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ORIGINAL ARTICLES

The American Stop Smoking Intervention Study for cancer prevention: an overview

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Abstract

The American Stop Smoking Intervention Study (ASSIST) is a programme to implement proven interventions in 17 states across the United States. ASSIST applies all that we have learned in 10 years of research on tobacco use prevention and control. The goal of this seven-year project is to reduce the prevalence of smoking and cigarette consumption in the ASSIST states. The scientific basis for ASSIST is described, followed by a general description of the project and its current status in the 17 targeted states.

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Introduction

Tobacco use, responsible for nearly one in five deaths, remains the leading preventable killer in the United States. Cigarettes are involved in over 400 000 deaths in the United States each year.[1] This includes 120 000 deaths from lung cancer, more than 31 000 deaths from other cancers, more than 84 000 deaths from respiratory diseases, and 180 000 deaths from cardiovascular disease.[2] Tobacco use costs the United States $50 billion annually in direct healthcare costs,[3] and billions more in lost productivity.

Non-smokers also suffer adverse consequences from tobacco, due to involuntary exposure to environmental tobacco smoke (ETS). At least 3000 lung cancer deaths occur annually in non-smokers because of exposure to the carcinogens contained in ETS.[4] It has been estimated that another 35 000–40 000 non-smoking Americans die from heart disease due to ETS exposure every year.[5] In addition, ETS aggravates symptoms in up to 1 000 000 asthmatic children, and causes up to 300 000 lower respiratory infections in children under 18 months of age.[4]

Despite the known hazards of tobacco use, 48 million adult Americans currently smoke cigarettes.[6] Approximately 3000 young people under the age of 18 begin smoking every day,[7] in large part because of the massive promotion of tobacco products. Seventy per cent of those who smoke report wanting to quit,[8] but the addictiveness of nicotine makes this very difficult for most.

Because of the enormous health burdens caused by tobacco, including its involvement in 30% of all deaths from cancer,[9] the National Cancer Institute (NCI) has funded major research programmes to develop effective ways to reduce the prevalence of tobacco use.[10] This research, conducted over the past decade, has tested numerous different interventions delivered through different channels and designed to reach different population groups.

Background

Research in tobacco control interventions can be divided into two broad categories: interventions that focus on changing the behaviour of individuals; and interventions that focus on changing the social environment in which individuals make decisions and act on them.

Individualised approaches to tobacco control

Early efforts to reduce the use of tobacco in the United States focused on individualised approaches designed to help adult smokers to stop (cessation techniques), and on educational programmes designed to prevent the young from starting to smoke (prevention programmes). The focus of this early cessation research included self-help programmes, clinical interventions by healthcare professionals, and use of the mass media to convey cessation messages to large numbers of individuals.

This early research frequently produced only modest reductions in tobacco use. Self-help interventions that sought to motivate and educate smokers often used brochures and other written materials. Because over 90% of ex-smokers report that they stopped "on their own",[11] this low-cost approach to tobacco control has been widely encouraged. However, results showed that providing written materials alone does not significantly increase cessation rates.[12] Significant changes in smoking rates have been shown when self-help materials are used in combination with telephone counselling for smoking cessation,[13] and with nicotine replacement therapy.[14]

Studies of smoking cessation interventions in primary-care settings also produced modest results, with cessation rates improved by 5–10% when clinicians were specifically trained to offer these services.[15 16] Nicotine replacement therapy further increased

cessation rates when offered as an adjunct to counselling.[17 18] The nicotine skin patch, in particular, is a popular and effective aid in smoking cessation.[19]

Early studies of prevention interventions were almost exclusively based in schools, and similarly addressed the needs and skills of individuals attempting to avoid tobacco use. These studies of school curricula for prevention of tobacco use produced similarly limited results. The most effective programmes used in middle schools delayed the onset of tobacco use.[20] "Booster" sessions in later school years helped to maintain this intervention effect, but without these subsequent sessions, the positive effects decayed rapidly.

Early studies of mass media interventions examined the impact of widely disseminated messages crafted to encourage individual smokers to quit. The results of these media campaigns were often difficult to assess, and were typically limited by the financial resources available to purchase airtime. One review concluded that media campaigns were more effective when combined with the distribution of written materials, or with efforts to increase social supports for cessation.[21] As discussed below, mass media have been used as a communications channel in several community trials, but the impact of this portion of more complex community interventions has not been assessed.

Community approaches

With the exception of the Community Intervention Trial for Smoking Cessation (COMMIT), addressed below, early research on community-wide interventions addressed an array of cardiovascular risk factors in addition to smoking. Complex protocols were used to reach smokers through more than one intervention channel. During the 1970s and '80s, the only proven tobacco control interventions were those directed at individual smoking cessation. The impacts of these interventions were assessed by monitoring smoking behaviour within entire communities or among cohorts of smokers. Except for COMMIT, all of these community trials were based on small numbers of communities, and randomisation was not used to assign communities for intervention and controls.

The Stanford Five-City Project did report a small treatment effect on quitting behaviour, especially among male smokers.[22] The Minnesota Heart Health Programme showed a small intervention effect on the prevalence of smoking among women, but not among men.[23] The Pawtucket Heart Health Programme showed no significant intervention effect on the prevalence of smoking.[24]

The COMMIT study was specifically designed to influence smoking rates, and each intervention community was paired with a control. A modest increase in cessation rates was shown among light and moderate smokers, but no impact was seen in COMMIT on the quitting behaviour of heavy smokers.[25] Overall, a small decrease (although not statistically significant) was observed in the prevalence of smoking within the intervention communities compared with the controls.[26] COMMIT was able to demonstrate a statistically significant difference in the receipt of information within intervention communities compared with controls. This difference was consistent with the observed changes in smoking behaviour.

All of these community studies noted sizable decreases in smoking rates in the comparison communities over time. These secular trends, which overshadowed the intervention effects, demonstrate that factors other than those employed in the intervention were important in influencing smoking rates among large populations.

Recent community interventions have focused on efforts to alter the social environment that surrounds smokers and potential smokers, through good public and private policies on tobacco use.[27] Such policies can affect the use of tobacco by:

- Increasing the cost of tobacco products by raising tobacco excise taxes
- Limiting the ubiquitousness of tobacco advertising, especially advertising aimed at recruiting children to tobacco use
- Protecting non-smokers from the dangers of ETS through clean indoor air policies
- Controlling the access to tobacco products by underage youth by enforcing the laws and regulations already in place, limiting illegal sales through vending machines, and restricting free sampling and individual cigarette sales.

Evidence now suggests that public and private policies are the most powerful kind of tobacco control intervention. Policies can take the form of legislation as enacted by legislative bodies at the local, state, and national levels. Policies may also be regulations promulgated by regulatory bodies at all levels. These two types are known as "public" policies because they are enacted by persons who are elected or appointed to represent certain constituencies. Policies may also be "private" or "voluntary," such as workplace or restaurant tobacco control policies that are implemented without a public mandate.

TAX INCREASES

The impact of increases in cigarette excise taxes has been the most thoroughly documented tobacco control policy. A variety of econometric studies have examined the relationship between cigarette prices and consumption, that is, the price elasticity of demand. Fifteen of these studies were reviewed in the 1992 Surgeon General's report.[28]

The short-term price elasticity of demand for adults was consistently found to be in the range of −0.3 to −0.5. This means that a price increase of 10% produces a decrease in consumption of about 4%. Approximately two-thirds of this decrease results from people choosing not to smoke; the remainder is due to decreases in daily consumption rates by those who continue to smoke.[29 30] The rapid, predictable, and widespread impact of significant increases in excise taxes make it one of the

most effective tobacco control interventions ever tested.

Young people are at least as sensitive to price changes as adults.[31] Data from COMMIT suggest that boys in the ninth grade (aged 14–15) are more sensitive to price changes than girls in the same grade.[32]

Although most former smokers say the expense of smoking was a major reason for quitting,[33] the availability of less expensive cigarettes may help the tobacco industry retain customers who are sensitive to price. In COMMIT communities, people who used discount (generic) cigarettes at baseline were less likely to stop smoking or to reduce consumption that those who smoked premium brands.[34]

CLEAN INDOOR AIR POLICIES

The primary purpose of restricting smoking indoors is to protect non-smokers from the carcinogens and other toxins in environmental tobacco smoke (ETS). The harmful effects of ETS have been extensively documented. The US Environmental Protection Agency classified ETS as a group A (known human) carcinogen.[4] Policies to prevent exposure to ETS have been enacted by hundreds of communities, as well as through state and federal legislation, and in individual organisations and worksites across the nation.[35] Where such worksite policies do exist, occupational exposure to ETS is reduced.[36]

Several longitudinal studies have documented decreases in prevalence and increases in smoking cessation after enactment of smoking restrictions in individual worksites and healthcare settings.[37–40] Other studies have not shown such effects.[41–43] An analysis from COMMIT showed that employees in smoke-free worksites were 25% more likely to quit that workers in other worksites.[44] A large, cross-sectional survey of Californians has documented a clear relationship between smoking and worksite smoking restrictions.[45] More restrictive policies were associated with lower smoking prevalence in a dose-response relationship. Additional studies may provide a clearer picture, but there is growing evidence that smoking restrictions are causally related to reductions in smoking prevalence.

ADVERTISING

The tobacco industry spends enormous amounts on advertising and promotion. Total expenditures in the United States, which exceeded $4.8 billion in 1994,[46] reflect the importance that the tobacco industry places on marketing. Studies have associated reductions in smoking prevalence with restrictions on advertising, bans on indoor smoking, and counter-advertising campaigns.[47–50] In addition, the massive advertising campaigns that accompanied introduction of brands marketed directly to women have been associated with dramatic increases in smoking uptake among females, especially girls.[51]

The influence of cigarette advertising on attitudes and behaviour of young people has been clearly documented. At least three studies have examined the impact of the Joe Camel campaign that made extensive use of cartoon figures. A study conducted in Atlanta found that 91% of six year olds, and 30% of three year olds, correctly associated the Camel cartoon figure with cigarettes.[52] Two other studies demonstrated that teenagers were far more likely than adults to see and remember the Camel advertisements.[53 54] One study also documented the rapid rise in popularity of the Camel brand among the young, apparently in response to the massive advertising investment.[54] Among young people who smoke and buy their own cigarettes, the three most heavily advertised brands—Marlboro, Camel, and Newport—have a substantially higher market concentration than among adult smokers.[55]

Industry expenditures on promotional items (caps, shirts, etc.) have increased in recent years. Children who own one of these items are much more likely to experiment with smoking.[56]

ACCESS BY THE YOUNG

The fourth area where tobacco control policies appear to influence tobacco use includes restrictions on sales to minors. Forty-nine states and the District of Columbia have laws that make it illegal to sell tobacco products to minors, defined in most jurisdictions as those under age 18.[35] However, enforcement of these laws has been lax; minors are often able to buy cigarettes either directly or through vending machines.[57–59]

Educational efforts directed at retailers have had limited impact. Active enforcement of retail laws has reduced sales to minors.[60] Requiring retail licences for tobacco has also reduced sales to minors, experimentation with tobacco by the young, and the prevalence of smoking among young people in at least one study.[61] Another study did not find a decrease in smoking prevalence among the young six months after a reduction in sales to minors was achieved.[62]

INTERVENTION APPROACHES: CONCLUSIONS

In summary, interventions directed at individuals have produced only modest changes in smoking rates in controlled settings. In community settings, a combination of interventions produced modest changes in one large, well-designed trial (COMMIT). More recently, policy changes have demonstrated a greater impact on smoking rates than any intervention aimed only at individuals.[63]

There is now widespread agreement that the most effective intervention programmes are comprehensive.[64] The use of multiple approaches seems to have the greatest impact on smoking rates in a variety of settings. The definition of "comprehensive" has expanded during the last decade to include policy interventions as well as use of the mass media and more traditional cessation and prevention services.

Perhaps the strongest evidence supporting a comprehensive approach to tobacco control is the dramatic decrease in smoking rates that has occurred in California. During the 1988

Table 1 Current smoking prevalence (%) among adults, aged 20 years or more, in the ASSIST states and the remaining American states. From the current population survey, 1992–1993

	ASSIST states	*Remaining states*	*Total*
Total	24.6	23.8	24.1
Males	26.9	26.7	26.8
Females	22.5	21.1	21.6
White	24.6	24.5	24.6
Black	28.1	25.6	26.5
Hispanic	20.3	18.3	18.7
Other	18.9	19.0	18.9

election, the voters of that state passed a referendum to increase cigarette excise taxes by 25 cents per pack, and dedicate a portion of the funds generated to tobacco control. The money is being used to implement a comprehensive programme including support for community coalitions to encourage policy changes, and a major mass media campaign. The effort is based on NCI recommendations for states participating in the American Stop Smoking Intervention Study (ASSIST). Smoking rates in California fell by 28% between 1988 and 1993, which is twice the rate of decline before 1988.[65]

A similar programme was initiated in Massachusetts following an excise tax increase in that state. A comparable decrease in cigarette consumption has already been observed.[66]

American Stop Smoking Intervention Study

ASSIST is the largest, most comprehensive tobacco control project ever undertaken in the United States. This seven-year, 17-state, federally funded demonstration project is a unique partnership involving NCI, the American Cancer Society (ACS), state health departments and thousands of public and private organisations (figure 1). The 17 states were selected competitively, with consideration given to geographical diversity and smoking prevalence.

The primary goal of ASSIST is to reduce smoking prevalence and cigarette consumption among adults in ASSIST states. Nationwide, the prevalence of smoking among adults (aged 20 or more) was 24.1% in 1992–1993, before ASSIST interventions began.[67] At that time, smoking prevalence was slightly higher in ASSIST states than other states (table 1). The project also seeks to reduce smoking initiation among adolescents by 50%. If ASSIST achieves its objectives, it will reach 91 million people, stop two million young people from becoming addicted to tobacco products, and prevent nearly 1.2 million premature deaths.[28]

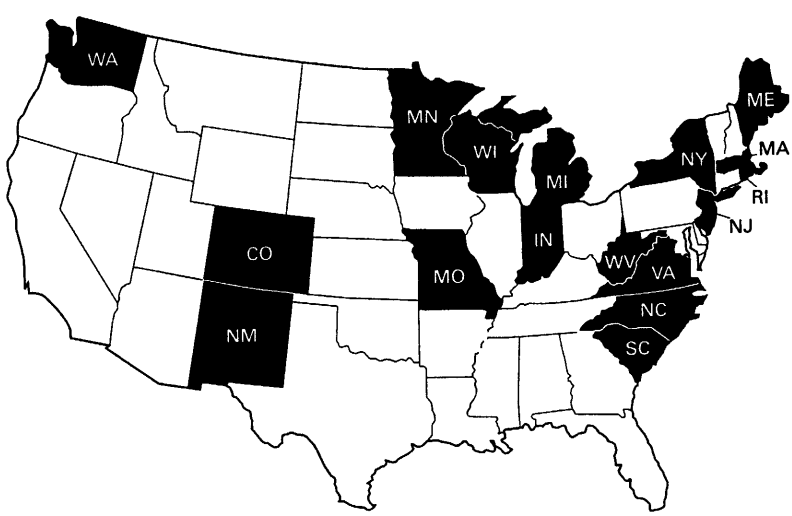

Figure 1 The ASSIST states. CO=Colorado; IN=Indiana; ME=Maine; MA=Massachusetts; MI=Michigan; MN=Minnesota; MO=Missouri; NJ=New Jersey; NM=New Mexico; NY=New York; NC=North Carolina; RI=Rhode Island; SC=South Carolina; VA=Virginia; WA=Washington; WV=West Virginia; WI=Wisconsin.

ASSIST PARTNERSHIPS AND COALITIONS

ASSIST has been designed as a collaborative effort. The ACS has participated as a full partner in planning and implementation. Drawing on its many decades of experience in cancer prevention and control, and using its extensive network of volunteers, ACS divisions and units are helping to mobilise communities and expand the delivery of smoking control interventions. ACS is making significant in-kind contributions to support the project.

State health departments are the primary contractors for ASSIST. The state health departments and ACS divisions have formed coalitions with health organisations, health and social service agencies and community groups to develop and to implement comprehensive smoking control plans.

Widespread involvement reflects the project's basic principle that optimal tobacco control occurs when community-based strategies are implemented by partnerships composed of strong health advocates and local leaders. The underlying assumption is that social change is more likely to succeed when those who will be affected are involved in planning, initiating, and promoting the change. By mid-1996, more than 6200 organisational members were participating in ASSIST coalitions.

SITE PLANNING

ASSIST is being implemented in two phases. During phase I (October 1991 to September 1993), each state conducted a detailed site analysis and needs assessment. These assessments documented: the distribution of tobacco use by age, gender and geographical area; the economic burden of tobacco use; and the social and political climate for enacting and enforcing tobacco control policies. After carefully reviewing these findings, each state developed and published its own comprehensive, five-year tobacco control plan.

During phase II (October 1993 to September 1998), the five-year intervention plans are being implemented and evaluated. Funding levels were increased from a planning level of approximately $400 000 per year per state to more than $1 000 000 per year per state. Intensive training of ASSIST staff and volunteers was a primary activity during phase I and the early years of phase II.

Table 2 ASSIST programme objectives

Community environment:	By 1998, cues and messages supporting non-smoking will have increased and pro-smoking cues and messages will have decreased
	By 1998, sites will substantially increase and strengthen public support for policies which a) mandate clean indoor air; b) restrict access to tobacco by minors; c) increase economic incentives to discourage the use of tobacco products; and d) restrict the advertising and promotion of tobacco
Community groups:	By 1998, major community groups and organisations that represent the priority populations and have broad-based statewide reach should be involved in ASSIST activities
Worksites:	By 1998, the proportion of worksites with a formal smoking policy that prohibits or severely restricts smoking at the workplace should increase to at least 75%
	By 1998, worksites reaching major target populations will adopt and maintain a tobacco use cessation focus
Schools:	By 1998, 100% of schools serving grades K through 12 and public vocation/technical/trade schools will be tobacco free
	By 1998, 100% of all schools serving grades K through 12 will use a tested, efficacious tobacco use prevention curricula
Health care settings:	By 1998, at least 75% of primary medical and dental care providers will routinely advise cessation and provide assistance and follow up for all of their tobacco-using patients
	By 1998, all public health facilities, both outpatient and inpatient, will have enforced smoke-free policies

ASSIST CONCEPTUAL FRAMEWORK: PRIORITY POPULATIONS, INTERVENTIONS, AND CHANNELS

ASSIST is designed to target groups with high rates of smoking and smokeless tobacco use, limited access to information about smoking and cessation services, and an increased risk for initiation. Based on national prevalence figures, these priority populations include the young, ethnic minorities, manual workers, the unemployed, women, heavy smokers, and smokeless tobacco users. Because of the potential for the greatest long-term impact, young people are a major focus in every state.

Three types of interventions are delivered through each channel—policy interventions, media interventions and programme services. Based on the findings from previous research, ASSIST states put the strongest emphasis on public and private policy interventions, and the least emphasis on programme services. Policy efforts are directed at restricting minors' access to tobacco, promoting clean indoor air policies, limiting tobacco advertising, and promoting higher excise taxes for tobacco products.

Media activities are designed to support these policy initiatives through well-designed media campaigns, especially use of free media. Using the media strategically to advance a social or public policy initiative has come to be defined as "media advocacy."[68]

Programme services include smoking cessation programmes and classes. Because these services are often available from private vendors, ASSIST resources are used to promote such services, but not to provide them. As policy and media interventions succeed, however, the demand for such services is expected to increase.

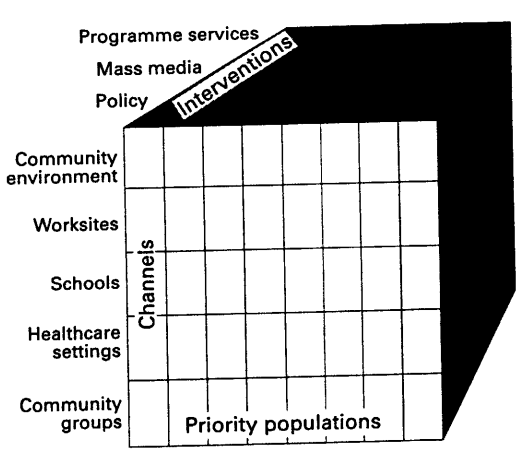

Figure 2 ASSIST planning diagram.

In each ASSIST state, the site analysis completed in phase I was used to determine the nature and degree of policy, media, and service interventions that would be needed to achieve the project goals. Annual reviews are being conducted during phase II to assess progress toward those goals and the specific objectives listed in table 2. Based on each annual review and past accomplishments, each ASSIST state refines its intervention plan.

"Channels" are the organisational vehicles and settings through which the coalitions develop and deliver interventions to the target populations (figure 2). The five ASSIST channels are the overall community environment (including local media), worksites, schools, healthcare settings, and community groups such as churches and chambers of commerce. To ensure sustained, systemic change, there should be activity within each channel, with integration and coordination across channels.

Through the community groups channel, community-based organisations have joined ASSIST coalitions and participated in educating and informing their constituents on the health effects of tobacco use and the need to support good tobacco control policies. Minority health coalitions and other ethnically diverse associations have been recruited and trained to reach their own constituencies. Youth groups and adult organisations that work with young people have also been mobilised, and have proven especially effective in attracting media attention and raising public awareness of the need for tobacco control policies. Healthcare settings provide valuable opportunities for reaching both smokers and non-smokers. All states have conducted training programmes for physicians on how to interact with and encourage their patients to quit smoking. States have also conducted trainings for nurses, dentists, and dental hygienists on optimal ways to intervene with their patients who use tobacco. In several cases, the state medical society journal has reached even more health providers with important information. More recently, states are

employing innovative approaches within this channel to reach and train home healthcare providers, operators of clinics for women, infant, and children and the greater maternal and child health community on ways to institute tobacco-free policies and help smokers to quit.

Schools comprise the channel through which school administrators are informed of the need to enact and enforce public and private smoking policies for school buildings and after-school programmes. Schools are also the means for outreach to teachers and students with strategies and interventions to prevent tobacco use and to become advocates for change.

Through the worksite channel, businesses and their associations become involved in creating smoke-free workplaces and developing programmes to support their smoking employees' cessation efforts. Some state chambers of commerce have supported and sponsored conferences and workshops for their members on various aspects of tobacco control. In addition, newsletters and information packets on relevant tobacco control issues—for example, healthcare costs, employee benefit packages, and model workplace policies—have been developed and distributed to business association members.

The community environment channel provides the best opportunity to reach the largest number of individuals. The use of mass media to promote policies that reduce tobacco use, especially among the young, is one of the most important activities in this channel.

ASSIST EVALUATION

Both formative and summative evaluation techniques are being used in this project. The primary outcome of reducing smoking prevalence will be measured through the Current Population Survey (CPS) conducted by the Bureau of the Census. CPS is a household survey of the civilian population, with sufficient sample size to document changes. It is of sufficient size to document changes in smoking prevalence in each state. Questions about prevalence were asked at baseline (1992–1993), repeated at midpoint (1995–1996), and will be repeated again at the end of the project (1998–1999). A variety of other surveys is being used to monitor smoking rates among young people and progress toward intermediate endpoints. A more complete description of the ASSIST evaluation is available.[69]

Conclusions

ASSIST is based on many years of tobacco control research and experience, and especially informed by the past 10 years of research on the impact of policy on tobacco use. ASSIST represents the best understanding of tobacco use as a public health issue, including the important social and environmental factors that affect decisions to begin and continue smoking. The project is an important departure from the traditional view of smoking as an individual behaviour, as if it were unaffected by the surrounding milieu.

ASSIST is founded on the understanding that, because individual behaviour is affected by social and economic environments, changes in those environments are effective strategies for tobacco control. Through its partnerships, coalitions, planning process, training, and technical assistance, ASSIST represents one of the most important efforts to date to reduce the leading cause of preventable death.

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