs per day among smokers SF+Alameda / Houston 1990 11.1 / 13.2 1992 10.3 / 11.9 Cig consumption differed significantly at baseline, being greater in Houston, and fell significantly in Houston, but not in SF/Alameda counties. In 1992, cig consumption was still significantly greater in Houston.</p>	<p>Quit rate in past 2 yrs: SF+Alameda / Houston 1990 7.2 / 5.8 1992 10.2 / 7.4 The quit rate increased significantly in the intervention counties between 1990 and 1992, but not in Houston, and was significantly greater in SF/Alameda counties in 1992 than in Houston, $P = 0.017$. In 1992, the odds of being a quitter in SF/Alameda counties compared to Houston were 1.65 (95% CI 1.27 to 2.15). Initiation rate not reported</p>
<p>Lando 1995</p>	<p>Method of selection: Cross-sectional surveys of randomly selected adults, 25-74 yrs of age, chosen by the 2-stage sampling method of Kish.</p>	<p>During the 10 yrs of the project, 20,184 eligible adults, from all 6 cities, completed the home interview (88%), and 18,062 (79%) completed the survey center protocol. For the cohort study, 7097 participants were randomly selected from the pre-intervention cross-sectional surveys, and 67.1% of these participated at the end of the study. Comparability of demographic data at base-</p>	<p>Prevalence: reported for the cross-sectional surveys and the cohort surveys Cross-sectional prevalence '80/ '81/ '82/ '83/ '84/ '86/ '88/ '89 Women (W): Int: 25.3/ 31.6/ 33.3/ 28.0/ 30.5/ 23.8/ 22.8/ 22.8 Comp: 22.1/ 31.0/ 29.3/ 27.8/ 26.7/ 23.4/ 28.3/ 26.0 Men (M): Int: 38.7/ 45.2/ 34.5/ 37.9/ 34.0/ 33.7/ 30.4/ 29.4 Comp: 34.5/ 43.8/</p>	<p>Not reported</p>	<p>Quit rate: The cumulative % of quitters was about 5% during the 1st yr, and over 7 yrs was slightly under 20%. Differences in survival, i.e. continuing as a smoker, did not differ significantly according to Cox proportional hazards analysis. Initiation rate not reported.</p>

Baseline data and smoking outcomes (Continued)

		line for intervention and comparison participants: These differed in age, sex and education.	36.3/ 39.5/ 32.3/ 31.6/ 27.2/ 31.1 Cohort prevalence '80/ '81/ '82/ '83/ '85/ '87/ '90 W: Int: 23.8/ 32.9/ 30.8/ 26.7/ 24.7/ 22.9/ 19.6 Comp: 23.2/ 28.1/ 30.5/ 27.9/ 25.0/ 24.1/ 19.6 M: Int: 30.8/ 39.0/ 27.0/ 32.2/ 27.5/ 26.0/ 21.4 Comp: 26.6/ 36.2/ 27.7/ 34.4/ 24.7/ 26.7/ 19.6 For women, the cross-sectional analysis showed a significant decline in smoking prevalence in the intervention cities compared to the comparison ones; but no effect was seen in the cohort analysis. For men, the prevalence of smoking fell during the course of the study, but neither cross-sectional nor cohort analyses showed any intervention effect.		
Lupton 2002	Method of selection: Random samples of individuals from the 4 coastal communities, conducted as part of the third Finnmark Heart Study. A cohort of those interviewed in 1988 were re-interviewed in 1993.	Number of participants at baseline (response rate, %): Cohort analyses: North Cape/ (I)/ Loppa, Gamvik, Masoy (C) '88: 1021 (78.6)/ 1315 (77.9) '93: 725 (71.0)/ 960 (73.0) Attrition 29% (I),	North Cape '88/ '93/ Change Women: 53.4/ 47.5/ -5.9 Men: 50.8/ 50.0/ -0.8 Loppa, Gamvik, Masoy '88/ '93/ Change W: 45.5/ 46.8/ +1.3, P<0.01 M: 50.6/ 47.9/ -2.7		Note: Among women, the difference in the change in smoking prevalence, between 1988 and 1993, remained significant after adjustment for age, but the level of significance is deflated, because the unit of analysis was the in-

Baseline data and smoking outcomes (Continued)

		27% (C) Com- parability of demo- graphic data at base- line for interven- tion and compar- ison participants: In North Cape the women were older, and there were fewer men with Sami background, than in the compar- ison communities.	ns (Significance of dif- ference in change between communi- ties)		di- vidual, whereas the unit of assignment was the community. The observed re- duction in smoking during the 5-yr in- tervention may have been due to secu- lar trends, rather than to the interven- tion. We note that in 1988, the preva- lence of smoking among the women in North Cape was substantially higher than that in the three com- parison municipali- ties, and also that in Batsfjord, the site of the other Finn- mark intervention, and then fell to a level comparable to these communities during the five-year intervention.
Lupton 2003	Method of selec- tion: Random sam- ples of individuals from the 4 coastal communities, con- ducted as part of the third Finnmark Heart Study. A co- hort of those in- terviewed in 1987 were re-interviewed in 1993.	Number of partici- pants at baseline (re- sponse rate, %): Cohort analyses Batsfjord (I)/ Loppa, Gamvik, Masoy (C) '87 595 (79.4)/ 1362 (77.9) '93 364 (61.0) 960 (70.0) Attrition 39% (I), 27% (C) Comparability of demographic data at baseline for intervention and comparison partici- pants: In Batsfjord,	Batsfjord '87/ '93/ Change Women: 46.6/ 47.2/ +0.6 Men: 52.2/ 44.7/ - 7.5 Loppa, Gamvik, Masoy '87/ '93/ Change W: 45.4/ 46.6/+1.2 ns M: 50.6/ 47.9/ -2.7 ns (Significance of dif- ference in change between communi- ties)		Note: Among men, the difference in the change in smoking prevalence, between 1987 and 1993, failed to reach sta- tistical significance, P=0.09. Even this level of significance is deflated, because the unit of analysis was the individual, whereas the unit of assignment was the community.

Baseline data and smoking outcomes (Continued)

		there were fewer men with Sami background than in the comparison communities.			
Maccoby 1977	Method of selection: A random, multi-stage probability sample of 35-59 yr old adults in each city.	Number of participants (1972 response rate, %; 1974 retention rate, %) Watsonville Gilroy Tracy '72 605 (73) 542 (82) 532 (81) '74 423 (70) 397 (73) 384 (72) Within Watsonville, high risk subjects were randomly assigned at baseline to receive intensive instruction (Watsonville II, n=113) or not (Watsonville RC, n=56). Also within Watsonville, a weighted probability sample was created, excluding the intensive instruction group, using the weighted means of the other high risk subjects and of the lower risk subjects to compensate for those excluded (Watsonville-R). Comparability of demographic data (age and sex) for intervention and comparison participants: No statistical comparisons made.	Not reported.	Per capita consumption of cigs reported for 1972, 1973 and 1974. Adults, ages 35-59: W ³ ville W ³ ville-R Gilroy Tracy Baseline (1972) 7.2 6.8 6.8 6.9 % change '73 -18.9 * -6.9 -2.3 -1.1 '74 -24.1 * -13.7 * -7.3 -2.5 * significantly different from Gilroy and Tracy, P<0.05. High risk subjects W ³ -II W ³ -RC Gilroy Tracy Baseline (1972) 14.4 14.2 14.6 13.7 % change '73 -36.3 * -5.8 -9.8 -8.5 '74 -42.3 * -15.1 -13.8 -17.2 * significantly different from Gilroy and Tracy, and also from Watsonville-RC, P<0.05. (All Ps using individual as unit of analysis).	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

<p>McAlister 1992</p>	<p>Method of selection: Census block data were used to identify geographic areas in Eagle Pass, Del Rio and Piedras Negras that were matched according to 4 housing categories (high income, middle-to-low income, subdivisions and public housing). Panels of moderate to heavy smokers were drawn from the respondents surveyed in these matched areas. Sampling was conducted at an approximate 10% ratio with whole residential blocks selected to reduce survey costs. In Eagle Pass each block was randomly assigned within income groups to the community-wide or the intensive personal condition. High income Anglo-American areas in Del Rio were omitted from the study because there were no comparable areas in Eagle Pass.</p>	<p>Number of participants (baseline response rates ranged from 77% to 83%). 1985/1986Eagle Pass - 1130, Del Rio - 1745, Piedras Negras - 452. Cohort (panel) follow up of smokers of 10+ cigs per day (follow up was achieved for approximately 2/3 of the original panel). 1987/1988 Eagle Pass - 160, Del Rio - 135, Piedras Negras - 37 Comparability of demographic data at baseline for intervention and comparison participants: Eagle Pass and Del Rio were comparable in age, sex, education and ethnicity, and similar to Piedras Negras, except for level of education.</p>	<p>Reported for 1985/6 for smokers of 10+ cig per day: Eagle Pass: 9.2 Del Rio: 11.9 Piedras Negras: 8.2</p>	<p>Not reported.</p>	<p>Quit rate for cohort: 1987/8 Verified/ Self-reported Eagle Pass 8.1 16.9 Del Rio 1.5 P=0.02 7.4 P=0.005 Piedras Negras - 8.0</p> <p>Cohort (panel) participants in Eagle Pass Verified quit rates/ Self-reported rates 1987 1988 1989 Volunteer contact only (n=90) 7.8 7.8 17.8 Personal counseling (n=70) 8.6 7.1 15.7 (All Ps using individual as unit of analysis). Initiation rate not reported</p>
<p>McPhee 1995</p>	<p>Method of selection: Telephone surveys of randomly selected Vietnamese men. Telephone numbers were chosen randomly from the 23</p>	<p>Number of participants (response rate, %): Santa Clara County/ Houston 1990 1322 (81)/ 1581 (82) 1992 1264 (85)/</p>	<p>Reported for 1990 and 1992. Prevalence among Vietnamese men: Santa Clara/ Houston 1990 36.0/ 40.0 1992 36.0/ 41.0</p>	<p>Tobacco consumption: cigs per day among smokers Santa Clara/ Houston 1990 9.9/ 13.2 1992 9.6/ 12.0</p>	<p>Quit rate in past 2 yrs: Santa Clara/ Houston 1990 8.0/ 6.0 1992 10.0/ 7.0 The quit rates dif-</p>

Baseline data and smoking outcomes (Continued)

	most common Vietnamese names listed in area telephone books. All men aged 18+ in the household were enumerated, and 1 subject per household, among those who understood Vietnamese, was selected for interview according to a modified Kish procedure.	1209 (88) Comparability of demographic data at baseline for intervention and comparison participants. Participants differed in level of education and unemployment rate, but not in age or household income.	The prevalence of cig smoking differed significantly at baseline, but there was no significant intervention effect.	Cig consumption differed significantly at baseline, and also fell significantly in the comparison area (Houston), but there was no significant intervention effect.	ferred significantly at baseline, but there was no significant intervention effect. Initiation rate not reported
Mudde 1995	Method of selection: Random samples of telephone numbers in each city. A panel of smokers, ages 25-64 yrs, was selected from among the respondents to these calls. Members of these panels were interviewed at baseline, midway through the study and at the end of the study period, using computer-assisted telephone interviewing.	Number of panel participants (initial response rates and subsequent retention rates, %): Den Bosch/ Apeldorn Oct '89 B'line 924 (61)/ 906(55) June '90 Mid 686 (74)/ 666(74) Dec '90 Final 547 (59)/ 546(60) Comparability of demographic data at baseline for intervention and comparison panel participants: Intervention and comparison participants were comparable in age, but differed in sex and level of education.	Not reported.	Daily consumption of cigs reported for smokers at baseline: Den Bosch Apeldorn Oct '89 17.5 15.9 (individual was unit of analysis).	Quit rate: reported for midway and end of study surveys of panel members: Den Bosch / Apeldorn June '90 5 (95% CI 3-7)/ 10 (95% CI 7 to12) Dec '90 7 (95% CI 5 to10)/ 9 (95% CI 7 to11) Initiation rate not reported
Nafziger 2001	Method of selection: Independent randomly selected samples of adults, aged 20-69 yrs, were interviewed at baseline (1989), and 5 yrs	Otsego/Schoharie (I)/ Herkimer (C) Response rate '89 363/ 263/ 85.1% '94/96 289/ 259/ 77.4% Panel 1994/95 257/	Cross-sectional survey Otsego+Schoharie/ Herkimer '89 '94/96/ '89 '94/ 96 Current smokers		Note: In the panel survey, as measured by CO and self report, smoking status had declined only in intervention counties. Most reduction

Baseline data and smoking outcomes (Continued)

	later (1994/96). A panel of those interviewed in 1989 was interviewed again in 1994/5.	167/97.6%	(%) 27.9 19.0/ 24.4 28.2 CO>=8 ppm (%) 30.3 19.0/ 23.6 30.9 CO ppm 10.2 7.7/ 8.4 10.0 P<0.01 Panel Survey O&S '94/95/ H '94/95 Current smokers (%) 17.6/ 21.6 P<0.001 CO>=8 ppm (%) 21.9/ 21.1 P<0.01 CO ppm 8.1/ 8.7 P<0.01		was due to quitting, although a few individuals began smoking in the 5-yr interval. The serial cross-sectional surveys also showed a significant net reduction in smoking prevalence in the intervention counties, as measured by the population mean for exhaled CO, self report of smoking and classification of individuals as smokers by exhaled CO. We note that the significance levels are deflated, because the individual was the unit of analysis, but the unit of assignment was the county.
Nussel 1985	Method of selection: All persons, aged 30-59, were invited by the mayor of their town to participate in a health check up by their personal physician.	Number of participants: 9700 persons in Eberbach and Wiesloch participated in the initial screening, response rate, 98%. Comparability of demographic data at baseline for intervention and comparison participants not available.	Prevalence: reported for 1976/77, 1980, and 1984 E'bach / W'loch / N'mund Women: '76/77 25 / 22 / - '80 34 / 34 / 17 '84 21 / - / 28 Men: '76/77 47 / 50 / - '80 33 / 54 / 42 '84 38 / - / 35	Not reported	Quit rate since baseline (1976/77), reported in 1981/82, from a random 10% sample of 30-45 yr-old men: Eberbach 37% Wiesloch 16% Initiation rate: Eberbach 4% Wiesloch 13%
O'Loughlin 1999	Method of selection: Random selection of households in each community, using the May 1992 Bell Canada telephone directory lists of res-	Number of participants (response rate %): Cross-sectional surveys: St-Henri / Centre-Sud June '92 849 (79.3)	Reported for cross-sectional samples for 1992 and 1995 St-Henri / Centre-Sud Adults 18-65 1992 33.4 / 42.7 1995 33.9 / 46.3 There was no signif-	Tobacco consumption, cigs per day, reported for smokers in the cohort sample: St-Henri / Centre-Sud Adults 16-65 1992 21.2 / 19.7	

Baseline data and smoking outcomes (Continued)

	<p>idential subscribers (1422 households in St-Henri and 1454 in Centre Sud were selected). One adult in each household was then randomly selected from those aged 18-65 yrs, who spoke either English or French,</p>	<p>/ 825 (77.8) March '95 345 (70.6) / 229 (67.2) Cohort followed up in 1997 (retention rate %): 423 (49.8) / 396 (48.0)</p>	<p>icant difference in the ORs for smoking prevalence in 1995 relative to 1992 in St-Henri compared to Centre-Sud, P=0.55 (All Ps using individual as unit of analysis). Smokes >=25 cigs/day 1992 44.5 / 45.1 1995 38.5 / 46.7 There was no significant difference in the ORs for heavy smoking prevalence in 1995 relative to 1992 in St-Henri compared to Centre-Sud, P=0.33. Prevalence for cohort sample St-Henri / Centre-Sud Adults 16-65 1992 31.1 / 41.3 1997 29.8 / 38.0 The odds ratio for smoking prevalence in St-Henri in 1997, compared to Centre-Sud, controlling for baseline smoking and other variables was 0.9 (95% CI 0.6-1.4). Smokes >=25 cigarettes/day 1992 48.5 / 43.2 1997 37.3 / 40.9 The odds ratio for heavy smoking prevalence in St-Henri in 1997,</p>	<p>1997 19.6 / 19.2 There was no significant difference in the changes in cigarette consumption between the 2 communities.</p>	
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Baseline data and smoking outcomes (Continued)

			compared to Centre-Sud, controlling for baseline smoking and other variables was 0.5 (95% CI 0.3-1.1).		
Osler 1993	Method of selection: Random samples of adults aged 20-65 yrs, drawn from the Local Central Person Register for each municipality.	Number of participants (response rate) Total / Slangerup/Helsing '89 1072(51) / - / - '90 1196 (59)/ Women (W) 294 Men (M) 273/ W 320 M 309 Comparability of demographic data at baseline for intervention and comparison participants: These were comparable in age, sex, level of education and marital status.	Reported for 1989 and 1990. Adults 20-65: Slangerup/Helsing 1989 39.0 / 40.0 1990 41.0 / 41.0 There were no significant differences between the intervention and comparison municipalities.	Not reported	Quit rate, 1990: Slangerup / Helsing Adults: 9.0 / 10.0 W: 8.0 / 10.0 M: 10.0 / 11.0 There were no significant differences between the intervention and comparison municipalities. Initiation rate not reported
Puska 1985	Method of selection: For the 1972 and 1977 surveys, independent random 6.6% samples were drawn from the 2 counties using the national population register. For the 1982 survey, an independent random sample was drawn, stratified by sex and 10 yr age groups, for ages 25-64.	Number of participants (response rate, %) North Karelia Kuopio 1972 3807 (94) 5434 (91) 1977 3630 (89) 5272 (91) 1982 2535 (80) 2188 (82) Comparability of demographic data (age and sex) for intervention and comparison participants: No statistical comparisons made.	Prevalence: reported for 1972 and 1977 North Karelia / Kuopio Women: '72: 11.7 / 13.1 1977: 8.9 / 11.1 p<0.01 Men: '72 52.2 / 50.9 1977 43.2 / 43.3 ns For women, the relative net percent reduction in daily smoking between '72 and '77 was 8±27, and between '72 and '82, 14±38, but neither reduction is significant. For men, the rela-	Per capita consumption of cigarettes, pipes and cigars reported for 1972, 1977 and 1982 North Karelia / Kuopio Women: '72: 1.1 / 1.2 1977: 1.1 / 1.3 1982: 1.7 / 1.9 ns Men: '72: 10.0 / 8.5 1977: 8.5 / 8.5 1982 6.6 / 7.8 P<0.001	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

			<p>tive net % reduction in daily smoking between '72 and '77 was 14±10, and between '72 and '82, 28±11. Both net reductions are significant (using individual as unit of analysis). The net reduction results are from Scand J Soc Med 11: 65-68, 1983.</p>	
Ronda 2004	<p>Method of selection: Using computerized telephone registers, a cohort of 1200 smokers, aged 18+, was recruited from a stratified random sample of 6500 adults in each region. Cohorts were interviewed again in 2000 and 2001. Analysis confined to respondents to all 3 surveys, 1998, 2000, 2001.</p>	<p>Number of inhabitants reached by phone at baseline: Maastricht (I)/ Comparison (C) Reached 4242/ 4697 Smokers 1502 (35.4%)/ 1597 (34.0%) Refused: 287 (19.1%) / 383 (24.0%) Interviewed: 1998 1215/ 1214 Responded to all 3 surveys 2001 772 (63.5%)/ 736 (60.6%) Attrition 36.5%/ 39.4% Comparability of demographic data for intervention and comparison regions: Respondents from Maastricht were significantly older, more often female and more highly educated than those in the comparison re-</p>		<p>Smoking amongst cohort of baseline smokers, number and (%) 1998/ 2000/ 2001 (I) 772(100)/ 677 (87.7)/ 628(81.3) (C) 736 (100)/ 631 (85.7)/ 599 (81.4)</p> <p>There was a substantial decrease in number of smokers, almost 29% quit smoking between 1998 and 2001, but no significant difference between Maastricht and the comparison region. A national mass media-led smoking cessation campaign was implemented in the Netherlands during the time of the intervention, and probably contributed to the decrease in smokers in both regions.</p>

Baseline data and smoking outcomes (Continued)

		gion. Attrition did not differ between regions, and drop-outs did not differ from participants with respect to age, gender and education.			
Roussow 1993	Method of selection: At baseline, all white women and men aged 15-64 were invited to participate. The upper age was extended to 68 years for the 1983 survey. For the 12 yr follow up in 1991, a random sample of white participants aged 15-64 yrs was selected from the 3 towns, with approx 50 people per sex- and age-specific decile. Those who had lived in the community for <2 yrs are excluded	Number of participants (% of 1980 census) 1979 Total population: R'son / Sw'den / R'ddale Women (W): 1227 (71) /1396(74) / 1208(68) Men (M): 1051(64) /1224(65) /1082 (60) Cohort: W: 705(57) / 821 (59) / 710(59) M: 546(52) / 710 (58) / 595(55) High risk cohort: W: 243(34) / 234 (32) / 224(32) M: 333(59) / 388 (55) / 320(53) 1982 Total population: W: 1126(67) /1323 (70) /1150(64) M: 914(56) /1171 (65) /1109(62) 1991 Random sample *: W: 273 / 267/ 274 M: 264 / 273 / 269 * Response rate not reported. Comparability of demographic data for intervention and	Prevalence: reported for 1979, 1983 and 1991. Baseline prevalence and % change at 4 yrs (1983). Total population: R'son / Sw'den / R'ddale W: 20.0, -5.2/ 17.6, -3.6 / 16.1, -0.5 M: 49.1, -9.0/ 49.5, -9.1 / 45.7, -7.6 Baseline prevalence and net change at 4 yrs. Cohort: W: 17.4, -4.0 */ 14.5, -3.0 / 14.4 M: 49.1, -3.7/ 46.5, +0.9 / 44.4 High risk cohort: W: 50.6, -9.0* 50.9, -7.4 45.5 M: 80.5, -2.7 85.3, +1.3 82.5 * significantly greater net reduction compared to Riversdale. Prevalence in 1991: Random sample W: 12.1 12.4 12.8 M: 36.0 25.3 ** 34.2 ** significantly lower than both Robertson and Riversdale.	Per capita consumption of tobacco, cigs per day, reported for 1979, 1983 and 1991. Baseline per capita consumption and % change at 4 yrs (1983). Total population: R'son / Sw'den / R'ddale W: 2.9, -0.6 / 2.6, -0.4 / 2.3, +0.1 M: 10.7, -2.9/ 11.2, -2.6 / 8.8, -1.8 Baseline per capita consumption and net change at 4 yrs Cohort: W: 2.6, -0.5 2.1, -0.2 2.3 M: 10.6, -1.2 11.3, -0.4 9.2 High risk cohort: W: 7.6, -1.1 7.5, -0.4 7.3 M: 17.4, -1.2 20.5, -0.8 17.3 Per capita consumption in 1991: Random sample W: 1.9 1.9 1.8 M: 6.8 * 4.8 5.8 * significantly greater than	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

		comparison participants: The age and sex distributions of the study populations were reported as very similar.	(Significance tests used individual as unit of analysis).	Swellenden Quit rate: R'son / Sw'den / R'dale W: All Sms 31.4 *28.3 *15.5 Light Sms 52.6 44.4 28.6 Heavy Sms 21.7 23.7 10.7 M: All Sms 22.8 16.9 20.1 Light Sms 40.5 26.5 32.6 Heavy Sms 19.9 15.8 17.7 * significantly greater quit rates than in Riversdale, the comparison community.	
Schorling 1997	Method of selection: Street segments (both sides of a stretch of road between clearly identifiable intersections) selected based on block statistics from the 1990 U.S. Census. Segment adjoining a census block with at least 50% African-American (A-A) and more than 10 A-A adults living in it selected for potential sampling. Only households with 1+ A-A residents included in the survey. Roster of age, gender and smoking status of household members who were identified as A-A and	Number of participants: Buckingham / Louisa Baseline '90 304 / 344	Reported for 1990 Buckingham / Louisa Women 21.1 / 18.7 Men 34.7 / 30.5	Cigs per day, 1990 Buckingham / Louisa Women + men 14.0 / 13.4	Quit rate in 1991, after 18m of the intervention Buckingham / Louisa All respondents 9.6 / 6.2 Attend church <once/month 8.8 / 6.4 Attend church >= once/month 10.5 / 5.8 None of these quit rates differed significantly. Initiation rate not reported

Baseline data and smoking outcomes (Continued)

	aged at least 17 obtained from one respondent (n=3744). Up to 2 respondents surveyed in each smoking household. First smoker completed a full survey, if there was a 2nd smoker, or recent quitter, only their smoking habit was obtained. Smokers interviewed (n=648, response rate 72%) followed to determine smoking status 18m later (retention rate 70%).				
Secker-Walker 2000	Method of selection: Random digit dialing sampling plan, stratified by geographic area.	Number of participants (response rate, %) 1989/90 6379 (79) 1993/94 6436 (90) The number of interviews was approximately equally divided between the intervention and comparison counties (-1,500 per county) Comparability of demographic data at baseline for intervention and comparison participants: Intervention and comparison were comparable in level of education, household income and ethnicity, but not in age, marital status and % working for pay.	Reported for 1989/90 and 1993/94 Prevalence: Women Intervention / Comparison '89/90 26.1 / 26.6ns '93/94 23.8 / 25.8 P<0.04(1-sided)	Cigs per day: Women Intervention / Comparison '89/90 19.3 / 20.1ns '93/94 17.3 / 18.2 P<0.02(1-sided)	Quit rate (quit in past 5 yrs): Intervention / Comparison '89/90 23.5 / 23.5ns '93/94 25.4 / 21.4 P<0.02(1-sided) Initiation rate not reported

Baseline data and smoking outcomes (Continued)

Shelley 1995	Method of selection: Independent, geographically clustered, stratified random sample of each county in each of the 2 time periods.	Number of participants (the response rates ranged from 70% to 75%): 1985 County Kilkenny - 792; 1986 County Offaly - 604 1990 County Kilkenny - 802; 1991 County Offaly - 631 Comparability of demographic data at baseline for intervention and comparison participants: Data on age distribution for women and men and for all respondents, and the proportion of men are shown, but statistical comparisons were not made.	Reported for 1985/6, and net change after 5 yrs: Women: Kilkenny 30.3, (- 5.5): Offaly, 29.8 (-2.6): net change - 2.9 Men: Kilkenny 27.7 (-0.7), Offaly 27.7 (-2.6): Net change + 1.9 None of these changes in smoking prevalence was significant.	Not reported	Quit rate not reported Initiation rate not reported
Tudor-Smith 1998	Method of selection: Households were randomly selected with a multistage cluster sampling design, within 10 strata defined by the 9 Welsh district health authorities and the reference area. A self completion questionnaire was left for each household resident aged 18-64.	Number of participants (household response rate, and self completion questionnaire response rate, %): 1982: Wales - 18,538 (88, 67), 4 reference counties - 1483 (84, 64) 1990: Wales - 13,045 (79, 61), 4 reference counties - 4534 (77, 61) Comparability of demographic data at baseline for intervention and comparison participants: the comparison area was	Reported for 1985 and 1990 Wales / 4 counties '85 '90 '85 '90 Men and women: 32.5 27.6* / 36.0 30.6 * prevalence in Wales, in 1990, was significantly lower than in the 4 counties, P<0.05, but the net change did not differ significantly.	Cigs per day, for smokers, reported for 1985 and 1990. Wales Four counties '85 '90 '85 '90 Men and women: 17.16 17.14 17.55 17.39	

Baseline data and smoking outcomes (Continued)

		reported as closest in sociodemographic and health profile to Wales at the 1981 census.			
Van Assema 1994	Method of selection: Random sample of 1000 adults from the computerised population registries of both intervention and comparison communities. Response rate to baseline survey, Bergeyk - 77.6%, comparison municipality - 73.1%	Number of participants in cohort study: Bergeyk / Comparison Sept '91 623 / 608 Retention rate at this, the 3rd survey, 81.8%.	Reported for Feb '90, Feb '91 and Sept '91. Bergeyk / Comparison Feb '90 35.9 / 32.7 Feb '91 31.8 / 31.5 Sept '91 32.6 / 32.3 The proportions of smokers in Bergeyk and the comparison municipality did not differ significantly between Feb 1990 and Feb 1991, nor between Feb 1990 and Sept 1991, P=0.19 for each chi square test. (Ps using individual as unit of analysis).	Not reported	Quit rate not reported Initiation rate not reported
Weinehall 1999	Method of selection: Each year, starting in 1985, all people 30, 40, 50, and 60 yrs of age in Norsjo municipality were invited annually to a health provider survey. Participants of the 1986 survey were invited to a re-survey after 2 and 5 yrs, and constituted the Norsjo panel. The reference area surveys, in 1986 and 1990, were independent samples as part of the MON-	Number of participants (response rate to the MONICA surveys, %): Cross-sectional interviews: 1985-1992 Norsjo - 1893 in 8 independent samples. The average participation rate was 93% - range 81%-96%. Norsjo panel: 1986 - 260, 1988 - 187, 1991 - 183. 154 (64%) responded to all 3 surveys. MONICA (cross-sectional interviews) 1986 - 1625 (81), 1990 -	Cross-sectional interviews Norsjo '85 '86 '87 '88 '89 '90 '91 '92 Women (W): 18 24 26 20 26 24 21 20 Men (M): 25 16 17 23 25 21 19 24 Reference Population '86 '90 W: 26 26 M: 23 23 Panel : '86 '88 '91 W: 17.5 12.5 13.8 M: 16.2 16.2 13.5	Not reported	Quit rate not reported Initiation rate not reported

Baseline data and smoking outcomes (Continued)

	ICA project .	1583 (79). Comparability of demographic data at baseline for intervention and comparison participants: Comparable in age and sex, but not in level of education or social class.			
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Analysis 1.2. Comparison 1 Results, Outcome 2 Effects on mediating variables and process outcomes.

Effects on mediating variables and process outcomes

Study	Intermediate Outcome	Process Evaluations	Programme exposure
Anantha 1995	No evidence related to mediating variables was found.	Information was gathered with regard to exposure, reach and impact of programme activities.	Detailed information was gathered in relation to programme exposure. Two thousand handbills and 500 health education folders were distributed. One hundred pocket cards, 40 photo albums and four sets of information boards were also used. Films were screened at least twice in each of the intervention villages. In order to examine the impact of health education material, the proportion of quitters and non-quitters was compared for those exposed to different health promotion activities. There was no difference in the proportion of quitters and non-quitters for those exposed to textual information and interpersonal communication using photocards. However, the proportion of quitters viewing audiovisual materials was greater than the proportion of non-quitters. Dose-response: No evidence of an overall dose-response, nor evidence comparing dose in the intervention and comparison areas were found.
Baxter 1997	Past quit attempts, 'would like to give up smoking', and passive smoking (two items: I live with a	No evidence was found.	No evidence was found.

Effects on mediating variables and process outcomes (Continued)

	<p>smoker, I often spend my day where people smoke) were assessed. Pre- and post-intervention results for passive smoking showed reductions in both conditions, but there was no net intervention effect. Results for past quit attempts and 'would like to give up smoking' were not found.</p>		
Brownson 1996	<p>No evidence related to mediating variables was found.</p>	<p>Each coalition was required to keep detailed records of project activities. A 'comprehensive qualitative evaluation' was conducted including coalition member and leader focus group analysis and level of effort analysis of coalitions. However, only selected findings from these analyses were found. A case study involving focus groups of 'successful' and 'unsuccessful' coalition members was conducted in an attempt to identify the characteristics associated with attainment of intermediate outcomes. Differences between the positive and negative case were found on decision-making for health promotion activities, scope of health problems and populations addressed, methods for encouraging community participation, benefits and costs of membership and approach to coalition institutionalization. Media content analysis was also conducted.</p>	<p>Evidence relating to exposure: Information relating to dose and awareness of programme activities was collated. Outcomes were examined separately for those who had heard of the programme and those who had not.</p> <p>Dose-response: Smoking prevalence was not significantly reduced in the group who had heard of the programme in comparison with those who had not, nor for communities with coalitions compared with those without. This may be partly due to programme activities focusing on physical inactivity, obesity and hypertension, but not smoking. Process records showed that smoking-related events were not among those most frequently held and therefore that dose in relation to smoking was low. No evidence comparing dose in the intervention and control areas was found.</p>
Bruckert 1999	<p>Level of tobacco dependence was assessed at baseline, but no data concerning this was found. Knowledge of cardiovascular risk factors was assessed, with 48% of respondents naming tobacco. Most respondents in Epernon had talked about cardiovascular illnesses with health professionals, other citizens or their children. A number of other health-related attitudinal variables were studied, including one concerning measures to re-</p>	<p>Little evidence was found concerning the processes used to develop the various components of the intervention, but city officials, local health professionals and sports' personnel were all involved, and communication professionals also assured the quality of the materials.</p>	<p>During the intervention, 5 information campaigns were implemented, each lasting for 4m. Conferences and exhibitions were held, and 55,000 brochures were distributed. In addition, an educational campaign was also developed by teachers, and implemented in the schools, to make children aware of what could be done to prevent heart disease and to have them pass these ideas onto adults.</p> <p>A survey, 6m after the end of the</p>

Effects on mediating variables and process outcomes (Continued)

	<p>strict smoking. In Epernon, this attitude scarcely changed during the intervention, but in the comparison towns it became more hostile (+1% vs +12%).</p>		<p>campaign, showed that 7/10 people knew Epernon was the site of an information campaign to prevent cardiovascular disease. 84% of adults and 94% of children said they knew one or more of the documents used in the campaign. The principal risk factors for heart disease were well understood, and among those adults touched by the campaign, 9/10 said that it delivered important information, and 97% that it should be implemented in other towns in France. Dose-response: The intervention was not effective in changing smoking behavior.</p>
<p>Carleton 1995</p>	<p>Knowledge concerning cardiovascular disease risk was assessed at baseline, but no data related to baseline values or follow up were found.</p>	<p>Particular emphasis was placed on formative and process evaluation, the first stated purpose of which was to examine programme implementation in detail and to evaluate its short-term impact. This was achieved by 'intervention tracking'. A computer-based system tracked the amount of intervention received, and provided a historical record of the programme. All participants were asked to complete a 'contact card'. This enabled them to be tracked throughout the course of the programme. In addition to individual participation in programmes, the level of community involvement was recorded i.e. the number of community organizations and volunteers involved in programme delivery. The evaluation of individual component programmes in relation to quality and short-term impact facilitated ongoing refinement of activities. Follow-up telephone interviews were conducted with randomly selected programme participants. The second main aim of process evaluation was to detect major con-</p>	<p>Detailed information was gathered in relation to programme exposure. Over the course of the programme 42,000 individuals participated in one or more programmes resulting in over 110,000 separate interactions with a programme designed to influence behaviour. Although the programme reached a 'broad array of residents' no direct evidence relating dose to outcomes or comparing dose in the intervention and comparison areas was found.</p>

Effects on mediating variables and process outcomes (Continued)

		<p>founding influences. 'Community tracking' was achieved through annual interviews with key informants in community agencies and provided ongoing assessments of secular trends by measuring variables such as quality of health care, social support networks and participation in healthcare initiatives and activities not associated with Pawtucket. Content analysis of major newspapers in each city for health-related articles and cigarette advertisements was undertaken.</p>	
<p>COMMIT 1995</p>	<p>In the cohort follow-up analyses, time to first cigarette, desire to quit, quit attempts in the past yr and the presence of another smoker in the household were assessed at baseline, but no post-intervention results for these were found. 'Smoking unacceptability' for heavy and light-to-moderate smokers did not differ between intervention and comparison conditions at the final follow-up survey in 1993. For the independent cross-sectional follow-up analyses, desire to quit, past quit attempts and methods used in trying to quit were assessed at baseline, but no post-intervention results for these were found. 'Smoking unacceptability' for smokers and recent ex-smokers did not differ between intervention and comparison conditions at the final survey in 1993. Two attitudinal indices were devised, one addressing smoking as a public health problem (smoking control in public places, legislative control, smoking control in health settings and smoking control in schools), and the other norms and values concerning smoking (belief in the harmfulness of smoking, social actions concerning smoking and risks of second-hand smoke). In the independent cross-sectional</p>	<p>The evaluation included extensive procedures to track activities in both intervention and comparison communities and to monitor implementation of the intervention. The extent to which trial-wide mobilization goals were met by each community and the extent to which a standard protocol could be implemented across diverse communities was examined. Multiple methods were used. A computerized record-keeping system monitored by the co-ordinating centre tracked the implementation of required intervention activities. Extensive documentation produced by staff and volunteers e.g. annual action plans logged project activity and also recorded the community mobilization process. These were supplemented with community visits and semi-structured interviews with key volunteers. Worksite surveys examined policies and support resources for smokers, and 2 separate surveys (a telephone survey of office practices and a postal survey of individual practitioners) evaluated the impact of the health provider channel. Community surveys, surveys of religious organi-</p>	<p>Detailed information was gathered in relation to programme reach and exposure. COMMIT objectives established the minimum level of activity to be conducted annually in each community for the 4 intervention channels. The mean level of attainment across the 11 sites varied from 90% to 93%. Nearly all mandated activities were implemented in each intervention site. Extensive analysis of summative survey data was also undertaken: Five receipt indices each associated with a major component of the intervention and 3 additional indices representing more general activities were summed to provide a measure of 'dose' for both intervention and control communities. The overall receipt index showed that persons in the intervention community were significantly more likely to recall exposure to smoking control activities than those in reference communities in both cohort and cross-sectional follow-up samples. However, the magnitude of mean differences in individual receipt indices between the 2 groups of communities was small. Dose-response: Receipt index differences were computed for each</p>

Effects on mediating variables and process outcomes (Continued)

	<p>follow-up analyses, for all subjects, the index of smoking as a public health problem did not differ at baseline between intervention and comparison cities, and although there was a significant difference in 1993 between conditions, the extent of change within condition did not differ. For heavy smokers, perception of smoking as a public health problem did not differ at baseline between intervention and comparison cities, but differed significantly in 1993, and the change since baseline also differed significantly. For light-to-moderate smokers, perception of smoking as a public health problem did not differ at baseline between intervention and comparison cities. Although there was a significant difference in 1993 between conditions, the extent of change within condition did not differ. There were no differences in this index in 1993 for recent ex-smokers or never-smokers. For the norms and values index, no intervention effects were observed for all subjects, nor for heavy smokers, light-to-moderate smokers, recent ex-smokers or never-smokers. the cohort follow-up analyses, for all subjects both indices showed positive attitudinal changes favouring non-smoking, in both intervention and comparison conditions, with no significant difference between them. Subgroup analysis showed a significant intervention effect for light-to-moderate smokers, the group of smokers for whom there was a significant intervention effect on quit rates.</p>	<p>zations and surveys of cessation resource providers in both intervention and reference communities were also undertaken. Media coverage of tobacco-related news and information (including billboards) was tracked in all communities and annual legislative tracking assessed changes and additions to tobacco control laws. Additionally, all communities were monitored quarterly for social, political, economic and other developments that might affect the success of the project in the intervention areas or influence tobacco control activity in the reference areas. Focus groups with former COMMIT volunteers and staff in each community were undertaken to assess continuation of project activities after the formal termination of funding. A cost-tracking system monitored staff and material inputs for the economic evaluation.</p>	<p>community pair and correlated with differences in outcomes . In the cohort follow-up analyses, the variability across community pairs in receipt index difference did not result in a correlation with differences in quit rates among heavy smokers but there was a significant correlation among the light-to-moderate smokers among whom there was a significant behavioural change. Cross-sectional follow-up analysis showed that differences in the summary receipt indices between intervention and comparison communities were correlated significantly with differences in the quit ratio but not with differences in change in prevalence.</p>
<p>Domenighetti 1991</p>	<p>Knowledge of risk factors increased in the canton of Tessin between 1987 and 1988/89, but no comparison with the cantons of Vaud and Fribourg was found.</p>	<p>Surveys investigated reach and awareness of intervention activities and the acceptability of the programme. No further details were found.</p>	<p>Estimates of adult exposure to many of the intervention components, and numbers of public events, both local and canton-wide, were provided.</p>

Effects on mediating variables and process outcomes (Continued)

			No evidence was found on dose-response.
Egger 1983	Knowledge of the effects of smoking and attitudes to smoking were each assessed by 6 questions. Social pressure to quit was also assessed. No significant changes in knowledge or attitudes were found. There was a small effect of social pressure on the decision to quit smoking in Lismore, compared with Coff's Harbour and Tamworth, but significance levels were not reported.	Focus groups and spot telephone surveys were conducted at regular intervals to assess the effectiveness of the intervention techniques used and programme participation and exposure were documented. No further detail of methodology given.	Detailed information was gathered in relation to programme exposure. 386 people took part in the community anti-smoking components. 1500, quit kits, 6000 fact sheets, 200 tip packs were distributed in addition to 5800 quit-line telephone messages. Dose-response: No direct evidence relating dose to outcomes was presented although reported influences in the decision to quit were measured. No evidence comparing dose in the intervention and comparison areas was found.
Fisher 1998	The baseline assessment included questions concerning knowledge of tobacco-related health risks, social and community support, and respondents' estimates of community attitudes about these issues. No details about responses to these questions were found.	Minutes of project meetings and other associated documentation were collated in order to provide a record of programme implementation, including engagement of target audiences in project governance and programme activities. No further methods reported.	Evidence relating to exposure: No numerical details concerning intervention components were found. Dose-response: Evidence was presented to suggest a significant dose-response relationship. The decline in prevalence among those who were aware of the Grace Hill programme was highly significant compared with those who were not. Evidence comparing dose in the intervention and control areas was also presented. Those in the intervention areas were significantly more likely to be aware of the programme (59%) than those in the control areas (6%).
Fortmann 1993	At baseline, knowledge, attitudes to smoking and past quit attempts were assessed. There was no difference in knowledge of the risks of smoking between the intervention cities and the comparison cities. 'Intend to quit' was significantly higher in the intervention cities than in the comparison cities, but 'confident could quit' and negative attitudes to smoking did not differ. Data on previous quit attempts	Extensive formative evaluation was undertaken to assist in the design, development, production and reach of programme activities. Individual component programs were evaluated in relation to reach and impact on behaviour change.	Detailed information was gathered in relation to programme exposure. It was estimated that overall each adult in the target population was exposed to about 5 hours of educational messages per yr. However, the evaluators suggest that despite the strength and breadth of the intervention, it may have been limited in comparison with the general environment: the average USA adult views approx-

Effects on mediating variables and process outcomes (Continued)

	were not found. Knowledge of cardiovascular risk factors, which was measured with a 17-item scale, increased steadily in both intervention and comparison groups during the course of the study, but the improvement was significantly greater at each follow up in the intervention cities. Predictors of a positive change in cardiovascular risk factor score during the intervention were also examined, but the scales for health attitudes and self-efficacy used in this analysis did not include items related to smoking.		imately 292 hours of tv commercials a yr. Additionally only a third of the adult study population used the study's educational materials or took part in one of its risk factor modification programs. Dose-response: No direct evidence relating dose to outcomes was presented. No evidence comparing dose in the intervention and control areas was found.
Giampaoli 1997	No evidence was found.	No evidence was found.	No evidence was found.
Goodman 1995	Knowledge that smoking increased a person's chance of heart disease was high among both African Americans and Whites with less than 12 yrs of education in the intervention town, and did not change appreciably during the course of the 4-yr intervention. No comparison with the reference area was found.	Considerable process evaluation was undertaken. The extent to which the programme was implemented as planned in its original proposal was examined along with the factors that influenced this. The interaction of different interest groups with the project was also documented and the strengths, unanticipated benefits and 'spin-offs' from the project were recorded. This was achieved through analysis of project documentation (quarterly reports, renewal grants and other project memoranda) and interviews with key stakeholders. Those interviewed included advisors from the Department of Health, administrative and other project staff, co-ordinating council members, staff from local agencies contracted to implement project activities and community volunteers. Means of participation, associated benefits and areas for improvement were identified through these interviews.	Information was gathered in relation to programme exposure. Overall there were 32,000 contacts with programme participants. However, only 11 out of 585 programmes targeted smoking cessation. These programmes reached 368 smokers. It is unclear whether activity to raise public awareness (a further 64 programmes, reaching 1954 people) included messages about smoking. Dose-response: No direct evidence relating dose to outcomes was presented. No evidence comparing dose in the intervention and comparison areas was found.
Gutzwiller 1985	No evidence related to mediating variables was found.	No evidence was found.	No evidence was found.

Effects on mediating variables and process outcomes (Continued)

Hancock 2001	Detailed data concerning knowledge of ways to reduce risk of lung cancer and skin cancer, and what changes to look for in skin cancer, were collected from all respondents at baseline. For women data concerning knowledge of ways to reduce risk of cervical cancer, when to begin having Pap smears and when to stop, what to do to help detect breast cancer early, and when a healthy woman should begin having mammograms and when she should stop were also collected at baseline. Detailed analyses of responses to these knowledge questions were presented, but no subsequent follow-up data were found.	Monitoring of all activities allowed an accurate description of the intervention to be given. Programme awareness and reach were documented and a measure of the acceptability of community programs was obtained. Minutes of committee meetings were collated and standard activity summary sheets recorded the number and type of activities and resources used within towns and community responses to the activities. Postal and telephone surveys assessed change in policies and practice pertaining to smoking in schools and local government organizations and the number and quality of all relevant media reports (including content analysis of newspapers) was monitored in all study towns. Exposure to and awareness of relevant activities was also assessed during the follow-up summative evaluation surveys in both intervention and control towns. Although outlined in detail, no information pertaining to process outcomes was found.	Detailed information was gathered in relation to programme exposure. However, descriptive information presented in relation to reach was limited. The number of intervention towns undertaking specific types of smoking-related activity was reported, and tracking of smoking-related activities showed that there was no notable variation in the overall activity between the intervention towns. Dose-response: No direct evidence relating dose to outcomes, or comparing dose in the intervention and control areas was found for adults.
Heinemann 1986	No evidence related to mediating variables was found.	Preparation work was done in the the year preceeding the start of the intervention, but no details were found.	The number of health-related talks, health service talks, sports groups, provision of advice about weight, diet and smoking, and health matters for city and business employees was substantially greater initially in Schleiz than in Dippoldiswalde, but tended to fall over time, while those in Dippoldiswalde increased, though to a lesser extent.
Hoffmeister 1996	Health attitudes were included in a 91-item questionnaire, and were assessed at baseline and after 3.5 years. No results for these assessments were found, and health attitudes were not mentioned in the 7-yr results.	The stated aim of process evaluation was to trace a connection between intervention measures and expected change in target variables. This was achieved by: 1) Maintenance of bi-annual reports and qualitative descriptions of measures and strategies by those involved in implementation. 2) Documenta-	It was reported that those from lower social classes were found to have a low level of programme awareness. Despite detailed information being gathered in relation to programme exposure, no direct evidence relating dose to outcomes or comparing

Effects on mediating variables and process outcomes (Continued)

		<p>tion of organizational processes and structural changes within the intervention communities and their influence on the intervention. 3) Annual participant surveys measuring involvement in the programme and its intermediate effects. 4) Contact analysis in which details of individual contacts were recorded against time using a standardized sheet, which enabled the type and purpose of contact and the type of organizations involved in the study to be examined for different project stages and for the impact of individual components. 5) Content analysis of newspapers. Published evidence from these reports, surveys and analyses was limited.</p>	<p>dose in the intervention and comparison areas was presented.</p>
<p>Jenkins 1997</p>	<p>Attitudes, norms, quit attempts and social pressure to quit were assessed at baseline and post-intervention. Motivation was assessed as 'how much want to quit', quitting self efficacy as 'how difficult to quit', quit attempts as 'ever tried to quit', and if so how many times, social norms regarding smoking as 'how many friends smoked' and 'if members of the household smoked', and pressure to quit for smokers and ex-smokers as 'have you been advised to quit by family or friends'. Motivation, self efficacy, ever tried to quit and number of attempts were all significantly greater in Santa Clara County at baseline than in the comparison area. Motivation, ever tried to quit and number of attempts increased significantly in both conditions during the intervention, but did not differ at the follow-up survey. Self efficacy did not change significantly. The number of friends and household smokers did not differ at baseline. The number of friends who did not smoke increased significantly in</p>	<p>Exposure to programme activities was assessed during the follow-up summative evaluation surveys. The quality of educational materials was also assessed. Although limited detail is given, 96.4% of physicians at post-test reported that the programme's health education materials had been helpful.</p>	<p>Detailed information was gathered in relation to programme reach and exposure. Follow-up survey samples in each area were asked about their awareness of project activities utilizing the following media: newspapers (articles and advertisements), television, billboards and public speaking. Significantly more respondents were aware of intervention activities through all media except newspaper articles and public speaking in intervention as opposed to control areas. Both smokers and non-smokers in the intervention area reported significantly more exposure to intervention activities than those in the control area. In the intervention area significantly more physicians reported using Vietnamese-language anti-smoking brochures, providing self-help kits and referring patients to a smoking cessation programme at follow up compared with baseline. Dose-response: No direct evidence relating dose to outcomes was presented.</p>

Effects on mediating variables and process outcomes (Continued)

	<p>both conditions and the number of household members who smoked diminished significantly, but there was no difference between conditions at the follow up. Pressure to quit increase significantly in both conditions, and also did not differ at the follow up.</p>		
<p>Lando 1995</p>	<p>Data were collected on health attitudes and beliefs at baseline, but no outcome results for these were found. Readiness to quit, as a predictor of smoking behaviour change, was assessed using 2 3-item scales from the baseline survey, one scale for 'interest in quitting' (a=0.76), and the other for 'quitting in past year' (a=0.64), and the combined 6-item scale, 'readiness to quit' (a=0.76). Both 3-item scales predicted quitting at the 2- and 7-yr follow ups, but not at the 4-yr follow up. With both scales in the model, only 'interest in quitting' was significant at the 7-yr follow-up. There was no difference in 'quitting in past year' scores between intervention and comparison conditions at any of these 3 follow-up intervals.</p>	<p>Extensive formative and process evaluation was undertaken. Individual component programmes were evaluated in relation to participation or reach, quality and impact on behaviour change. A dedicated formative evaluation group evaluated 20 to 30 approaches per yr and those that were ineffective were eliminated. The predominant methodology was the telephone survey, for example, a telephone survey was conducted to assess changes in physicians' practices in relation to risk reduction. Data about each intervention activity were logged on a computerized event history record and assigned a weight dependent on quality criteria. This enabled the production of quarterly reports showing programme contacts and programme by programme contributions. Incorporation of programme activities into the community, perceived ownership of the programme and programme sustainability were tracked. The theory that the supply and demand for heart disease programmes would be higher in intervention communities than in comparison areas towards the end of the intervention period was also examined, although results were mixed.</p>	<p>Detailed information was gathered in relation to programme exposure. Over 60% of the target population participated in the screening education programme and more than 30% were recruited to face-to-face intervention programmes (most of the young people resident in study areas were involved in school-based activities.) The increased effect observed towards the end of the study is consistent with the increased delivery of anti-smoking messages and activities late in the intervention programme. However, risk reduction activities increased over time in the control areas. Exposure was significantly higher in the education communities compared with comparison communities after 1 and 3 yrs but not after 5 or 6 yrs. No significant differences were found among smokers in intervention and comparison communities with respect to reported exposure to cessation messages. Participation in smoking cessation programmes was minimal in both intervention and comparison areas, whereas exposure to media messages regarding smoking was high. Thus the exposure data suggest that the programme may not have added a great deal to the level of risk reduction activity that may have occurred in its absence. Dose-response: A study of the screening education programme in</p>

Effects on mediating variables and process outcomes (Continued)

			one community showed that 1 yr after screening, smoking prevalence was significantly lower in the intervention group. No further direct evidence relating dose to outcomes was presented.
Lupton 2002	No evidence related to mediating variables was found.	A process evaluation was carried out to study the interaction between outside experts and community members, but no details were found related to this. Nor were details provided concerning the actual implementation of the intervention, such the number of work-sites visited or courses given. During the first 2 yrs there was a major crisis in the fish resources, which severely affected the communities. During this time, the focus was on improving working conditions rather than on changing individual lifestyle. Individual counseling was more strongly emphasized after 1990.	27% of men and 20% of women were aware of the program, and more than 20% had discussed the project, and regarded it positively and helpful for behaviour change. Dose-response: No evidence was presented for a dose-response of smoking behaviour in relation to the extent of the intervention.
Lupton 2003	No evidence related to mediating variables was found.	A process evaluation was carried out to study the interaction between outside experts and community members, but no details were found related to this. During the first 2 yrs there was a major crisis in the fish resources, which severely affected the communities. This led to a change in emphasis, from individual lifestyle change to environmental changes, and facilitation of healthy lifestyle choices. Several details were provided concerning the number of people involved in suggesting health promoting activities for the project manuals, and the numbers involved in sports activities, cholesterol screening in grocery stores, and cookery classes. At the end of the intervention, in 1991, smoking was confined to smoking rooms in the health centre, schools and kindergartens.	Evidence related to exposure: 77% of men and 82% of women were aware of the programme, and more than 40% had discussed the project, and regarded it positively and helpful for behaviour change. 1 in 3 were aware of the project manual, and 11% of men and 18% of women had participated in project activities. Dose-response: The intervention was not effective in changing smoking behaviour.

Effects on mediating variables and process outcomes (Continued)

Maccoby 1977	Knowledge of cardiovascular risk factors was assessed by a 25-item questionnaire, which included 3 items about smoking. There were significant increases in overall knowledge scores in the 2 intervention cities after 2 yrs, compared with Tracy. The intensive instruction intervention of the high risk group in Watsonville improved this.	The media campaign was monitored and feedback used formatively. Network analysis was also used to trace the path of communications within the community, however limited information is presented in relation to this.	Information was collected in relation to the number of mass media messages broadcast. Dose-response: Evidence was presented to suggest a significant dose-response relationship. Increased levels of intervention exposure were associated with improvements in knowledge of CVD risk. No evidence comparing dose in the intervention and comparison areas was found, but the gains in knowledge of CVD risk were greater in the intervention cities than in Tracy.
McAlister 1992	Significant intervening variables and social psychological processes related to smoking cessation were to be analyzed, and baseline pre-exposure knowledge, attitudes and behaviours related to the goals of the project were obtained. No results of the baseline assessment or later outcomes were found.	Numerical information was recorded in relation to dose and reach of mass media messages. Systematic interviews were conducted with community workers and volunteers to assess dose and response. Formative evaluation involved focus groups to preview and test the design and content of mass media messages. Feedback from the community during campaigns was also used formatively.	Information was gathered in relation to programme exposure. Of 288 people who received intensive personal contact in El Paso, 166 accepted services and 32 were formally counseled for smoking cessation. In Piedras Negras it was estimated that 2/3 of the 166 eligible households received the minimum contact intervention. Dose-response: No direct evidence relating dose to outcomes for the study population was presented. No evidence comparing dose in the intervention and comparison areas was found.
McPhee 1995	Motivation to quit, confidence in quitting, ever tried to quit and number of quit attempts were assessed at baseline and post-intervention. There were no differences in these measures at baseline. Following the intervention, the changes were similar to those reported in Project I: Motivation, ever tried to quit and number of attempts increased significantly in both conditions, but did not differ post-intervention. Confidence did not change significantly.	Exposure to programme activities was assessed during the follow-up summative evaluation surveys. No further methodological details were found.	Detailed information was gathered in relation to programme reach and exposure. Articles in newspapers resulted in 465,000 print media exposures, 15,000 brochures and 4600 copies of the quit kit were distributed and the media campaign resulted in 2.8million exposures. Television advertisements resulted in 100 mins of air time, 25 presentations took place at community events, 68 general practitioners participated in training and 400 students took part in Saturday school activities. Results suggested that the intervention achieved broad pen-

Effects on mediating variables and process outcomes (Continued)

			<p>etration in the target community, especially among smokers. Follow-up survey samples in each area were asked about their awareness of project activity through the following media: newspapers articles & advertisements, television, billboards and public speaking. With the exception of newspaper articles, recall of each of these 5 elements was significantly greater than in control areas. The percentage of current and former smokers who had been advised to quit by a general practitioner rose significantly and to the same extent in both intervention and control areas.</p> <p>Dose-response: No direct evidence relating dose to outcomes was presented.</p>
<p>Mudde 1995</p>	<p>Assessment of beliefs concerning the pros and cons of smoking, social support for not smoking, and self efficacy to refrain from smoking in several situations were obtained at baseline, but no post-intervention results were found. The % of smokers attempting to quit did not differ between conditions at the June 1990 and the December 1990 follow-up interviews.</p>	<p>Two programme components (group smoking cessation support and a self-help manual) were evaluated individually for reach and effectiveness. Numerical records relating to participation in group sessions, distribution of self-help manuals, calls to the quit line and media messages were maintained. Awareness and clarity of messages and participation in activities was also assessed during the endpoint survey. Telephone interviews with general practitioners assessed relevant health promotion activity.</p>	<p>Detailed information was gathered in relation to programme exposure. It was estimated that between 6 and 11% of the potential target population was reached by intervention elements. Overall evidence comparing dose in Den Bosch and Appeldorn showed that awareness of local smoking cessation activities over the intervention period did not differ significantly between areas. Significantly more respondents in the intervention area recalled messages indicating the existence of the self-help manual and a group cessation programme, and more subjects in the intervention area owned a manual. However, fewer subjects in the treatment city had called a telephone quit line and there were no differences between cities in the number of those who had acquired written materials other than the self-help manual, participated in a group programme or received advice to quit from a general practitioner. Thus the avail-</p>

Effects on mediating variables and process outcomes (Continued)

			<p>ability of smoking cessation support messages in the control community may have been one contributing factor to the lack of net intervention effect.</p> <p>Dose-response: No significant relationship was found between quitting behaviour and exposure to intervention elements. Only 27% of those who had quit reported that programme messages had influenced their decision.</p>
Nafziger 2001	No evidence related to mediating variables was found.	<p>Details of the number of organizational leaders interviewed (384) and the important findings of the community organizing process were reported, together with way these findings influenced the setting up of the Advisory Councils and the 24 local health committees. No details of the membership of these councils and committees, frequency of meetings, or how they functioned were found.</p>	<p>Neighborhood and workplace screenings for cardiovascular risk factors reached >8,500 residents in the intervention counties. Tips and fact sheets were mailed to >900 community agencies, organizations, health providers and schools each month. The school-based component of this program provided presentations to 18% of the combined population of the 2 intervention counties. No evidence of exposure to, or participation in, smoking cessation activities was found.</p> <p>Dose-response: No evidence was presented for a dose-response of smoking behaviour in relation to the extent of the intervention.</p>
Nussel 1985	No evidence related to mediating variables was found.	<p>Process evaluation examined the implementation of project activities or 'models' and demonstrated how around 50 different models gradually evolved through the participation of the community. However, no published evidence was found.</p>	No evidence was found.
O'Loughlin 1999	Data collected at baseline included behaviour-specific measures of attitudes, perceived self efficacy, knowledge of community resources, social support for positive behaviour change and intentions to change behaviour. No results for these data were found. Among the	<p>Collation of process data was achieved via 3 main types of evaluation activity : formative evaluation, evaluation of implementation and impact evaluation. Each individual component of the programme was evaluated in each of these ways. Formative evaluation involved pi-</p>	<p>Detailed information was gathered in relation to programme exposure. However, the published findings concerning this were limited. Of 39 interventions developed, 8 specifically related to tobacco and 14 were multifactorial. Awareness</p>

Effects on mediating variables and process outcomes (Continued)

	<p>cohort follow-up respondents, attempt to quit in past yr was assessed at baseline (1992) and at the follow up (1997). The proportion of smokers who attempted to quit in the past yr was similar at baseline in St. Henri and in Centre-Sud. After 5 yrs, the proportions had fallen in both communities, and there was no net intervention effect.</p>	<p>loting health promotion materials and activities on a small scale to assess relevance, comprehension and acceptability to the target audience. Implementation evaluation was conducted to determine the resources required and barriers and facilitators to implementation. Repeated awareness and participation surveys were conducted over the course of the study to measure penetration and whether objectives were being met. A variety of methods were employed to meet these aims and included consultation with the steering committee and key informants, focus group and face-to-face interviews, maintenance of journals by intervention agents and postal questionnaires. Those participating in activities were also asked to register with the programme in order that exposure could be tracked. Additionally, local heart health promotion efforts in both intervention and control areas outside the programme were monitored through regular interviews with key contacts in local health and social service centres. Systematic assessment of environmental change e.g. access to smoke-free areas, was not conducted.</p>	<p>of the programme reached 37.4% of the target population but participation was low at 2 to 3%. Dose-response: No direct evidence relating dose to outcomes was presented. No evidence comparing dose in the intervention and control areas was found. However, in discussing the lack of effect, O'Loughlin et al suggest that even if component interventions were very effective, too few people participated to bring about measurable community-wide changes.</p>
Osler 1993	<p>Health beliefs about the importance of one's own efforts and whether influenced to stop smoking by one's social network were assessed in 1990, but comparisons of these variables between conditions were not reported. 'Considered stopping smoking', and 'tried to stop smoking' were also assessed post-intervention in 1990, and no net intervention effects were seen for these variables.</p>	<p>Information pertaining to awareness and participation in programme activities and whether social networks or mass media had encouraged changes in health behaviour was gathered during summative surveys. No further evidence was found.</p>	<p>Detailed information was gathered in relation to programme exposure. Participation in programme activities was lower than expected due to failure to integrate the programme into community social organizations and institutions. A significantly higher proportion of those in the intervention area were aware of local projects. This relationship was not observed for those in the youngest (20-24 yrs) and oldest age groups (55-65 yrs) and those who were unmarried. However, in both Slangerup and Helsing about 9%</p>

Effects on mediating variables and process outcomes (Continued)

			of respondents had participated in local health projects. Dose-response: No direct evidence relating dose to outcomes was presented.
Puska 1985	Plans for this project included studying environmental, social and physical factors related to health behavior change, and included beliefs, cultural norms, peer influence, media influence, smoking policy and health services. Of the intermediate outcomes for which intervention effects were reported, knowledge of cardiovascular related risk factors increased in both North Karelia and Kuopio, with 10 to 15% correct responses in both areas, although slightly more in North Karelia. Various health-related attitudinal measures, for example, 'considered quitting in past 6-months', and 'thinks current levels of smoking are too high', showed no major changes, and no difference between areas. Quit attempts clearly increased more in North Karelia than in Kuopio between 1972 and 1977, with less difference in quit attempts after 1977, but better maintenance rates.	In order to assess feasibility of programme implementation individual activities were evaluated in relation to participation, reach, and impact on behaviour change. Numerous surveys (postal and telephone) of both the target population and professional groups within the community documented intervention progress. Frequent surveys enabled changes in intervening variables to be measured over time in order to provide insight into the process of change. The health promotion activity of local health personnel and exposure to smoking cessation advice was monitored in both experimental and control areas. Decision makers in both North Karelia and Kuopio were surveyed to assess intervention exposure and perceived adequacy of CVD control activities. Additionally, surveys of lay health workers measured their activity level, provided a descriptive account of their involvement and assessed the long-term feasibility of this approach. Content analysis of local newspapers was also conducted.	Detailed information was gathered in relation to programme exposure. Evidence comparing dose in North Karelia and Kuopio generally confirmed the effectiveness of the more active work in relation to both smoking and other risk factors in North Karelia. From 1972 to 1977, a total of 1509 articles related to CVD were printed in local newspapers in North Karelia. During the same period over 1.5 million bulletins, leaflets, posters, signs, stickers and other educational materials were distributed, a total of 251 general meetings reaching over 200,000 community members were held and approximately 800 people were trained as lay opinion leaders. Comparisons between North Karelia and Kuopio: From 1972 to 1977 there were three to four times more CVD prevention-related articles in North Karelia than in Kuopio. Local health personnel in North Karelia were found to be more active in health education measures than those in Kuopio. Although there was little difference in frequency of health-related discussions at home or in the work-site between areas, more people in North Karelia participated in organized health education meetings, and doctors and public health nurses in North Karelia made more contacts with other health professionals concerning health promotion activities than did those in Kuopio. During the first five years

Effects on mediating variables and process outcomes (Continued)

			<p>of intervention, smokers in both areas reported receipt of general practitioner advice to quit with equal frequency, but cessation advice was received twice as often from nurses in North Karelia. Later health behaviour surveys measuring exposure to cessation advice between 1978 and 1995 found that men in North Karelia had a significantly greater chance of being told to quit by a doctor or public health nurse than those in the control area. The same trend observed among women was not significant. Although health personnel were more attentive to patients' smoking the success of more intensive group support was not great. Dose-response: No direct evidence relating dose to outcomes was presented. However, about 41% of smokers who had made a quit attempt in the past year stated that nobody had specifically influenced them.</p>
<p>Ronda 2004</p>	<p>Attitudes to smoking, including intention to change smoking behavior, self efficacy and stage of change were assessed, but no data were found relating to these mediating variables.</p>	<p>A detailed process evaluation was undertaken. This included assessment of the formation and activities of the local health committees, the extent to which program activities were implemented, and the characteristics of participants, their satisfaction with programme activities and their familiarity with, and participation in, project activities. In addition, changes in organizations with health-promoting activities were evaluated in 1998 and 2001, by surveying 700 organizations in Maastricht and 577 in the comparison region. At the post-test, a larger % of organizations in Maastricht was involved in at least one health promoting activity related to physical activity than in the comparison region. In addition, the number of activities related to</p>	<p>Evidence related to exposure: 24.3% of respondents to the 2001 follow-up questionnaire were aware of the programme, and 74% were exposed to its activities, but only 15% participated in the programme. Dose-response: The intervention was not effective in changing smoking behaviour.</p>

Effects on mediating variables and process outcomes (Continued)

		healthy eating, smoking, or physical activity was higher in Maastricht than in the comparison region.	
Roussow 1993	Risk factor knowledge and attitudes were assessed at baseline, but the attitudinal results were not reported. Knowledge was assessed by 43 items, which included risk factors and diet. At baseline, knowledge was higher in the intervention towns, than in the comparison town. At the 4-yr follow up, knowledge had increased more in females in both intervention towns, and also in males in Robertson, the high intensity intervention town, than in Riversdale. Similar changes were seen in both cross-sectional follow-up and cohort follow-up surveys. At the 12-yr follow up knowledge scores were similar in all 3 towns and had increased by about 20 % points since the 4-yr follow up.	Participation and reach of activities was recorded. No further details relating to process methodology were found.	Published findings found in relation to programme exposure were limited. 156 people attended small group smoking cessation sessions. Dose-response: No direct evidence relating dose to outcomes was presented. No evidence comparing dose in the intervention and comparison areas was found.
Schorling 1997	Baseline data on mediating variables included beliefs (smoking has affected health, quitting will improve health, pros and cons of smoking), confidence would be a non-smoker in 1 yr, previous quit attempts, smoking environment (spouse or partner smokes, friends smoke), family would help to quit, friends would help to quit, and majority of people think respondent should quit. Smokers were classified into their stage of change, pre-contemplation, contemplation, and preparation, and at the follow up, action and maintenance. The baseline variables noted above were used in a multivariate analysis of factors associated with stages of change. At the follow up, progress through the stages of change was compared between conditions. There was a	Awareness of the programme and contact with particular components or activities was assessed through follow-up summative surveys in both intervention and control areas. However, no further details relating to process methods were found.	A significantly higher proportion of respondents in the intervention community compared with the control community had heard of the smoking cessation programme at follow up and reported being spoken to by a member of their church about smoking. Specific figures were not reported in relation to dose. Dose-response: No direct evidence relating dose to outcomes was presented.

Effects on mediating variables and process outcomes (Continued)

	<p>trend toward progression through the stages of change in Buckingham County at the follow up, and a significant change since baseline when compared with Louisa County. Apart from the stages of change results, follow-up findings related to the other variables which were assessed at baseline were not reported.</p>		
Secker-Walker 2000	<p>Attitudes to smoking (intention and motivation to stop smoking, motivation to continue smoking, and confidence in quitting), quit attempts and length of longest attempt, perceptions of social support, and perceptions of family, friends and community norms concerning women smoking, were assessed at baseline (1989/90) and post-intervention (1993/4) among women smokers. Smoking environment (number of household smokers, ex-smokers and non-smokers, friends and co-workers who smoke) was also measured at baseline, but post-intervention results were not found.</p> <p>Intention and motivation to stop smoking did not change significantly during the intervention in either condition and did not differ between conditions in 1993/94. Motivation to continue smoking and confidence in quitting fell significantly in both conditions, but there was no net intervention effect. The number of quit attempts in the past yr increased significantly in both conditions, but there was no net intervention effect. The length of the longest quit attempt increased significantly in the intervention counties, but not in the comparison counties, but there was no net intervention effect. Perceptions of social support fell significantly in the comparison condi-</p>	<p>Detailed process evaluation was undertaken. Individual components e.g. telephone support system, stop smoking kit, self-help video and media use were evaluated in relation to participation or reach, quality and impact on behaviour change. Surveys of health professionals, educators and high school administrators, organizations concerned with health, and worksites in all communities were surveyed to assess practice and policy in relation to smoking. A combination of postal and telephone surveys methodology was used. A community leadership survey was also conducted to assess community involvement and perceived ownership of the programme. By measuring activity in both intervention and control areas, the process evaluation was designed to detect major confounding influences and provided an assessment of secular trends. Content analysis of newspapers in each city for health-related articles and cigarette advertisements was also undertaken.</p>	<p>Evidence relating to exposure: No details of the extent to which individual programme components were implemented were found.</p> <p>Dose-response: No direct evidence relating exposure to outcomes was found. However, in comparison to the control communities, health professionals in intervention communities reported significantly more smoking-related activity, including referral of clients to smoking cessation support, distribution of self-help materials and attendance at professional training. Programme recognition and perceived ease of access to smoking information, cessation groups, support groups, one-to-one support and videotapes were also significantly greater in intervention than control areas. However, although significantly larger proportions of those in intervention counties reported hearing about smoking issues on the radio and reading about them in newspapers, more respondents in comparison communities reported seeing smoking-related issues on television.</p>

Effects on mediating variables and process outcomes (Continued)

	<p>tion and slightly in the intervention condition, but there was no net intervention effect. Perceptions of family and friends' norms concerning women smoking did not change significantly in either condition. Perceptions of community norms fell significantly in both conditions, but more so in the intervention counties, and the difference in 1993/94 was significant, indicating that women smokers in the intervention counties perceived that community members felt more negative about women smoking than in the comparison counties.</p>		
Shelley 1995	<p>Attitudes toward coronary heart disease were assessed at baseline in Inistioge, a town in County Kilkenny, but no published results were found.</p>	<p>Extensive formative evaluation was undertaken to assist in the development of programme materials and activities. Ongoing evaluation, throughout the implementation period, measured the operational strengths, weaknesses and the short-term impact of events. This information was used formatively along with feedback from the public, professionals and committee members. Regular postal surveys gathered information on awareness of the programme, participation in programme activities and intermediate trends in reported behaviour change.</p>	<p>Detailed information was gathered in relation to programme exposure. In the end point follow-up survey, 93.2% of respondents had heard of the programme. Penetration of individual media methods followed a similar pattern to the overall awareness of the programme. Men, those who were not in paid employment, those who had left school early and had fewer good health habits were less likely to have heard of the project. Numerous individual activities, including a 'quit smoking' competition, had a sizeable response. Dose-response: Project awareness was significantly associated with a composite score reflecting a change in health habits in the past 5 yrs. No direct evidence comparing dose and individual smoking-related outcomes was found. No evidence comparing dose in the intervention and comparison areas was found.</p>
Tudor-Smith 1998	<p>Health knowledge and beliefs and quit attempts were assessed. The proportion of smokers agreeing that their present level of smoking is harmful to their health in-</p>	<p>Extensive formative and process evaluation was undertaken. Formative evaluation provided rapid feedback in relation to the achievement of programme objectives and</p>	<p>It was reported that 'process information suggests that Heartbeat Wales achieved its basic aim of establishing a region-wide approach to the prevention of CVD'. The</p>

Effects on mediating variables and process outcomes (Continued)

	<p>creased in Wales and in the comparison area. Quit attempts also increased in Wales and in the comparison area. Analyses at the individual level and at the community level showed no significant differences. Perceived health, access to social support and locus of control were also assessed at baseline, but follow-up data were not found.</p>	<p>also assisted the process of identifying key causal factors leading to change. Process evaluation aimed to determine how and why changes were achieved. Detailed information was gathered with regard to the implementation of individual component programmes. Specific activities (e.g. 'quit and win' contests) were evaluated in relation to reach and impact on behaviour change. Health promotion practice among general practitioners and health visitors was measured along with organizational level change in both practice and policy (in hospitals, schools and workplaces). A variety of methods were employed including postal questionnaires and telephone interviews, and consultation with key individuals. Additionally, bi-annual tracking surveys across Wales measured intermediate effects. The process evaluation was also designed to detect major confounding influences. This was achieved by 1) active monitoring of events in the comparison area. 2) a retrospective study involving semi-structured interviews with health promotion managers to gather information on relevant heart health promotion activity by local health authorities in both areas and 3) market research surveys providing feedback on national initiatives particularly those involving the mass media.</p>	<p>number of smokers receiving advice to quit smoking did not differ significantly between the intervention and comparison areas at follow up. Dose-response: Despite detailed information being gathered in relation to programme exposure, no further details pertaining to level of programme implementation were found. Thus, no direct evidence relating dose to outcomes or comparing dose in the intervention and comparison areas was presented.</p>
<p>Van Assema 1994</p>	<p>Attitudes, social influences, self-efficacy and intention to change risk for each of the targeted behaviours (smoking, nutrition, alcohol consumption and solarium use) were assessed, but no results pertaining to these mediating variables were found for baseline or follow-up surveys.</p>	<p>The main objective was to assess what was done and how this was received by participants, group leaders and the wider community. Extensive documentation of programme implementation was undertaken including exposure and short-term impact. Data were gathered throughout the implementation period using minutes of meet-</p>	<p>Detailed information was gathered in relation to programme exposure. At post-test (in the intervention area) 82.4% of respondents were familiar with the project, 80.3% reported reading about the project in newspapers, 42% were familiar with the information centre and 37% had discussed the project with someone else. However, the num-</p>

Effects on mediating variables and process outcomes (Continued)

		ings, process reports, activity registration forms, pre-structured telephone interviews, written questionnaires and semi-structured interviews. The findings were also used formatively. Awareness and participation in the programme were also measured in the summative evaluation surveys. Sustainability of programme in the community after the formal end of the programme was also documented.	ber of inhabitants that participated in group activities (n=40) or requested self-help manuals (n=37) was limited, partly by enrolment limits due to the short duration of the project. Those who were exposed to the programme were more likely to be female, married and be more educated than the non-exposed. Dose-response: There was a trend toward a greater proportion of smokers who quit being people who were aware of the programme. No evidence comparing dose in the intervention and control areas was found.
Weinehall 1999	Perceived emotional support, based on responses to 4 items, and social network, indicating the availability of social interaction, were assessed annually in Norsjo municipality, and in 1986 and 1990 in the MONICA reference area. There was little change in the proportions of respondents with either high or low levels of emotional support in Norsjo, nor in the reference area, and no apparent difference between them. There was also little change in the proportions of respondents with extended or limited social networks in Norsjo, nor in the reference area, although the proportion with limited social networks was several % points greater in Norsjo (18.7%-22%) than in the reference area (13.5%-13.1%). No tests of significance for these comparisons were presented.	Methods included content analysis of media output and an endpoint population survey to assess project awareness and participation. Perceived control or ownership of the programme and the influence of programme activity on local health policy and practice were also measured. Further information regarding programme implementation was gathered through semi-structured interviews with key decision-makers, planners and medical staff with varying degrees of seniority.	Detailed information was gathered in relation to programme exposure. The project focused mainly on diet and nutrition with minimal emphasis on reducing smoking. Of 257 published articles, only 4 (1.6%) related to smoking, and of 63 radio broadcasts only 1 (1.6%) was about smoking. In general women and professional/non-manual workers were more likely to recall media messages than men and manual workers. Dose-response: No direct evidence relating dose to outcomes was presented. No evidence comparing dose in the intervention and comparison areas was found.

WHAT'S NEW

Last assessed as up-to-date: 30 January 2006.

Date	Event	Description
18 June 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 3, 1999

Review first published: Issue 3, 2002

Date	Event	Description
23 May 2006	Amended	Updated for 2006 issue 3 with the addition of 5 studies (Bruckert 1999, Lupton 2002, Lupton 2003, Nafziger 2001, Ronda 2004) and additional data on cost effectiveness added to one study (Secker-Walker 2000). There were no changes to the conclusions.

CONTRIBUTIONS OF AUTHORS

R Secker-Walker did initial data extraction, and wrote text and tables. He also summarised the intermediate outcomes sections.

Wendy Gnich did a literature search and data extraction. She also wrote the text related to intermediate outcomes, process evaluation and economic data for each project, and assisted with revisions.

Stephen Platt provided conceptual guidelines for the process evaluation, and assisted with revisions

Tim Lancaster provided extensive editorial support.

DECLARATIONS OF INTEREST

The first author was a principal investigator in one study included in the review.

NOTES

The Tobacco Addiction Group is sad to report the death of Roger Secker-Walker in June 2008 and gratefully records his committed work on the review. Future updates will be undertaken by other members of the Group

INDEX TERMS

Medical Subject Headings (MeSH)

Consumer Participation; Prevalence; Program Evaluation; Randomized Controlled Trials as Topic; Smoking [epidemiology; *prevention & control]; Smoking Cessation

MeSH check words

Female; Humans; Male