

The SUCCESS Project: The Effect of Program Format and Incentives on Participation and Cessation in Worksite Smoking Cessation Programs

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One of the weakest links in public health efforts to reduce smoking rates has been an inability to engage large numbers of smokers in intervention programs. Smokers are generally aware of the health risks of tobacco use,¹ and most express a desire to quit.² Only a small percentage do so in any given year, however, and very few use formal cessation programs that clearly increase the likelihood of success.³

A prior study by this investigative group illustrates the problem. This research found that offering free group smoking cessation programs in worksites over a period of 24 months significantly increased cessation rates.⁴ Moreover, there was a significant dose–response relationship between participation in cessation programs and outcomes; worksites with higher rates of participation had higher rates of cessation. Unfortunately, however, overall participation rates were low (12% of smokers in 24 months) so that the potential benefits of the free cessation programs were not maximized. This finding suggests that if methods could be found to induce more smokers to participate in cessation programs, much larger benefits might be realized.

One approach to increasing participation in cessation programs is to offer incentives such as monetary payments,⁵ competitions,⁶ lotteries,⁷ and tangible prizes like T-shirts.⁸ Research suggests that such incentives may increase participation.^{9–13} Their effect on cessation is less clear, however, because studies have typically examined cessation rates only among program participants rather than among eligible smokers.

Another method for increasing participation in smoking cessation programs is to make them more accessible and attractive to smokers. Most smokers who try to quit “prefer” do-it-yourself methods over formal cessation programs.^{14,15} It has thus been argued that

Objectives. This study examined the effect of program format and incentives on participation and cessation in worksite smoking cessation programs.

Methods. Twenty-four worksites were randomized to 6 conditions that differed in cessation program format and the use of incentives. Programs were offered for 18 months in each worksite. A total of 2402 cigarette smokers identified at baseline were surveyed 12 and 24 months later to assess participation in programs and cessation.

Results. A total of 407 (16.9%) of the smoker cohort registered for programs; on the 12- and 24-month surveys, 15.4% and 19.4% of the cohort, respectively, reported that they had not smoked in the previous 7 days. Registration for programs in incentive sites was almost double that of no-incentive sites (22.4% vs 11.9%), but increased registration did not translate into significantly greater cessation rates. Program type did not affect registration or cessation rates.

Conclusions. Although incentives increase rates of registration in worksite smoking cessation programs, they do not appear to increase cessation rates. Phone counseling seems to be at least as effective as group programs for promoting smoking cessation in worksites. (*Am J Public Health.* 2002;92:274–279)

programs that entail less time should attract more smokers.^{16,17}

The present report describes the results of the SUCCESS study, a randomized trial that evaluated different approaches to increasing the participation of smokers in cessation programs and the effect of increased participation rates on cessation. Twenty-four worksites in the Minneapolis–St. Paul, Minn, metropolitan area were randomized to 1 of 6 experimental conditions in a 2 × 3 factorial design. Two levels of incentives for participation in smoking cessation programs (incentives vs no incentives) were crossed with 3 types of program offerings (group programs, phone counseling programs, and a choice of group programs or phone counseling programs). The principal study hypotheses were (1) that providing incentives for participation and cessation would increase rates of participation in programs and thereby lead to higher rates of cessation and (2) that offering smoking programs that are more convenient or flexible with regard to study participants’ program preferences (i.e., phone counseling programs or choice between phone counseling and

group programs) would attract larger numbers of smokers than group programs alone, thereby increasing overall cessation rates.

METHODS

Worksites

Twenty-four worksites in the Minneapolis–St. Paul metropolitan area were recruited for the trial from a listing obtained from Dun & Bradstreet Information Services, Minneapolis, Minn. Eligibility criteria included 300 to 1000 employees working at a single site; the availability of a worksite liaison to help coordinate study activities; no current smoking cessation program; a relatively stable workforce and no major changes in the company, such as reorganization or change in location, anticipated in the study period; and no prior participation in the Healthy Worker Project, a previous worksite-based study. Steps in recruiting worksites included sending a letter explaining the study, following up with a phone call to screen for eligibility and gauge initial interest, and visiting representatives of eligible companies to obtain formal consent.

One hundred twenty-eight worksites were contacted in random order; 78 met study eligibility requirements. The primary reasons given by eligible worksites for declining to participate were that they were too busy or lacked interest in smoking cessation programs (79%). The worksites agreeing to participate included 9 manufacturing sites, 4 private sector business sites that were not manufacturing sites (2 administration–product development sites, 1 warehouse, and 1 direct marketer), 5 health care sites (3 acute care hospitals and 2 residential care facilities), and 6 government sites (1 federal, 2 state, and 3 county).

Research Design

The trial was conducted between fall 1995 and spring 1999. It employed a factorial group-randomized trial design with 6 intervention conditions: 3 program formats (group program, phone counseling program, or a choice of either program) crossed with 2 levels of incentives for participation in smoking programs and cessation. Four worksites were randomly assigned to each of the 6 intervention conditions. Randomization was stratified by gender and education of the workforce. The evaluation design included 3 surveys: a baseline survey of all employees that identified a cohort of current tobacco users and follow-up surveys of the tobacco-use cohort 12 and 24 months after baseline. Primary outcomes in the study were rates of participation in smoking cessation programs and cessation.

Intervention Programs

The 3 program formats were each offered at one third of the worksites. The *group* program comprised 13 group sessions held at the worksite over a period of 2 months.¹⁸ The *phone* program comprised mailed print materials, including the American Lung Association's *Freedom From Smoking* manual,¹⁹ and 3 to 6 telephone counseling sessions. The *choice* program offered employees a choice of either the group or the phone program. Program implementation was overseen by advisory committees of 6 to 15 employees at each worksite.

Smoking cessation programs were promoted 3 times during a period of approximately 18 months in each SUCCESS worksite. Employees were allowed to participate in pro-

grams more than once. Employees desiring to participate in programs responded by returning cards that were available on promotional displays. Study personnel contacted those who returned cards to confirm group time and place. Employees expressing interest in the phone counseling program were automatically mailed printed cessation materials and were then contacted by a phone counselor.

Those who failed to attend groups after registering for the program were generally not actively followed up. The phone counseling protocol called for counselors to try calling up to 10 times for each counseling session. Counselors left phone messages or sent letters to those they could not reach in 10 calls.

In half of the sites assigned to each of these 3 program types, employees were offered direct *incentives* for participating and for quitting. Participation incentives consisted of \$10 for joining a cessation program and \$20 for completing three fourths of the program (i.e., attending 9 of the 13 group program sessions or mailing 3 of a possible 4 postcards indicating completion of sections of the self-help manual in the phone counseling program). To claim cessation incentives, employees first notified program staff that they intended to quit and then provided a form reporting that they had not smoked during the previous 30 days. This form was countersigned by a family member or friend to corroborate self-report. Those who completed these notification steps were given \$20 and were entered into a drawing for a grand prize. In 5 sites, each drawing was for 1 cash prize for \$500; however, 6 sites elected to offer 2 prizes of \$250 and 1 site offered 4 prizes of \$125. Prize drawings occurred 3 times (about once every 6 months) in each of the incentive sites. Winners of the drawings had to be abstinent at the time of the drawing; abstinence was verified by saliva cotinine tests.

Evaluation Procedures

Three surveys were conducted: a baseline survey of all employees and follow-up surveys of a cohort of tobacco users and recent ex-users conducted 12 and 24 months after the baseline survey. For each survey, the questionnaires were distributed through the worksite mail systems. This original mailing was

followed up with a postcard reminder, a second mailing of the questionnaire, and, finally, a brief telephone interview of employees who had a telephone at work or a very short form of the survey. Tobacco use cohort members who had left SUCCESS worksites by the time of the 12- and 24-month surveys were contacted at their home addresses.

Measures

Demographic characteristics measured at baseline included age, sex, ethnicity, marital status, education, job level (professional, clerical or sales, labor; coded from descriptions of job title and duties), and years working at the company.

To determine smoking status at baseline, respondents were first asked if they had ever smoked cigarettes on a regular basis (i.e., more than 100 cigarettes in their lifetimes). Those who had smoked regularly were then asked whether they now smoked cigarettes. This series of questions approximates that used to obtain national estimates of the prevalence of smoking.²⁰ Respondents who reported that they had smoked 100 cigarettes in their lifetimes and were current cigarette smokers composed the cigarette smoking cohort that is the subject of this report. Other smoking variables measured at baseline included number of cigarettes smoked per day (daily smokers only) or per week (occasional smokers); age of initiation of smoking; duration of smoking; stage of change²¹; level of addiction to nicotine as indicated by whether the first cigarette of the day was smoked within 30 minutes of waking; and level of self-efficacy for cessation, measured by a single item that asked participants to rate on a scale from 0 to 10 their confidence that they could quit permanently if they decided to do so.

The main cessation outcome assessed during the 12- and 24-month surveys was 7-day point prevalence of smoking; that is, subjects were asked whether they had smoked in the previous 7 days. Information about cessation date was gathered, however, and longer-term abstinence at the 24-month follow-up was calculated. To test the validity of self-reported abstinence from smoking, a randomly selected sample of employees who reported on the 24-month survey that they had not smoked or used nicotine-containing products

in the previous 7 days were contacted by telephone and asked to provide saliva samples to test for cotinine. If respondents consented to do so, they were sent a kit with materials for collecting saliva. Those who returned a sample were sent an incentive payment of \$25.

Participation was characterized in terms of program registration and number of group sessions attended or counseling telephone calls completed.

Analysis Strategy

Unless otherwise noted, all reported statistical tests of relationships between program characteristics and the 3 outcome variables—participation in programs and cessation rates at 12- and 24-month follow-ups—were performed with the SAS/STAT MIXED procedure and the SAS/STAT GLIMMIX macro, mixed-model regression programs especially suited to the analysis of data from designs involving nested random effects.²²

Potential individual-level covariates considered for inclusion in the analyses were gender, age, occupation level, education, marital status, ethnicity, stage of change, self-efficacy, level of addiction, age of initiation of smoking, and duration of smoking. Variables were entered successively into models of the relationship between the treatment variables (program format and use of incentives) and each outcome (participation and cessation at 12 and 24 months). Variables were retained in the analyses if estimates changed by 10% or more. Final models for each outcome variable included the 2 study variables as fixed effects, their interaction, and selected covariates that had been identified as possible confounders. Worksite was included in all models as a random effect nested within the 6 study cells.

RESULTS

Sample Size and Return Rates

Over all sites, 11 714 (78%) of 14 991 employees provided baseline data. Return rates across worksites ranged from 50% to 96% (median=80%). Of respondents, 10 278 (88%) completed the full survey, 10 49 (9%) were interviewed by telephone, and 387 (3%) completed a short form of the written survey. Respondents who completed the short

TABLE 1—Baseline Sociodemographic Characteristics of the Smoking Cohort, by Program Study Condition

Characteristic	Choice, No Incentive (n = 418)	Choice, Incentive (n = 483)	Group, No Incentive (n = 415)	Group, Incentive (n = 380)	Phone, No Incentive (n = 305)	Phone, Incentive (n = 481)	P
Mean age, y	36	40	39	40	40	39	.0001
Female, %	50	61	58	64	50	54	.001
Educational level, %							
High school or less	31	40	37	30	20	32	
Vocational school	20	22	21	25	23	19	
Some college	28	20	25	29	35	25	
College degree	22	17	17	17	22	23	.001
Occupational level, %							
Professional/managerial	28	17	20	18	14	21	
White collar	36	24	24	22	55	50	
Blue collar	36	59	56	60	30	29	.001
Marital status, %							
Married/partner	59	60	60	63	72	59	
Divorced/separated/widowed	15	22	24	20	18	24	
Never married	25	18	17	17	10	17	.001
White, %	89	91	96	93	95	93	.006
% whose first cigarette of day was within 30 min of waking	49	60	56	55	52	51	.044
Median confidence in ability to quit (scale = 0–10)	6.2	5.5	5.9	5.9	6.1	6.0	.0358
Stage of change, %							
Precontemplation	46	42	48	44	38	45	
Contemplation	38	45	38	41	46	41	
Preparation for action	16	13	14	15	16	15	.308

form were not included in the present analyses since this version did not ask about some variables used in the analyses.

The full and phone versions of the baseline survey identified 2402 individuals who reported being current cigarette smokers. Of these, 85.5% returned the 12-month survey and 81.7% returned the 24-month survey. Table 1 compares the baseline characteristics of the members of the current cigarette smoker cohort in each of the 6 program format–incentive condition cells. There were significant differences between cells in terms of demographic characteristics of employees and some smoking-related variables. These results indicate the need to control for covariates in the outcome analyses.

Table 2 presents unadjusted baseline smoking rates, the number and proportion of employees who participated in cessation programs, and 12- and 24-month quit rates by

company. Wide variation was observed between companies in baseline prevalence of smoking (10.7%–37.2%), program participation (4.7%–36.7%), and quit rates (10.4%–28.2%).

Table 3 presents adjusted participation and quit rates at 12 and 24 months as a function of the 2 main effects examined in the study, incentives and type of program offered. Companies are grouped by their treatment assignment. Analysis of the effects of program variables on participation indicated that offering incentives had a strong effect on registration in smoking programs. Offering incentives for participation and cessation nearly doubled enrollment rates, from 12% of cigarette smokers to 22% ($F_{3,20}=9.71, P=.0054$). Type of cessation program was not related to registration rate ($F_{2,20}=0.84, P=.45$), and the interaction between program type and incentive condition was also not significant.

TABLE 2—Baseline Cigarette Smoking Rates, Rates of Registration in Smoking Cessation Programs, and Cessation Among the Cohort of Current Cigarette Smokers, by Company

Treatment Condition and Company ^a	Baseline Smoking Prevalence (% All Employees)	% Cohort Registering for Programs	% Cohort Cessation at 12 mo	% Cohort Cessation at 24 mo
Group—incentive				
3 (manufacturing)	31.6	18.9	11.5	17.9
10 (health care)	10.7	16.4	10.2	10.4
19 (manufacturing)	14.0	26.7	16.9	23.3
21 (government)	21.2	25.7	16.8	18.9
Group—no incentive				
2 (manufacturing)	25.4	13.0	10.1	13.2
7 (manufacturing)	27.5	18.4	21.7	25.8
11 (health care)	37.2	9.9	8.6	10.9
14 (government)	16.9	16.7	6.2	16.7
Phone—incentive				
4 (manufacturing)	29.3	18.6	13.7	18.7
8 (manufacturing)	25.0	25.0	12.2	25.3
9 (government)	12.5	27.0	20.6	23.4
13 (government)	19.8	36.7	18.3	22.1
Phone—no incentive				
1 (health care)	18.6	14.3	14.0	17.4
16 (government)	17.4	5.3	32.6	20.5
18 (government)	22.1	9.0	24.2	26.4
22 (private)	28.0	7.7	15.3	20.0
Choice—incentive				
5 (health care)	31.7	23.3	19.6	15.7
12 (health care)	14.0	11.2	15.2	23.3
20 (private)	23.1	21.9	13.8	16.9
23 (manufacturing)	28.3	10.8	15.6	18.8
Choice—no incentive				
6 (private)	14.4	13.0	14.4	19.5
15 (private)	12.2	9.1	25.0	28.2
17 (manufacturing)	29.8	20.1	13.6	15.6
24 (private)	28.3	4.7	12.3	23.8

^aCompanies are identified by type and study code number.

Baseline cigarette smokers were considered to have quit smoking if they reported on the 12- or 24-month survey that they had not smoked a cigarette (not even a puff) in the previous 7 days. A sample of 188 subjects who reported on the 24-month survey that they had not used tobacco in the previous 7 days were randomly selected to be asked for saliva samples to validate self-report. Of these, 3 subjects could not be reached, 12 refused to provide a sample, and 24 agreed but failed to provide a sample. Of the 149 saliva samples gathered, 21 were

not analyzed because subjects reported on the brief questionnaire that accompanied the sample that they had used nicotine replacement products (n=12) or tobacco products (n=9) in the previous 7 days. Of the 128 samples analyzed, only 3% had concentrations of cotinine consistent with smoking (i.e., >10 ng/mL).²³ Those who refused to provide a sample, those who failed to provide a sample, and those who reported using nicotine products before providing a sample were distributed relatively evenly across the 6 conditions.

Results of both 12- and 24-month follow-ups indicate that incentives did not have an effect on quit rates, and the interactions between program type and incentive condition were not significant for either time period. The relationship between program format and cessation, however, was statistically significant at 12 months ($P=.046$) and marginally significant at 24 months ($P=.081$). In both sets of analyses, the phone counseling program was associated with the highest cessation rate and the group program was associated with the lowest. Pairwise post hoc comparisons of the 12-month data found that cessation rates for both the phone counseling and choice format worksites exceeded those for the group format sites at the $P<.05$ level. These comparisons in the 24-month data indicate a significantly greater cessation rate in the phone counseling condition than in the group condition ($P=0.041$), with the choice condition intermediate and not significantly different from either of the other 2 conditions.

An examination of length of abstinence at the 24-month follow-up indicated that whereas 19.4% of the cohort reported not smoking in the previous 7 days, 14.1% and 11.5% reported abstinence for at least the previous 3 months and 6 months, respectively. Results of analyses of the 24-month follow-up data that used 3- and 6-month periods of abstinence as the outcomes indicated that neither program type nor incentive condition was statistically significantly related to longer-term cessation. The between-group patterns were similar to those observed using the 7-day abstinence measure.

To clarify the failure of incentives to increase cessation rates, a comparison of the quit rates of those who registered for programs and those who did not in each of the treatment conditions was next performed. Quit rates among program registrants were higher than quit rates among nonregistrants in every treatment condition. However, the differential between registrants and nonregistrants was consistently higher in nonincentive sites (a mean difference of 15.0 percentage points between registrants and nonregistrants in nonincentive sites vs a mean difference of 6.7 percentage points in incentive sites). This finding is consistent with the idea that incen-

TABLE 3—Registration in Programs and 12- and 24-Month Smoking Cessation Rates, by Program Format and Incentive Condition

Program Type	n	Least Squares Mean	SE	df	F	P
Registration in cessation programs ^a						
Phone counseling	786	0.169	0.0279			
Group	795	0.200	0.0278			
Choice	821	0.150	0.0279	2, 20	0.84	.4466
Incentives						
Yes	1264	0.222	0.0226			
No	1138	0.119	0.0227	1, 20	9.71	.0054
Cessation reported on the 12-mo survey ^b						
Phone counseling	616	0.166	0.0146			
Group	637	0.115	0.0141			
Choice	611	0.160	0.0143	2, 20	3.60	.0463
Incentives						
Yes	965	0.145	0.0114			
No	899	0.148	0.0118	1, 20	0.02	.9029
Cessation reported on the 24-mo survey ^c						
Phone counseling	603	0.203	0.0156			
Group	618	0.155	0.0153			
Choice	602	0.189	0.0155	2, 20	2.85	.0812
Incentives						
Yes	951	0.189	0.0124			
No	872	0.176	0.0130	1, 20	0.69	.4146

^aAnalysis adjusted for gender, occupation, education, marital status, stage of change, ethnicity, and self-efficacy.

^bAnalysis adjusted for occupation, stage of change, education, self-efficacy, and level of addiction.

^cAnalysis adjusted for stage of change, level of addiction, and self-efficacy.

tive programs tend to attract smokers into programs who are less motivated or who have greater difficulty quitting.

Examination of registrant and nonregistrant quit rates as a function of type of cessation program also revealed an interesting pattern. Participants in group and phone programs quit at comparable rates (30% in both program types). Nonparticipants, however, quit at significantly lower rates in the sites that offered the group program only (12.6%) than those where the phone program only was offered (18.9%).

DISCUSSION

This study addressed a perplexing public health problem; namely, that although reasonably effective programs are available to

help smokers quit, relatively few participate in them. Two approaches to improving participation in smoking cessation programs were explored in the context of worksite-based smoking interventions. The first was offering smokers incentives for participation and cessation. This proved to be effective: smokers in worksites in which financial incentives were offered enrolled in cessation programs at about twice the rate of those in worksites in which no incentives were offered.

The second approach was formatting smoking programs in ways that make participation easier. Specifically, we compared a traditional multisession group format with a telephone counseling format with many fewer contacts and with a choice format in which smokers could choose either program or both. Contrary to our expectations, we found no

difference in participation in programs as a function of program format.

Examination of cessation results revealed 2 interesting findings. First, increasing participation in cessation programs through financial incentives did not improve cessation outcomes. Further research on this topic is needed, however. In this study, incentives doubled participation rates, yet fewer than 1 in 4 smokers were recruited to programs. Although participation was related to higher cessation rates, the absolute number of participants was not great enough to influence significantly the rate among all smokers in the incentive sites. If the effect of incentives on participation can be increased, this increase might more than offset a possible lower likelihood of quitting among the additional participants attracted by the incentives. Research on the optimal size of incentives and the most effective mix of incentive contingencies (e.g., on participation vs cessation) is needed. In addition, greater emphasis on maintaining motivation and recycling apparent dropouts might better capitalize on the increased participation rates that incentives generate. A recent study suggests that incentives might be related to cessation if the incentives are large and offered with a very comprehensive smoking cessation program.¹²

Second, quit rates among participants in the different program types were not significantly different. This result suggests that, contrary to expectations, the phone counseling program was at least as effective as the more intensive group program in promoting cessation.

The number of individuals who refused or failed to provide a saliva sample could be seen as a limitation of the current study. There are a number of possible reasons for failing to provide a sample, however, including the time and inconvenience involved. This level of failure to return samples by mail is not unusual among studies using mail collection²⁴; we do not believe that it casts doubt on the validity of self-report of cessation. Moreover, since saliva return rates did not differ by treatment group, between-group comparisons should not be affected.

In summary, this study indicates that incentives might not be an effective addition to worksite smoking cessation programs unless programs can better capitalize on the increase

in participation that incentives generate. Neither the group program, the phone counseling program, nor a choice of programs has any clear advantage in terms of either participation or cessation. It appears that worksites can choose between group and phone counseling program formats on the basis of convenience of implementation since they appear to be equally effective. ■

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Contributions

D.J. Hennrikus participated in planning the study, supervised the day-to-day running of the study, and took the major role in writing the paper and running the final analyses. R.W. Jeffery wrote sections of the paper, was involved in the planning of all aspects of the study, and exercised overall financial and scientific oversight of the study. H.A. Lando led in designing the smoking cessation programs and was involved in planning all aspects of the study. D.M. Murray provided advice on study design and randomization of worksites to conditions and guided early analyses. K. Brejle and B. Daviddann served as the intervention and evaluation coordinators on the project and, as such, contributed significantly to its design and implementation. J.S. Baxter, D. Thai, and J. Liu contributed to data management and data analysis. J. Vessey guided the analysis of the data in the later part of the study.

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It Is Well With My Soul

By Rev. Melvin Baxter Tuggle II, PhD

National concerns about health care are magnified in urban, underserved minority communities, which suffer disproportionately high rates of preventable illness and disease. Reverend Tuggle addresses the causes of those diseases — such as smoking, hypertension, violence and obesity — and demonstrates the role of churches, schools, community groups and other public institutions in developing strong partnerships to enhance public health in these communities. He describes the challenges as well as opportunities for collaboration to promote better health.

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