Effects of a Smokers' Hotline: Results of a 10-County Self-Help Trial

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The effect of a smokers' hotline as an adjunct to self-help manuals was examined. Subjects were 1,813 smokers recruited from a 10-county rural and small urban area. Counties were matched on demographic characteristics and assigned to a manual only or manual plus hotline condition. Subjects were followed over an 18-month period. Hotline services included taped messages and access to paraprofessional counselors. Results show a consistent, significant hotline effect across outcome measures and follow-up periods. This effect emerged either as a main effect for the hotline or as an interaction with enrollment method such that a significant hotline effect emerged for subjects who enrolled through face-to-face methods. These findings indicate the effectiveness of the hotline in enhancing self-help quit rates.

As Glynn, Boyd, and Gruman (1990) point out, there are few large social movements about which so little is known as is the case with self-quitting among smokers. There currently are about 40 million ex-smokers in the United States (Pierce, Fiore, Novotny, Hatziandreu, & Davis, 1989), about 90% of whom stopped smoking on their own (Fiore et al., 1990). There is an emerging but still fledgling body of research focusing on means to enhance this important process of self-quitting.

In general, self-help trials show increasing abstinence prevalence over time and lower abstinence rates than those obtained in clinics. A recent summary of 10 large self-help trials (Cohen et al., 1989) reported significant-other or biochemically validated abstinence prevalence rates of 5.1–26.9% at 6 months ($Mdn = 13.2$) and 8.2–25.1% at 12 months ($Mdn = 13.9\%$). Continuous abstinence, defined as abstinent at all panels with "not even a puff" of cigarettes between panels, ranged from 2.5% to 10.1% at 6 months ($Mdn = 4.9$) and from 2.2% to 6.7% at 12 months ($Mdn = 4.2$).

Self-help trials have often used smoking cessation manuals. A recent expert advisory panel convened by the National Cancer Institute concluded that whereas a variety of manuals enhanced quit rates, there was a general lack of superiority of one particular manual over others (Glynn et al., 1990). Therefore, the panel advised using existing materials with demonstrated success rates rather than developing new programs. One widely used self-help manual set is that developed by the American Lung Association (ALA). Davis, Faust, and Ordentlich (1984) examined the ALA's self-help smoking cessation manual or a brief leaflet, crossed with the addition or noninclusion of the ALA's maintenance manual. Results show self-reported abstinence at 1 year to be significantly higher for all manual conditions relative to the leaflet alone condition. Abstinence rates for the manual conditions ranged from 15% to 18% for abstinence prevalence and from 3% to 5% for continuous abstinence.

A second recommendation of the advisory panel was to use program adjuncts, such as telephone hotlines. Advantages of hotlines are that they are accessible to entire communities "as needed," free of charge, and can offer personal contact without face-to-face interaction that may discourage self-quitters from using formal services. Research on smokers' hotlines has been encouraging but inconclusive. Dubren (1977) offered nonsmoking telephone messages to half of the participants in a televised stop smoking program. At one month, self-reported abstinence prevalence for the telephone group was about double that of the control group (66% vs. 34%). Shiffman (1982) used telephone hotline counselors who spoke with ex-smokers (generally clinic quitters) who were tempted to smoke or had recently relapsed ("crisis callers"). Self-reported abstinence prevalence at 6 months was 63%. Our own group has reported significant-other validated abstinence prevalence rates of 34% and 26% at 6 and 12 months, respectively, for FREEDOM LINE™ [1] crisis callers, about three quarters of whom were self-quitters (Giovino et al., 1986). In addition, we have demonstrated that it is possible to achieve and maintain high hotline utilization rates using a persistent media approach (Ossip-Klein, Shapiro, & Stiggins, 1984). However, to date, there have been no long-term controlled trials of the effectiveness of smokers' hotlines.

The present trial was designed to test the effectiveness of a smokers' hotline as an adjunct to self-help manuals for self-quitters in a 10-county region.

Method

Subjects

Subjects were 1,813 smokers recruited from a 10-county region in Western New York State from August 1985 to July 1987. These counties consisted of rural and small urban areas with a total population of

[1] FREEDOM LINE™ is a joint project of the University of Rochester Smoking Research Program and the American Lung Association—Finger Lakes Region, Inc.

618,637, approximately 48,068[2] of whom were eligible for the study. Thus, about 4% of the eligible population were recruited.

Counties were matched on population size, median age, education, and percentage employed full-time, on the basis of 1980 Census data. Pairs of counties were assigned to a manual only (M) or manual plus hotline (M + H) condition, using a restricted randomization procedure to minimize spillover of hotline media into nonhotline counties. A total of 32 (2^5) possible combinations of counties were assessed against a map of media distribution ranges; only two schemes met the above criterion. The final assignment was made by a coin toss. Target numbers of subjects to be recruited from each county were prorated to population sizes of each county. The final sample represented 81–137% of target recruitment goals for each county, with a total of 919 and 894 subjects in M and M + H counties, respectively.

Subjects were recruited through media, local sign-ons, medical/dental office brochures, and other techniques. Recruitment techniques were balanced across M and M + H counties. Subjects registered for the Smoker's Self-Help Project (SSHP) through face-to-face contact (37%), telephone calls (41%), or mailed forms (23%). Details on recruitment will be published separately (Ossip-Klein, Giovino, Black, et al., 1991).

To qualify for the SSHP, all subjects were required to (a) have smoked at least 10 cigarettes/day for the past year, (b) be planning to stop smoking on their own within 3 months or have a clear quit date, (c) be 18+ years of age, (d) be planning to remain in their current county for the next 2 years, (e) be living in a private home/apartment with a telephone, (f) not be taking antipsychotic medications, and (g) agree to follow-up calls and possible breath/saliva tests "to see how smoking or quitting affects your body."

A total of 1,832 subjects were recruited; final analyses were based on 1,813 subjects. Reasons for dropping the remaining subjects included being missed at the first follow-up and quitting smoking before enrollment.

Procedures

Intervention. All subjects received an American Lung Association self-help packet, containing a *Freedom From Smoking in 20 Days*® quit manual, a *Lifetime of Freedom From Smoking*® maintenance manual, and a relaxation tape. Subjects in the five hotline counties were offered access to the FREEDOM LINE™ hotline, given hotline stickers and flyers, and encouraged to call at each follow-up. The hotline was also promoted by a few newspapers and radio stations whose circulation was restricted to hotline counties. FREEDOM LINE™ offered 24-hr, 7 day/week messages of support (changed daily) and 9 a.m. to 9 p.m. daily access to counselors (all ex-smokers) who offered information/ support to all callers and coping skills interventions for crisis callers. Crisis callers were offered additional follow-up services, which were integrated with SSHP follow-up schedules.

On enrollment in the project, subjects provided a $5 deposit that was refunded on completion of the first follow-up interview. An additional $5 was paid to subjects for each subsequent follow-up.

Follow-up. Subjects within counties were randomized to frequent (1, 3, 6, 12, and 18 months) or infrequent (1, 12, and 18 months) follow-up conditions (*n* = 908 and 905, respectively). Follow-up frequency was not related to outcome; therefore data were collapsed over follow-up conditions for final analyses. Standardized follow-up interviews were conducted by project staff and advanced undergraduate students.

Measures

Assessment. Subjects completed an initial baseline questionnaire that assessed sociodemographic, health, and smoking-related variables. Subjects also provided names of two significant others to vali-

date abstinence and locate subjects' whereabouts in the event of a move. At follow-up, subjects were assessed for changes in smoking status, hotline use (in M + H counties), and other smoking-related factors.

Smoking status. Both prevalence and continuous measures of abstinence were used, with abstinence defined as "not a single puff " for the designated period and no use of other tobacco products. Subjects who refused interviews or dropped out of the study were classified as smokers. For comparison with other studies, a number of outcomes are reported, ranging from 48+-hr prevalence to continuous abstinence from Month 3 (the "deadline" for the initial quit date) to 12 and 18 months. For the present trial, the primary measures of outcome are 90+-day abstinence at 12- and 18-month follow-ups. This measure provides a meaningful abstinence period that exceeds the period of greatest relapse following a quit episode (Hunt, Barnett, & Branch, 1971) but still allows for a hotline effect on re-quitting following a slip/relapse.

Significant-other verification of abstinence was sought for all subjects, and biochemical validation was obtained for a subsample.

Significant-other validation (SOV). SOV reports were obtained for at least 90% of self-reported claims of abstinence at each follow-up (range = 90–99.7%). Abstinence was validated if the significant other could verify abstinence for at least the past 48 hr. The following reinstatement procedure was used for claims of abstinence for which we were unable to obtain an SOV: A single positive SOV at any point could validate any prior or subsequent self-reported abstinence. Similarly, any discrepant SOV would disqualify any prior or subsequent self-reported (i.e., nonvalidated) abstinence. This procedure is consistent with the concept of "sampling" in verifying abstinence (Ossip-Klein et al., 1986). Furthermore, given a relatively low SOV discrepancy rate of 3.7%, invalidating claims of abstinence for subjects for whom we could not obtain an SOV at a particular follow-up would be unduly harsh and would underrepresent true abstinence rates. Discrepancy rates did not differ for M or M + H conditions (p = .99).

Biochemical verification (COT). Biochemical verification was obtained for 53.7% and 51.6% of self-reported or SOV claims of abstinence at 12 and 18 months, respectively. A less frequent sampling of 6.5%, 12.5%, and 20.9% was obtained at 1, 3, and 6 months, respectively. Sampling took place at subjects' homes or worksites. The primary biochemical measure was salivary cotinine, collected using the procedures of Abrams, Follick, Biener, Carey, & Hitti (1987). Samples were sent to the American Health Foundation, Valhalla, New York, for radioimmunoassay, and their recommended cutoff of 25 ng/ml was used for nonsmokers (Cummings & Richard, 1988). Alveolar carbon monoxide levels (COa) were determined using a MiniCO 1000 (Catalyst Research Corporation), with a cutoff of 8 parts per million. This measure was used in cases of nicotine gum use and in a few cases where saliva samples were insufficient or lost in shipment; an elevated COa could also invalidate an acceptable cotinine. Overall discrepancy rates were 10.1% for those sampled and 20.1% when refusers and no-shows were included as discrepant. Because of the range of reasons for refusing/not showing (e.g., illness, family deaths, forgetting, not wanting a stranger to come to the house), it is likely that true discrepancy rates fell somewhere between these two figures. Significantly higher discrepancy rates were found in manual only counties using both sets of classification criteria, 15.8% vs. 5.8% for M vs. M + H counties, respectively, for those sampled; $\chi^2(1, N = 337) = 8.0$, $p < .01$; and 27.6% vs. 13.9% including refusers and no-shows; $\chi^2(1, N = 378) = 10.1$, $p < .01$. It is unclear why these differences occurred, as there were no systematic differences in sampling procedures for the two sets of counties. There-

fore, these results were considered representative of the samples. As with SOV, a reinstatement procedure was used. A single biochemically verified abstinence validated any prior or subsequent claims of abstinence, unless evidence was available to the contrary (i.e., a discrepant SOV or biochemical measure at any point). In such cases, only biochemically verified follow-ups were considered abstinent. Conversely, a single discrepant biochemical measure invalidated any reported or SOV claims of abstinence (final COT $N = 1,580$).

Results

Subject Characteristics

Subject characteristics are presented in Table 1, with comparisons to a national sample of smokers from the Adult Use of Tobacco Survey (AUTS; U.S. Department of Health and Human Services, 1986). The two groups in the present trial differed from each other only in race, $\chi^2(1, N = 1,794) = 6.24$, $p < .05$. However, the magnitude of difference was quite small (less than 2%) and did not moderate the effects of the hotline on outcome. On the basis of 1980 census data, demographic characteristics of the 10 counties were similar to the AUTS total sample, except for race in the 10 counties (94–99% White). However, compared with AUTS smokers, the present sample of smokers was older, had more females and Whites, was better educated, smoked more cigarettes, and was more likely to have a previous quit attempt.

Enrollment

Significant differences were found in enrollment method, with somewhat fewer M + H than M subjects enrolling face-to-face (34.24% vs. 39.16%, respectively). This variable was therefore controlled for in subsequent regression analyses described below.

Follow-Up

Follow-up completion rates of over 90% were obtained at all follow-ups (range = 90.9–98.2) and did not differ for M or M + H conditions.

Table 1
SSHP Smokers Versus AUTS Smokers

Characteristic	SSHP			AUTS
	Manual alone	Manual + hotline	Total	
n	919	894	1,813	4,516
Socioenvironmental variables				
Age				
M	43.60	43.32	43.47	
SD	12.49	11.78	12.14	
% 45+	43.0	40.0	41.0	34.7
% female	63.0	63.6	63.6	47.1
% White	97.8	99.3*	98.6	85.3
% married	70.4	71.8	71.1	
% 13+ years of education	50.2	49.2	49.7	27.7
% employed (full- or part-time)	74.0	72.7	72.4	
Smoking variables				
Cigarettes/day				
M	27.49	27.96	27.72	
SD	10.83	11.50	11.17	
%25+	56.0	56.0	56.0	32.2
Years smoked				
M	25.45	25.38	25.42	
SD	11.95	11.43	11.69	
% smoke within 30 min of waking	82.4	83.0	82.7	
% any previous quit attempt	87.3	89.8	88.5	65.1
Longest period of previous abstinence				
% 0 days	13.9	12.0	13.0	
% 1 day–6 months	68.2	69.9	69.1	
% 6 months–2 years	12.6	12.1	12.4	
% 2+ years	5.2	6.0	5.6	
No. of smoking-related symptoms				
M	3.25	3.35	3.30	
SD	2.13	2.14	2.14	

Note. SSHP = Smokers' Self-Help Project—Current Trial. AUTS = 1986 Adult Use of Tobacco Survey; percentages are weighted estimates.
* $p < .05$.

Outcome

Analyses were conducted on two sets of samples, on the basis of abstinence verification procedures. First, to maximize comparison with other studies, the entire sample was included, with abstinence based on SOV as described above. A second, more conservative set of runs was conducted on only known abstainers on the basis of COT described above and on known smokers (self-reported smokers or discrepant SOV or biochemical measures; total $N = 1,580$). For this latter set of runs, subjects with self- or SOV-reported abstinence only were dropped (*drops*). Subject characteristics for the two sets of samples did not differ statistically. Within the COT sample, M drops differed from M + H drops only in lifetime quit attempts, 3.00 ± 2.56 versus 4.13 ± 3.36, $F(1, 232) = 8.37$, $p < .005$, two-tailed. Thus, the COT sample appeared to be reasonably representative of the total population.

Data were first analyzed using counties as the unit of analysis. A Wilcoxon Matched-Pairs Ranked-Signs test (two-tailed) was conducted for the five matched pairs of counties for 90+ days' abstinence at 12 and 18 months. Results were in the predicted direction for the SOV sample at 12 months and significant at 18 months ($Z = -1.75$, $p < .05$) and were significant for the COT sample at both intervals ($Z = -2.02$ and -1.75 at 12 and 18 months, respectively, $p < .05$ for both; see Figure 1). Subsequent analyses were conducted at the individual level to examine the mediating effects of various demographic and smoking history variables on outcome.

Differences in abstinence rates for M versus M + H conditions were analyzed using chi-square tests of independence, with Yates' correction where applicable (see Table 2). Abstinence was consistently higher in M + H counties across all follow-ups and definitions of abstinence. One-, 3-, and 6-month 48-hr abstinence prevalence was significantly higher in M + H counties for both SOV and COT samples (p at least $< .05$). For both samples, abstinence rates were significantly higher in hotline counties for 180+-day abstinence at 12 and 18 months, and continuous abstinence from Month 3 to 18 (p at least $<.05$). For the COT sample, results were also significant for all additional measures but one at 12 and 18 months (p at least $< .05$).

Continuous abstinence data suggested that rates at which subjects relapsed may have been reduced for hotline counties. For the SOV sample, continuous abstinence dropped from 5.2% to 3.9% at 12 and 18 months, respectively, for M counties (25% relapse rate) and from 7.0% to 6.4%, respectively, for M + H subjects (8.6% relapse rate). Relapse rates for the COT sample were 16.6% versus 5.7% for M and M + H counties, respectively.

Because of hypothesized differences in hotline effectiveness across enrollment methods, data were next stratified by face-to-face, mail, and phone methods; separate chi-square analyses were conducted for each. For the face-to-face condition, abstinence rates were significantly higher for the hotline condition, across outcome measures, for both SOV and COT samples (p at least $< .05$), with only three exceptions where results were in the predicted direction but did not reach significance. No significant differences in abstinence rates by M versus M + H conditions were found for subjects who enrolled by mail or phone.

To examine differences between face-to-face and the remaining enrollment methods, chi-squares and one-way analyses of variance were conducted on baseline differences between methods; data were collapsed across phone and mail groups. For both SOV and COT samples, face-to-face enrollees smoked fewer cigarettes/day, had higher self-efficacy and baseline stress scores, and included fewer Whites and more women (p at least $< .05$ for all).

Models

A series of simultaneous logistic regressions were used to determine the effects of the hotline after controlling for potential moderating variables. Four separate sets of runs were conducted, using 90-day abstinence at 12 and 18 months for both SOV and COT samples (runs using other outcome criteria produced similar results). Within each set of runs, four models were tested: (a) crude effect of the hotline alone (entered as M vs. M + H counties); (b) hotline effect, controlling for enrollment method and Enrollment × Hotline interaction; (c) hotline effect, controlling for Model 2 variables and smoking-related factors (number of cigarettes/day, number of smoking-related symptoms, years smoked, self-efficacy, motivation, number of quitters at home, number of important people who smoke, lifetime quit attempts, and longest previous abstinence);[3] (d) hotline effect, controlling for Model 2 variables and socioenvironmental variables (gender, ethnicity, marital status, education, and perceived stress). Separate analyses were conducted for each model to exceed a minimal 10:1 ratio of subjects to variables.

The Hosmer-Lemeshow chi-square was not significant for any runs (p at least $> .20$), demonstrating an adequate fit for the models. Overall, results indicated that, even after controlling for potential moderator variables, a significant hotline effect remained; furthermore, odds ratios were not weakened by the addition of possible moderators. Significant main effects for the hotline were found at both 12 and 18 months across models for the COT sample and at 18 months for Models 2–4 for the SOV sample. Significant interactions with enrollment method were found for the SOV sample at both follow-ups and for the COT sample at 18 months across models, indicating the hotline effect among subjects who enrolled face-to-face. Odds ratios were generally higher for the COT sample. For example, at 18 months, odds ratios for the hotline main effect for the COT sample, controlling for other variables, ranged from 1.43 to 1.47 (i.e., subjects in hotline counties were 43–47% more likely than non-hotline subjects to be abstinent). Corresponding odds ratios for the SOV sample were 1.19–1.20. Results for moderator variables will be presented in a separate article (Ossip-Klein, Giovino, Emont, et al., 1991). Entering only these significant variables into simultaneous logistic regressions did not diminish the hotline effect.

Mechanisms

Exploratory analyses. To explore possible mechanisms for the hotline effect, Models 3 and 4 above were rerun using hierarchical stepwise logistic regressions in which hotline, enrollment method, and Hotline × Enrollment Method were entered first, followed by entry of all main effects variables and all two-way interactions of the Hotline × Main Effects variables. For all runs, the ratio of number of subjects in the smallest group to

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[3] Details on measurement of these variables will be reported in a separate paper (Ossip-Klein, Giovino, Emont, et al., 1991); copies of the questionnaires are available from Deborah J. Ossip-Klein.
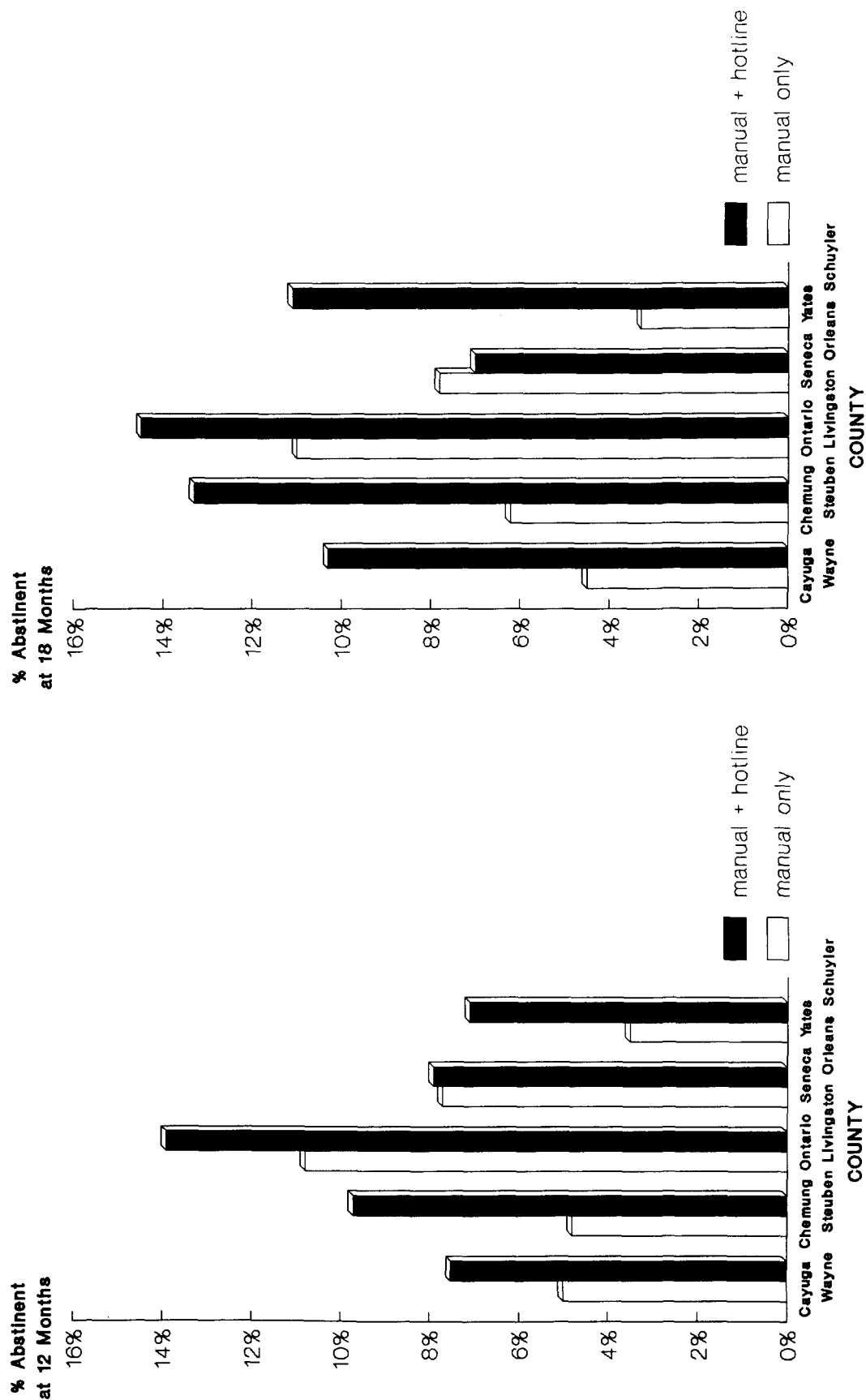
Figure 1. Abstinence rates by counties: had abstained from smoking 90+ days at 12 and 18 months.

Table 2
Percentage of Abstinence and Chi-Square Values by Hotline Condition

	Sample							
	SOV				COT			
Outcome variable	Manual only	Manual + hotline	$\chi^2(1)$	n	Manual only	Manual + hotline	$\chi^2(1)$	n
48+-hr prevalence								
1 month	10.2	14.2	6.70**	1,813	5.2	7.7	4.48*	1,701
3 months	9.6	15.0	6.29**	911	6.0	10.0	4.60*	852
6 months	10.4	15.2	4.64*	909	6.9	11.2	4.76*	854
12-month measures				1,813				
48+ hr	13.1	13.8	*ns*		8.1	11.7	6.05*	1,747
7+ days	11.3	13.0	*ns*		8.1	11.9	6.49**	1,699
30+ days	10.3	12.2	*ns*		7.7	11.4	6.78**	1,699
90+ days	8.7	10.5	*ns*		7.1	10.0	4.55*	1,699
180+ days	6.6	9.2	4.01*		5.8	9.0	6.54**	1,699
Month 3–12	5.2	7.0	*ns*		4.8	7.0	*ns*	1,699
18-month measures				1,813				
48+ hr	15.6	17.7	*ns*		8.9	13.3	8.27***	1,750
7+ days	13.8	16.0	*ns*		8.5	12.7	7.82**	1,699
30+ days	12.4	14.7	*ns*		7.9	12.6	9.98***	1,699
90+ days	10.8	13.5	*ns*		7.6	12.1	9.85***	1,699
180+ days	8.2	11.3	5.09*		6.0	10.3	10.49****	1,699
Month 3–18	3.9	6.4	5.13*		4.0	6.6	5.54*	1,699

Note. SOV = significant-other validation; COT = biochemical verification.
* $p < .05$. ** $p < .01$. *** $p < .005$. **** $p < .001$.

variables exceeded 5:1 (Tabachnick & Fidell, 1983), and the total number of subjects to variables exceeded 10:1. At one year (off 90+ days), a significant interaction was found between hotline condition and longest period of previous abstinence for both COT and SOV samples, with a greater hotline effect for subjects with longer periods of previous abstinence (>6 months). For the SOV sample, a significant interaction was also found for number of cigarettes/day (greater hotline effect for heavier smokers, i.e., 26+ cigarettes/day). For both SOV and COT samples, the interaction with number of home quitters was of borderline significance at one year ($p < .10$) and significant at 18 months ($p < .05$), with a greater hotline effect for subjects with no home quitters. To explore whether increased hotline use may have mediated the hotline effect, chi-square analyses were conducted for hotline utilization for each of these variables. Higher utilization was found among subjects with longer periods of previous abstinence, with results reaching significance at 12 months for the COT sample: 28.8% versus 37.3% for subjects with <6 months versus >6 months previous abstinence, respectively; $\chi^2(1, N = 852) = 4.28$, $p < .05$, and among heavier smokers in the SOV sample at 12 months: 27.8% versus 33.9% of light versus heavy smokers, respectively; $\chi^2(1, N = 894) = 4.01$, $p < .05$. No utilization differences were found for subjects who differed in presence of home quitters.

Quit attempts. A hotline may also promote abstinence by increasing quit attempts. Chi-square analyses showed a significantly greater number of reported 48-hr quit attempts in hotline counties for the COT sample only: 52.4% versus 47.6%, $\chi^2(1, N = 1,699) = 4.04$, $p < .05$; findings were in the predicted direction for the SOV sample but were not statistically significant.

Hotline use. Overall, 35.9% ($n = 321$) of subjects called the hotline at least once by the 18-month follow-up, and 8.7% ($n =$

78) spoke with counselors. Abstinence rates were consistently higher for users compared with nonusers (see Table 3), although they were most often significant for shorter abstinence periods. This pattern is consistent with a hotline effect on increasing re-quitting following a slip/relapse. Abstinence rates were also generally higher among counselor users compared with nonusers. However, these results were not statistically significant, possibly because of the small sample of counselor users, which lowered the power of these analyses.

Because of differences in hotline effect by enrollment method, hotline use across enrollment methods was examined. Total utilization was significantly higher in the phone registration group at 18 months for the SOV sample only: 31.2%, 35.6%, and 42.9% for face-to-face, mail, and phone, respectively; $\chi^2(2, N = 879) = 7.28$, $p < .03$. Although it is not surprising that subjects who register by telephone would also be greater telephone hotline users, these findings indicate that higher utilization could not account for greater hotline effects among face-to-face enrollees.

Discussion

The present trial showed a consistent, significant FREEDOM LINE™ hotline effect on abstinence across virtually all outcome measures and follow-up intervals. This emerged either as a main effect for the hotline (most often in a biochemically validated sample) or as an interaction with enrollment method such that a significant hotline effect was found for subjects who enrolled through face-to-face methods (in both biochemically and significant-other validated samples). These effects remained even after controlling for possible confounding variables in regression analyses. There was also some suggestion of

Table 3
Percentage of Abstinence × Hotline Use: Manual Plus Hotline Subjects Only

Outcome variable	Sample					
	SOV			COT		
	None	Any	χ^2	None	Any	χ^2
12 months						
48+ hours	11.1	19.6	11.57****	9.9	16.7	7.74***
7+ days	10.5	18.5	10.91****	9.8	16.7	8.20***
30+ days	10.0	17.1	8.90***	9.4	15.9	7.45**
90+ days	9.4	13.1	ns	8.8	12.8	ns
180+ days	7.9	12.0	3.81*	7.6	12.4	5.10*
Month 3–12	6.3	8.7	ns	6.1	9.3	ns
18 months						
48+ hours	15.4	21.8	5.88*	11.1	17.9	7.87***
7+ days	14.3	19.0	ns	10.7	16.3	5.46*
30+ days	13.3	17.1	ns	10.5	16.3	5.87*
90+ days	12.2	15.9	ns	10.2	15.6	5.44*
180+ days	10.3	13.1	ns	9.1	12.6	ns
Month 3–18	5.6	7.8	ns	5.6	8.3	ns

Note. SOV = significant-other validation; COT = biochemical verification. In chi-squares, for SOV, $df =$ 1, $N = 894$; for COT, $df = 1$, $N = 852$.
$* p < .05.$ $** p < .01.$ $*** p < .005.$ $**** p < .001.$

a hotline effect on reducing relapse rates among continuously abstinent subjects. As in previous studies, abstinence prevalence increased with time, and both prevalence and continuous abstinence were within the usual range for self-help trials.

The finding that FREEDOM LINE™ was most effective with subjects who enrolled face-to-face suggests that the hotline may differentially impact on various populations. This effect was not due to higher utilization rates among face-to-face enrollees. This group did differ from mail/phone enrollees on several baseline variables, but none interacted with the hotline condition in predicting outcome and thus do not appear to account for the differential hotline effect. It is possible that having a personal contact with project staff mediated the hotline effect. Previous research has demonstrated that personal contact can enhance quit rates in self-help populations (e.g., Meyer, Nash, McAlister, Maccoby, & Farquhar, 1980). Face-to-face enrollees may have perceived the FREEDOM LINE™ as an extension of the personal contact with project staff and thus were more likely to benefit from their contact with the hotline.

Over one third of subjects (35.9%) called the hotline at least once, and 8.7% spoke with a counselor. This suggests that significant numbers of self-quitters will utilize a hotline. Abstinence rates were higher for hotline users versus nonusers, particularly on shorter term measures of abstinence. These results were statistically significant for message callers and in the predicted direction, although not significant, for counselor callers (possibly due to the small sample of counselor users). These findings are consistent with a hotline effect that can mediate short-term relapse crises. However, it is unlikely that higher abstinence rates among users accounted for the total differences in outcome between hotline and manual only counties. It is possible that simply knowing that telephone help was there if needed enhanced abstinence even among nonusers.

The relative effectiveness of message versus counselor services was not addressed by our study. Although messages were most utilized, the 8.7% counselor utilization was also clinically significant for a self-help population. To the extent that counselor services may enhance abstinence, utilization data suggest that centralized counselor services available to large population bases are necessary to generate sufficient calls to make this service cost-effective (and to generate a sufficient subject pool for research on effectiveness).

Exploratory analyses suggested a greater hotline effect for subjects who had longer periods of previous abstinence and were heavier smokers. These groups also had higher hotline utilization rates, which may indicate a greater use of self-help resources by subjects who have previous relapse experiences or who are most likely to have difficulty quitting, or both. To the extent that these results are valid, they suggest a particularly important role for this hotline in enhancing quit rates among heavy smokers who have received increasing attention as a difficult but key group for smoking cessation. A greater hotline effect was also found for subjects who had no other home quitters. The presence of other home quitters has been shown to have a detrimental effect on abstinence (Kingsolver, Lichtenstein, & Mermelstein, 1986), which could override a hotline effect. Although these exploratory findings may be useful in identifying possible mechanisms for the hotline effect, they must be viewed as, at best, suggestive.

An additional mechanism for the hotline effect may have been its impact on quit attempts, which were somewhat higher in hotline than in manual only counties. The presence of the hotline may have encouraged more subjects to move to action (Prochaska & DiClemente, 1982) and ultimately become quitters. Whether the hotline also influenced movement through earlier stages of change (precontemplation, contemplation) is unknown.

In evaluating the hotline effect, it is important to note that the current hotline implementation differed somewhat from how it would typically be used. First, subjects were enrolled in a study

in which they received ongoing telephone contact from project staff. Although no effect was found for frequency of contact, receiving any telephone contact may have itself influenced abstinence rates or decreased hotline use, particularly counselor use. A second difference is that promotion of the hotline was restricted to avoid media spillover into manual only counties. We have previously demonstrated the effectiveness of persistent media approaches in maintaining high hotline utilization rates (Ossip-Klein et al., 1984). The methodological demands of the current trial may have led to lower call rates than could be achieved with more aggressive promotion. A third difference is that the current hotline condition was paired with self-help manuals. What the effects would be in the absence of self-help materials or in combination with different types of self-help interventions (e.g., health care provider or media strategies) remains to be determined. Finally, this study was conducted in small towns and rural areas. Whether results would generalize to large urban areas is unknown. However, it is notable that the hotline was effective for remote populations, who are generally underserved by smoking cessation services.

Overall, our results indicate a significant effect for the FREE-DOM LINE™ hotline on abstinence for rural and small urban populations. This effect was most pronounced for face-to-face enrollees and possibly for heavier smokers and those with longer periods of previous abstinence and no other home quitters. The presence of the hotline also appeared to enhance quit attempts, which suggests that it encouraged movement through stages of change. Utilization patterns indicate the importance of including a message component to the hotline, as the greatest percentage of users called for the message only. The counselor service was utilized by a lesser, though still clinically significant, percentage of the population. It is likely that the observed hotline effect resulted from both higher abstinence rates among users as well as a ripple effect on nonusers, who may have been influenced by the knowledge that help was available if needed. To the extent that the present results generalize to other populations, they suggest that a hotline can provide a means of reaching and enhancing abstinence rates among self-quitters.

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