VOLUME 23 · NUMBER 27 · SEPTEMBER 20 2005

JOURNAL OF CLINICAL ONCOLOGY

ORIGINAL REPORT

Peer-Delivered Smoking Counseling for Childhood Cancer Survivors Increases Rate of Cessation: The Partnership for Health Study

Karen M. Emmons, Elaine Puleo, Elyse Park, Ellen R. Gritz, Rita M. Butterfield, Jane C. Weeks, Ann Mertens, and Frederick P. Li

From the Dana-Farber Cancer Institute/ Harvard School of Public Health; Massachusetts General Hospital/ Harvard Medical School, Boston; University of Massachusetts–Amherst, Amherst, MA; University of Minnesota, Minneapolis, MN; The University of Texas M.D. Anderson Cancer Center, Houston, TX.

Submitted July 13, 2004; accepted June 3, 2005.

Supported by Grants No. U24-CA55727 and RO1-CA77780 from the National Institutes of Health; support provided to the University of Minnesota by the Children's Cancer Research Fund; support to the Dana-Farber Cancer Institute by Liberty Mutual, the Patterson Fellowship Fund, and the Harry and Elsa Jiler American Cancer Society Research Professorship (F.P.L.). SmithKline Beecham donated nicotine patches.

Presented in part at a paper session at the 24th Annual Meeting and Scientific Sessions of the Society for Behavioral Medicine, Salt Lake City, UT, March 19-23, 2003.

Authors' disclosures of potential conflicts of interest are found at the end of this article.

Address reprint requests Karen M. Emmons, PhD, Harvard School of Public Health and Dana-Farber Cancer Institute, Center for Community-Based Research, 44 Binney Street, Boston, MA 02115; e-mail: Karen_M_Emmons@dfci.harvard.edu.

0732-183X/05/2327-6516/$20.00

DOI: 10.1200/JCO.2005.07.048

ABSTRACT

Purpose
Cancer survivors smoke at rates that are only slightly lower than the general population. This article reports on the final outcomes of Partnership for Health, a smoking cessation intervention for smokers in the Childhood Cancer Survivors Study (CCSS).

Methods
This study is a randomized control trial with follow-up at 8 and 12 months that involved smokers (n = 796) enrolled onto the CCSS cohort. Participants were randomly assigned to either a self-help or a peer-counseling program that included up to six telephone calls from a trained childhood cancer survivor, tailored and targeted materials, and free nicotine replacement therapy. The intervention was delivered by telephone and postal service mail.

Results
The quit rate was significantly higher in the counseling group compared with the self-help group at both the 8-month (16.8% *v* 8.5%; $P < .01$) and 12-month follow-ups (15% *v* 9%; $P \leq .01$). Controlling for baseline self-efficacy and readiness to change, the intervention group was twice as likely to quit smoking, compared with the self-help group. Smoking cessation rate increased with an increase in the number of counseling calls. The cost of delivering the intervention was approximately $300 per participant. The incremental cost-effectiveness of the intervention compared with controls was $5,371 per additional quit.

Conclusion
Interventions to prevent future illnesses are of critical importance to childhood cancer survivors. The Partnership for Health intervention resulted in a doubling of smoking cessation quit rates. Because of the seriousness of smoking among childhood cancer survivors, this intervention model may be appropriate as a multicomponent treatment program for survivors who smoke.

J Clin Oncol 23:6516-6523. © 2005 by American Society of Clinical Oncology

INTRODUCTION

Childhood cancer survivors represent an increasingly large group due to successes in therapy over the last several decades.[1,2] In 1997, there were more than one-quarter million survivors of childhood cancer alive in the United States.[3] Survivors have the potential to live a normal life span, but may also have cancer- and treatment-associated damage to vital organs.[4,5] Therefore, preventable risk factors for cardiac, pulmonary, neoplastic, and other major diseases should be minimized in this high-risk population.

Using data from The Childhood Cancer Survivors Study (CCSS), an analysis of smoking prevalence among 9,709 pediatric cancer survivors revealed that childhood cancer survivors are smoking at a somewhat lower rate than age- and sex-matched groups from the general population.[6] However, the health implications of smoking are greater for cancer

survivors than for the general population. To date, no published smoking cessation intervention studies have targeted childhood cancer survivors.

The purpose of this article is to report the outcomes of Partnership for Health (PFH), which was a randomized trial designed to evaluate the impact of a peer-based telephone counseling intervention on smoking among childhood cancer survivors. Participants were randomly assigned to either: (1) a peer-delivered telephone counseling intervention (PC); or (2) a self-help intervention (SH). We hypothesized that the PC intervention would outperform SH in terms of smoking quit rates.

METHODS

CCSS was a multisite study in which childhood cancer survivors completed a baseline survey about medical history and health behaviors, including smoking. Details on the methods for the larger CCSS study are provided elsewhere.[7,8] All methods were approved by our institutional review board. Eligibility criteria for participation in CCSS include: (1) diagnosis of leukemia, CNS malignancies (all histologies), Hodgkin's disease, non-Hodgkin's lymphoma, kidney cancer, neuroblastoma, soft tissue sarcoma, or malignant bone tumor; (2) diagnosis and initial treatment at one of the 27 collaborating CCSS institutions; (3) diagnosis date between January 1, 1970, and December 31, 1986; (4) age younger than 21 years at the time of diagnosis; and (5) survival of at least 5 years from the time of diagnosis. Smokers who were identified through the CCSS-baseline questionnaire were invited to participate in PFH. Eligibility criteria for PFH included: (1) age of at least 18 years; (2) not currently in treatment for cancer; (3) mentally able to provide informed consent; (4) reading and speaking English; and (5) being a current smoker. Of the 27 CCSS institutions, 22 participated in PFH; each received institutional review board approval before patients were invited to participate in PFH.

Sample size was determined based on a power analysis set at 80% power to detect a difference of 7% to 10% in quit rates at the $P = .05$ level. From the CCSS baseline database, 1,769 subjects were identified as current smokers. Of these, 1,391 were alive and had a known address at the beginning of PFH. Relapse rates among smokers are high,[9] thus an additional 890 subjects who reported former smoker status in the CCSS survey were identified; 398 were alive, had a known address and were screened for current smoking status. Of the 1,789 CCSS participants with known addresses, 528 (29%) were not eligible for a variety of reasons, and 1,261 individuals were potentially eligible for the smoking cessation study, based on CCSS data. Interviewers successfully contacted 959 individuals from May 1999 through July 2000 and determined them to be eligible (76%), but were unable to contact 302 individuals (24%), and thus their eligibility status is unknown. Seven hundred and ninety-six participants enrolled (83% of known eligible participants; 63% of potentially eligible participants), and 162 declined participation (17% of known eligible participants; 13% of potentially eligible participants; Fig 1). After consent and completion of the baseline survey, participants were randomly assigned to either a peer-counseling (PC) or a self-help (SH) intervention

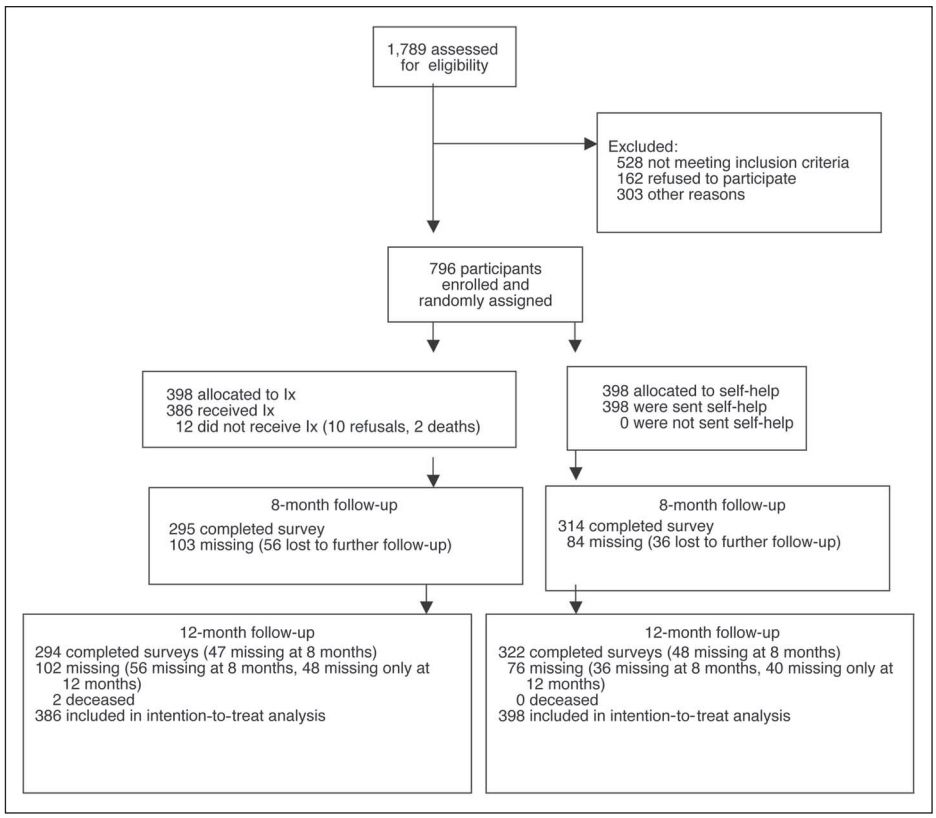

Fig 1. Recruitment and retention rates (Consolidated Standard of Reporting Trials statement). Ix, intervention.

condition. Follow-up assessments were conducted 8 and 12 months after the baseline survey. Participants in PFH were more likely to be female (46.6% *v* 37.1%; $P = .0001$); and more likely to be white (88.8% *v* 81.1%; $P < .0001$), compared with smokers in the CCSS database.

Intervention Conditions

Self-help intervention. SH participants received a letter from the study physicians highlighting the importance of smoking cessation to reduce the risk of secondary cancers and the "Clearing the Air: How to Quit Smoking and Quit for Keeps" cessation manual.[10] Self-help was used rather than a no-intervention control because of the ethical issues associated with failure to promote smoking cessation among this high-risk group. It would have been preferable to have the risk message come from the participants' physicians, but this proposal was logistically impractical due to the large number of physicians involved in this 22-site trial. The smoking cessation manual discussed nicotine replacement therapy (NRT) as a treatment option. Because NRT is available over-the-counter, self-help participants were able to purchase and use this form of therapy if they wished.

Peer-delivered telephone counseling intervention. The goal of the intervention was to enhance self-efficacy and social support, increase knowledge about the health risks of smoking, reduce barriers to quitting, help participants to set goals, and provide feedback regarding behavior change. Each participant was assigned a peer counselor (who was also a childhood cancer survivor) who worked with them throughout the intervention; up to six calls were provided within a 7-month period. The intervention was based on the principles of motivational interviewing,[11] and thus emphasized the smoker's choice, personal responsibility for change, and enhancement of self-efficacy. The calls were tailored to the participants' stage of readiness to quit smoking and interest in other health topics and goals. NRT was discussed, and made available without cost to PC participants and their spouses/partners who indicated in the counseling calls that they were ready to make a serious quit attempt, following recommendations in the Clinical Practice Guidelines for Treatment of Tobacco Use and Dependence.[12]

A written report, tailored to each consented participant, was mailed before the first counseling call, introduced the participant's peer counselor, and provided feedback tailored to the interaction of smoking with cancer type and treatment, risk perception, self-efficacy, motivation to quit smoking, and other topics related to survivorship that the participant endorsed on the baseline survey as being of interest. Supplemental materials, also tailored to the participant's needs, were provided during the intervention period. The intervention components[13] were guided by the Social Ecological Model,[14] which takes into account several factors at the individual, interpersonal, and systems levels that are thought to influence the behavior change process. The intervention integrated principles from a number of theories of behavior change[15-19] and reflects a strong focus on social support mechanisms related to behavior change.[20,21]

Measures

Smoking status. The primary outcome variable for this study was 7-day point-prevalence smoking status, as measured at 8- and 12-month follow-up assessments. The bogus pipeline procedure, which is a well-accepted strategy for increasing the accuracy of self-report, was used.[22] Other variables related to smoking behavior were assessed, including number of recent quit attempts, smoking rate, and nicotine dependence (measured as time from waking to first cigarette).[23] NRT use was measured at both the 8- and 12-month follow-ups.

Psychosocial variables. Self-efficacy was defined using single-item measures of confidence in one's ability to quit smoking in both the short (1 month) and long term (6 months),[24] using 5-point Likert response scales.

Readiness to quit smoking was assessed using the Stages of Change algorithm,[25] which classifies active smokers into four categories: (1) precontemplation, which includes individuals who report they are not seriously thinking about quitting smoking in the next 6 months; (2) contemplation, which includes individuals who report they are seriously thinking about quitting smoking in the next 6 months; (3) preparation, which includes individuals who are intending to quit smoking in the next month and who have tried to quit in the past year; and (4) action, which includes individuals who quit smoking in the past 6 months.

In order to determine the social norms of participants related to smoking, the number of smokers among the family and friends of the respondent was ascertained. Support for quitting was assessed by asking the extent that the participants' friends, family, and coworkers encouraged quitting during the past 12 months (single item for each network group). Social support was measured with the emotional/informational support subscale of the Medical Outcomes Study[26] (Cronbach's $\alpha = .94$). In addition, perceived vulnerability due to cancer and smoking was assessed using a subset of items tapping perceived vulnerability and perceived importance of health protection from Tyc's Perceived Importance of Health Protection scale[27] (Cronbach's $\alpha = .80$). This measure, which was developed for adolescent cancer survivors, was adapted to include an older age range. Questions were also asked about knowledge of the risks of smoking for cancer survivors using the Tobacco Knowledge Scale.[27] Severity of psychological symptoms (eg, depression, anxiety, somatization) was determined using the global severity index of the Brief Symptom Inventory 18 (BSI),[28] using a response scale of 1 (not at all severe) to 5 (extremely severe; Cronbach's $\alpha = .91$). Finally, perceived health status was measured with one item from the 12-item Short-Form Medical Outcomes Study Health Survey.[29]

Demographic characteristics and medical history. The following demographic variables are available through the CCSS database: age, sex, race, ethnicity, and socioeconomic status. Extensive personal and family medical history data are available through the CCSS database, and includes cancer history and treatment, presence of chronic medical conditions, functional limitations, and medication use. Education, employment history, and marital status were assessed on the PFH baseline survey.

Cost data. A tracking system was developed to collect detailed data on intervention delivery costs. Staff and peer counselor time were valued at actual salary rates, including fringe benefits. Telephone usage was valued at $0.10 per minute. All other resources were valued at their actual invoice costs. The per-subject baseline survey cost was estimated by dividing the total survey cost by the number of subjects, and prorating by the percentage of the survey devoted to the collection of information relevant to generating tailored reports (31%).

Data analysis. Data analysis for the outcome evaluation began with univariate descriptive analyses (Table 1). Smoking cessation, using the intention-to-treat principle, was the primary dichotomous outcome variable. Two-way categoric analyses using

Table 1. Demographics and Medical History (N = 796)

Variable	No. of Patients	%
Age, years		
Mean	31	
SD	6.66	
Sex		
Male	422	53
Marital status		
Married/cohabiting	350	44
Widowed/separated/divorced	119	15
Never married	327	41
Education		
< High school	104	13
High school/GED	263	33
Post–high school	318	40
≥ College	111	14
Employed	637	80
Cigarettes smoked per day		
Median	12	
Range	1-100	
Stage of readiness to quit smoking		
Precontemplator	143	18
Contemplator	343	43
Preparation	310	39
Type of cancer		
Leukemia	205	26
Hodgkin's disease	144	18
CNS malignancy	93	12
Non-Hodgkin's lymphoma	90	11
Bone cancer	84	11
Soft tissue sarcoma	75	9
Kidney cancer	54	7
Neuroblastoma	48	6
Age at cancer diagnosis, years		
0-3	151	19
4-9	231	29
10-14	223	28
≥ 15	191	24
Cancer treatment		
Radiation, chemotherapy, or surgery only	92	12
Radiation and surgery	113	14
Radiation and chemotherapy	59	7
Chemotherapy and surgery	120	15
Radiation, chemotherapy, and surgery	259	33
Data missing	153	19

Abbreviations: SD, standard deviation; GED, General Educational Development certification.

χ^2 statistics for categoric variables and analysis of variance for continuous variables were used to assess the relationships between smoking cessation and the potential independent predictors psychosocial factors, demographic and medical history factors, NRT use, and intervention condition. A logistic regression model predicting cessation was developed using all variables from the bivariate analyses with statistical significance at the $P = .10$ level. A final parsimonious model included only significant variables and effect modifiers. All two-way interactions were examined for significance in this final model. Model assessment was conducted using sensitivity-specificity tables and Hosmer-Lemeshow goodness-of-fit statistics. Per subject incremental costs were calculated by summing up the costs for each group and dividing that by the number of subjects randomly assigned to that group. All outcomes were evaluated using the intention-to-treat principle. Analyses were conducted using SAS Version 8.2 (SAS Institute, Cary, NC).

RESULTS

Demographics and Cancer History

Table 1 lists demographic characteristics and cancer history. Overall, study participants were relatively young, moderately well educated (87% had at least some post–high school training), and 80% were employed. Slightly more than half of the participants were male. Almost half of the participants were diagnosed with cancer before they were 9 years old. There were no significant differences between the two intervention groups with regard to the demographic or medical history variables. The smoking-related variables (eg, smoking rate, number of quit attempts) were not related to the type of cancer the participant had.

Psychosocial Variables

At baseline, most of the respondents were thinking about quitting at some point in time, with 40% of participants reporting being ready to quit. However, self-efficacy levels for quitting within the next month were low (mean = 2.21 on a 5-point scale; standard deviation [SD] = 1.19), and only slightly higher for quitting during the next 6 months (mean = 3.01; SD = 1.21).

Treatment Outcomes

Using intention-to-treat analyses, 14.5% of all participants had quit smoking at the 8-month follow-up. The quit rate was significantly higher in the PC group when compared with the SH group (16.8% *v* 8.5%; $P < .0003$; Fig 2). This difference was maintained at the 12-month follow-up (15% *v* 9%; $P \leq .01$). Controlling for baseline self-efficacy and depression, the PC group was likely to quit smoking by the 12-month follow-up, compared with the SH group (12-month OR = 1.99; 95% CI, 1.27 to 3.14). These analyses

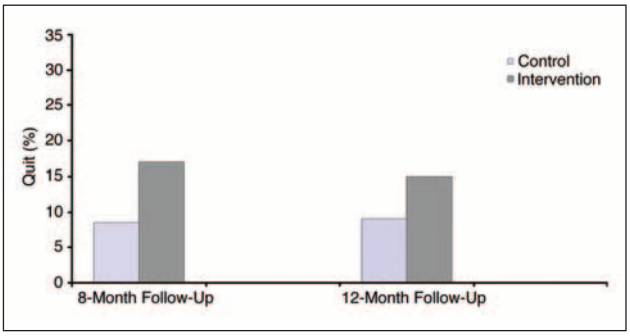

Fig 2. Quit rates by intervention condition (n = 796). Mo., months.

were repeated and restricted to participants who had complete data, that is, who had responded to both follow-ups. This produced similar indications of intervention effects with higher odds ratios. However, we have not presented these data because intention-to-treat analyses are more conservative.

Attempts to quit smoking were not significantly different between the two conditions; by the 12-month follow-up, 20% of the SH group had made at least one serious quit attempt and 37% had made two or more attempts, compared with 18% and 43% of the PC group, respectively. Thus, the intervention did not have an impact on efforts to quit, but rather the likelihood that those efforts would be successful.

There were no baseline differences in stage of readiness to quit by group. By the 12-month assessment, there were no significant differences in readiness by group among continued smokers.

Predictors of Cessation

Of interest was the extent to which several psychosocial factors were related to smoking cessation outcomes. Both short- and long-term self-efficacy were related to smoking cessation at the 12-month follow-up ($P \leq .0001$ and $P = .037$, respectively); individuals with high self-efficacy at baseline were four times more likely to quit than those with little or no self-efficacy (OR = 4.32; 95% CI, 2.34 to 8.06). Baseline stage of readiness was marginally related to smoking cessation, with 11% of precontemplators, 10% of contemplators, and 16% of those participants in the preparation stage quitting by 12 months ($P = .06$). The relationship between perceived vulnerability and smoking cessation was not significant. BSI depression score had a marginally significant relationship with cessation, such that individuals with higher levels of depressive symptoms were less likely to quit. No relationships were found between smoking cessation and baseline levels of social support, quality of life, tobacco-related knowledge, or cancer diagnosis.

Multivariable logistic regression models were formulated to examine associations between smoking cessation and all variables with significant bivariate relationships. The final model (Table 2) controlled for age and sex, although they were not statistically significant. Long-term self-efficacy, BSI score, and intervention condition were predictors of smoking cessation outcomes; stage of change, although marginally significant in the bivariate analyses, did not enter into the final model. Controlling for all other variables, the PC group had an odds ratio of 1.79 for quitting, compared with the SH group ($P = .01$).

Use of NRT

Although NRT was offered only to the PC participants and not to SH participants, it is available over the counter to all smokers. All participants in both conditions were asked whether they had used NRT during the study period. Twenty-nine percent of PC participants requested, received, and reported using NRT as part of the intervention.

Table 2. Multivariable Logistic Regression Models of Smoking Cessation Outcomes

Variable	Odds Ratio	95% Confidence Limits
Age group, years		
18-25 *v* ≥ 36	0.515	0.279, 0.966
26-30 *v* ≥ 36	0.582	0.329, 1.029
31-35 *v* ≥ 36	0.686	0.376, 1.250
Sex		
Female *v* male	1.129	0.725, 1.760
Long-term self-efficacy	1.355	1.125, 1.631*
Intervention		
1 = yes *v* 0 = no	1.689	1.085, 2.629*
Mean positive feelings	0.580	0.313, 1.076
Have a lot of energy		
Past 4 weeks (baseline)	1.449	1.054, 1.991*
Depressive symptoms	0.692	0.477, 1.005

*$P < .05$.

At the 8-month follow-up, 33% of participants in the PC condition reported that they had used NRT during the previous 6 months, compared with 8% of the SH participants. At the 12-month follow-up, 16% of the PC participants indicated that they had used NRT in the previous 4 months, compared with 6% of SH participants. There were significantly higher quit rates at the 12-month assessment among NRT users, compared with nonusers ($P < .0001$); 14% of those in the SH group who used NRT reported being quit, compared with 26% of the PC group, although this difference did not reach significance using intention-to-treat analyses. Although quit rates overall and among NRT users were higher in the PC group, no significant interactions between NRT use and intervention group were found.

Process Data

We asked all self-help participants on the follow-up survey whether they had received the study materials. If they had, we followed up with questions about how much of the received materials they had read, and whether they found the materials to be useful. Seventy-four percent of the control participants responded that they had indeed received the PFH materials. Of that group, 67% reported having read either a lot or all of the materials sent; 56% of participants reported that they found the materials to be somewhat useful, and 21% reported that they were very useful. As expected, recall of receipt and rates of use of the materials were higher among the peer-counseled intervention group participants (95% reported receiving the materials; 79% reported reading a lot or all of the materials). The differences in recall of receipt and use likely reflect increased engagement as a result of the peer-delivered components of the intervention.

Impact of Intervention Dose

Intervention dose refers to the number of counseling calls each participant received. There were substantial

differences in quit rates across the entire range of calls (Fig 3) for the 8-month follow-up, with an increase in smoking cessation rates of 5 percentage points among those participants who received six calls, compared with those who received five calls (29% *v* 24%, respectively). Although most of these differences in quit rates by intervention dose were maintained by the 12-month follow-up, the difference between those receiving five versus six calls was no longer evident.

Cost Effectiveness

The total intervention delivery cost per person was $298.17 for the PC group, and $1.25 for the SH group. Therefore, the incremental cost-effectiveness of the PC condition compared with the SH control [$(Cost_{PC} - Cost_{SH})/(Quit\ rate_{PC} - Quit\ rate_{SH})$] was $5,371 per additional quit at 12 months.

DISCUSSION

Partnership for Health is the first large-scale intervention targeting smoking cessation among childhood cancer survivors. This study demonstrated that the PFH counseling intervention doubled smoking cessation rates, compared with the self-help intervention. This is a substantial impact for a relatively low-intensity and low-cost intervention that can be delivered via postal mail and telephone, without the need for in-person contact. The per-person cost of the PFH intervention (approximately $300) is at the low end of the range of costs reported in the literature. For example, interventions involving physician counseling and NRT have been found to cost as much as $7,000 per case subject.[30,31] The cost effectiveness of this intervention was not directly estimated in terms of cost per year of life saved. However, this ratio is almost certainly highly favorable, given that interventions with similar efficacy but higher delivery costs have been found in simulation models to be very cost effective (eg, less than $10,000 per year of life saved).[30,31]

Peer counseling has proven effective for a variety of health behaviors and populations.[32] PFH has now demonstrated that this well-tested intervention strategy is effective with smoking cessation among cancer survivors. Given the large number of survivors who participate in volunteer activities related to cancer prevention, researchers should now look for ways to implement peer counseling for smoking cessation on a broader scale among the survivor community. Peer-to-peer outreach is a common strategy offered to cancer patients, and this study provides evidence that it is also effective for smoking cessation among survivors.

Some limitations of this study should also be noted. First, difficulties in reaching potential participants in this highly mobile population had an impact on the response rate. Although these participants were recruited from the accrued CCSS cohort, initial entry into the CCSS database occurred up to 6 years before the launch of PFH. These young adults had experienced major life changes following enrollment onto CCSS that made it difficult to locate and track potential participants (eg, multiple moves to go to college and begin employment, marriage, and name changes). We conducted the outcome analyses using both intention-to-treat analyses and the complete data set only. The findings were

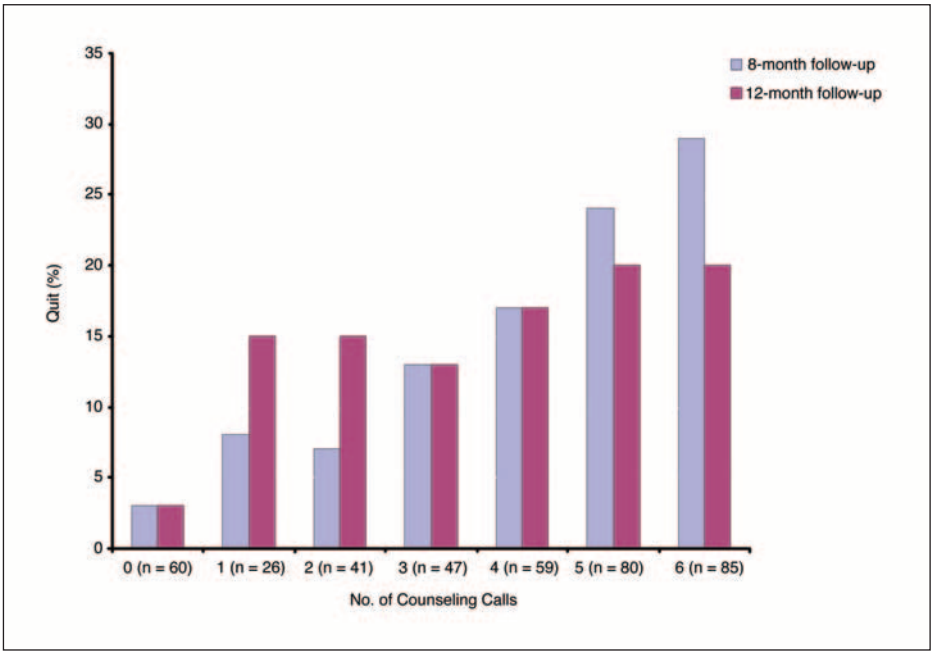

Fig 3. Relationship between the number of telephone counseling calls received and cessation rate (n = 398).

identical, although the odds ratios were lower with the more conservative intention-to-treat approach. Future studies will evaluate various methods of interpolation for missing data. There was also limited diversity with regard to race and ethnicity in the study sample, despite making substantial efforts to recruit minority group members. The ethnic composition of our sample generally reflects the 22 cancer centers from which the CCSS cohort was drawn, although the minority group representation in CCSS was slightly higher than in PFH, most likely because of the lower smoking initiation rates found among nonwhites in the CCSS sample.[6] A similar trend is seen in the general United States population, with lower smoking rates found in young minority populations, compared with white populations.[33] Thus, the findings are generalizable only to populations similar to those that participated in this study. The assessment battery in the present study was limited by constraints related to respondent burden, and was focused primarily on individual- and interpersonal-level variables. The intervention included a number of components (eg, tailored materials, peer counseling, access to NRT), and thus it is not possible to determine which components were most effective. Although we recognize the limitations of a "kitchen sink" approach, it is also important to recognize that multiple components are likely required to achieve success at smoking cessation.[34] It should be noted that we gave considerable thought to the design of the comparison condition, and in the end, used a self-help condition. We wanted to emulate standard of care to the extent possible, because it was our goal to evaluate whether the experimental intervention could outperform the services that cancer survivors typically receive. We also gave careful thought to the decision to make NRT available to the intervention group. Although there was higher NRT use in the experimental condition, presumably at least in part because of its availability, all smokers can purchase NRT over the counter, and in fact, 8% of self-help participants did so. Again, the goal was to compare what we feel might become a best practice intervention with standard of care, and thus we felt that this comparison was appropriate.

There are several important strengths of this study. In designing this study, we thought carefully about the selection of the control group, and opted for a real-world control, in which participants in the self-help control group would have information about NRT and access to it as an over-the-counter product. The study sample was drawn from the CCSS cohort, the largest and most comprehensively characterized research cohort of childhood cancer survivors ever assembled in North America.[7] The study included a large sample of smokers, and thus had sufficient power to detect study outcomes. Both the outcome and cost-effectiveness data were analyzed using the intention-to-treat principle so that the findings would be conservative.

Although the quit rates were doubled in the PFH intervention group compared with the self-help group, some commentary is warranted on the absolute level of cessation observed. Approximately 15% of participants in the PFH group had quit by the 12-month assessment. Although this may not seem high, it is important to note that this study was conducted among nonvolunteers, that is individuals who did not proactively seek out smoking cessation. In fact, many participants were not interested in quitting smoking at baseline. The literature provides a number of examples in which quit rates are lower among nonvolunteers than among volunteer subjects.[35,36] Two other studies have been conducted using a similar proactive recruitment strategy with nonvolunteers, comparing telephone counseling with a control condition. Lando et al,[37] randomly assigned smokers who had expressed interest in quitting smoking through a variety of means (eg, registered in a quit smoking contest; expressed interest in quitting in a community survey) to a telephone counseling intervention or a nonintervention control group. Quit rates at 6 months were 8.5% in the intervention group and 5.0% in the control group ($P < .01$); the difference was not significant at the 18-month follow-up. Curry et al[38] identified smokers through a random sample of Health Maintenance Organization enrollees and randomly assigned them to telephone counseling plus self-help materials or self-help materials only. At the 3-month follow-up, the counseling group had significantly higher quit rates than the self-help group (11% *v* 5%, respectively), but the difference was not significant at 12 months (11% *v* 7%, respectively). Studies of telephone interventions delivered to smokers who call smoking cessation quit lines have found a range of quit levels, ranging from those similar to nonvolunteer samples[39] to quit rates of those found with more intensive interventions.[40] For example, Borland et al[40] observed 6-month quit rates of 21% in a telephone counseling group versus 12% in a self-help group; the difference was nonsignificant at the 12-month follow-up. It is also important to note that in this study both groups were equally likely to try to quit smoking—the primary difference between conditions was that those in the intervention condition who did try were more likely to be successful. The results of Partnership for Health are particularly important given the young age of this population; quitting at an early age decreases the chances that survivors will experience the deleterious health effects of smoking.

Historically, oncologists have not been extensively involved in the delivery of smoking cessation advice or interventions.[41,42] This may be understandable in the context of patients with advanced disease. However, late effects may be enhanced by smoking, so smoking cessation and prevention efforts should be incorporated into ongoing care.[41] PFH provides a road map for the development of a national model for smoking cessation interventions for cancer survivors. Future studies should evaluate the impact of different intervention doses on outcomes, as well as ways of using

other less costly intervention modalities to supplement or replace the counseling calls (eg, Web-based interventions).

Authors' Disclosures of Potential Conflicts of Interest

The authors indicated no potential conflicts of interest.

REFERENCES

1. Haupt R, Fears T, Robison L, et al: Educational attainment in long-term survivors of childhood acute lymphoblastic leukemia. JAMA 272: 1427-1432, 1994

2. Ries LAG, Percy CL, Bunin GR: Cancer incidence and survival among children and adolescents: United States SEER Program 1975-1995. Bethesda, MD, Cancer Statistics Branch, National Cancer Institute, 1999

3. Weiner S, Simone J, Hewitt M: Childhood cancer survivorship: Improving care and quality of life. Washington, DC, National Cancer Policy Board, National Academy Press, 2003

4. Meadows A: Curing cancer in children: Minimizing price, maximizing value. J Clin Oncol 13:1837-1839, 1995

5. Bhatia S, Robison L, Oberlin O, et al: Breast cancer and other second neoplasms after childhood Hodgkin's disease. N Engl J Med 334:745-751, 1996

6. Emmons K, Whitton J, Diller L, et al: Predictors of smoking initiation and cessation among childhood cancer survivors: The childhood cancer survivor study. J Clin Oncol 20: 1608-1616, 2002

7. Robison L, Mertens A, Boice J, et al: Study design and cohort characteristics of the Childhood Cancer Survivor Study: A multi-institutional collaborative project. Med Pediatr Oncol 38:229-239, 2002

8. Mertens A, Potter J, Neglia J, et al: Methods for tracing, contacting, and recruiting a cohort of survivors of childhood cancer. J Pediatr Hematol Oncol 19:212-219, 1997

9. Stead L, Lancaster T: Group behaviour therapy programmes for smoking cessation. *The Cochrane Database of Systematic Reviews* 2005, Issue 2. Art. No.: CD001007.pub2. DOI: 10.1002/14651858.CD001007.pub2

10. National Cancer Institute: Clearing the air: How to quit smoking and quit for keeps. Bethesda, MD, National Institutes of Health, NIH publication No. 95-1647, 1993

11. Miller W, Rollnick S: Motivational Interviewing: Preparing People to Change Addictive Behaviors. New York, NY, Guildford Press, 1991

12. Fiove MC, Bailey WC, Cohen SJ, et al: Treating Tobacco Use and Dependence: Clinical Practice Guideline. Rockville, MD, U.S. Department of Health and Human Services. Public Health Service, June 2000

13. Emmons K, Butterfield R, Puleo E, et al: Smoking among participants in the Childhood Cancer Survivors Cohort: The Partnership for Health Study. J Clin Oncol 21:189-196, 2003

14. Stokols D: Translating social ecological theory into guidelines for community health promotion. Am J Health Promot 10:282-298, 1996

15. Becker MH: Understanding patient compliance: The contribution of attitudes and other psychosocial factors. Lexington, MS, Health, 1979

16. Leventhal H, Hirschman RS: Social psychology and prevention. Hillsdale, NJ, Lawrence Erlbaum Associates Inc, 1982

17. Azjen I, Fishbein M: Understanding Attitudes and Predicting Social Behavior. Englewood Cliffs, NJ, Prentice Hall, 1980

18. Bandura A: Social Foundations of Thought and Action: A Social Cognitive Theory. Englewood Cliffs, NJ, Prentice-Hall, 1986

19. Prochaska J, DiClemente C: Self Change Processes, Self Efficacy and Decisional Balance Across Five Stages of Smoking Cessation. New York, NY, Alan R. Liss Inc, 1983

20. Gore S: Stress-buffering functions of social supports: An appraisal and clarification of research models, in Dohrenwend BS, Dohrenwend BP (eds): Stressful Life Events and Their Context. New York, NY, Neale Watson Academic Press, 1981

21. Israel BA, Schurman SJ: Social support, control and the stress process, in Glanz K, Lewis F, Rimer B (eds): Health Behavior and Health Education: Theory, Research and Practice. San Francisco, CA, Jossey-Bass Publishers, 1990, pp 187-215

22. Hansen W, Malotte C, Fielding J: The bogus pipeline revisited: The use of the threat of detection as a means of increasing self-reports of tobacco use. J Appl Psychol 70:789-792, 1985

23. Fagerstrom KO, Schneider NG: Measuring nicotine dependence: A review of the Fagerstrom Tolerance Questionnaire. J Behav Med 12:159-182, 1989

24. Gritz E, Kristeller J, Burns D: Treating nicotine addiction in high risk groups and patients with medical co-morbidity, in Orleans C, Lode J (eds): Nicotine Addiction: Principles and Management. Oxford, United Kingdom, Oxford University Press, 1993

25. Prochaska JO, DiClemente CC, Norcross JC: In search of how people change: Applications to addictive behaviors. Am Psychol 47: 1102-1114, 1992

26. Sherbourne C, Stewart A: The MOS social support survey. Soc Sci Med 32:705-714, 1991

27. Tyc VL, Hadley W, Crockett G: Predictors of intentions to use tobacco among adolescent survivors of cancer. J Pediatr Psychol 26:117-121, 2001

28. Derogatis LR: BSI Brief Symptom Inventory: Administration, scoring and procedures manual-II. Minneapolis, MN, National Computer Systems Inc, 1993

29. Ware JE, Sherbourne CD: The MOS 36-item short form health survey (SF-36): Conceptual framework and item selection. Med Care 30:473-483, 1992

30. Oster G, Huse D, Delea T, et al: Cost-effectiveness of nicotine gum as an adjunct to physician's advice against cigarette smoking. JAMA 256:1315-1318, 1986

31. Fiscella K, Franks P: Cost-effectiveness of the transdermal nicotine patch as an adjunct to physician's smoking cessation counseling. JAMA 275:1247-1251, 1996

32. Harris RM, Bausell RB, Scott DE, et al: An intervention for changing high-risk HIV behaviors of African American drug-dependent women. Res Nurs Health 21:239-250, 1998

33. Johnston LD, O'Malley PM, Bachman JG: Demographic subgroup trends for various licit and illicit drugs, 1975-2001 (ed 57). Ann Arbor, MI, Institute for Social Research, 2002

34. Tobacco Use and Dependence Clinical Practice Guideline Panel, Staff, Consortium Representatives: A clinical practice guideline for treating tobacco use and dependence. JAMA 283:3244-3254, 2000

35. Gritz WR, Berman BA, Bastani R, et al: A randomized trial of a self-help smoking cessation intervention in a nonvolunteer female population: Testing the limits of the public health model. Health Psychol 11:280-289, 1992

36. McBride CM, Curry SJ, Grothaus LC, et al: Use of self-help materials and smoking cessation among proactively recruited and volunteer intervention participants. Am J Health Promot 12: 321-324, 1998

37. Lando HA, Hellerstedt WL, Pirie PL, et al: Brief supportive telephone outreach as a recruitment and intervention strategy for smoking cessation. Am J Public Health 82:41-46, 1992

38. Curry S, McBride C, Grothaus L, et al: A randomized trial of self-help materials personalized feedback and telephone counseling with nonvolunteer smokers. J Consult Clin Psychol 63:1005-1014, 1995

39. Zhu SH, Anderson CM, Tedeschi GJ, et al: Evidence of real-world effectiveness of a telephone quitline for smokers. N Engl J Med 347: 1087-1093, 2002

40. Borland R, Balmford J, Segan C, et al: The effectiveness of personalized smoking cessation strategies for callers to a Quitline service. Addiction 98:837-846, 2003

41. Dresler CM, Gritz ER: Smoking, smoking cessation and the oncologist. Lung Cancer 34: 315-323, 2001

42. Gritz ER, Lazev AB, Vidrine DJ: Smoking cessation in cancer patients: Never too late to quit, in Given C, Given B, Champion V (eds): Evidence Based Interventions in Oncology. New York, NY, Springer Publications, 2003, pp 107-140