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Activating Lay Health Influencers to Promote Tobacco Cessation

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Abstract

Objective—Evaluate the effect of tobacco cessation brief-intervention (BI) training for lay “health influencers,” on knowledge, self-efficacy and the proportion of participants reporting BI delivery post-training.

Methods—Randomized, community-based study comparing In-person or Web-based training, with mailed materials.

Results—In-person and Web-training groups had significant post-training cessation knowledge and self-efficacy gains. All groups increased the proportion of individuals reporting BIs at follow-

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Human Subjects Statement

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Conflict of Interest Statement

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up, with no significant between-group differences. Irrespective of participants' prior intervention experience, 80–86% reported BIs within the past 90 days; 71–79% reported 1 in the past 30.

Conclusions—Web and In-person training significantly increase health influencer cessation knowledge and self-efficacy. With minimal prompting and materials, even persons without BI experience can be activated to encourage tobacco cessation.

Keywords

tobacco cessation; brief intervention; community

Despite decades of tobacco control efforts, tobacco use remains a pressing public health problem with nearly one in 5 Americans smoking.¹ Effective tobacco dependence treatments, both behavioral and pharmaceutical, are more numerous and available than ever before, but continue to be underutilized. Nearly 80% of smokers in the U.S. still attempt to quit without assistance,¹ though there is robust evidence that guideline recommended approaches significantly improve a tobacco users' likelihood of quitting compared with unaided quit attempts.² Approximately 80% of the U.S. population who are *not* current tobacco users, but may know or be concerned about someone who does smoke or dip. A community-based social network approach that engages this target audience in providing tobacco cessation brief interventions could provide a complementary and powerful addition to clinical interventions, encouraging more quit attempts and use of effective treatments for greater public health impact.

Brief Interventions In Tobacco Cessation

Brief interventions (BIs), at the low-intensity end of the continuum of tobacco cessation services, are 3- to 5-minute conversations intended to encourage a tobacco user to quit and to use effective cessation aids, eg quit line, cessation medications.² For over 2 decades health professionals, primarily physicians, have been targeted for tobacco cessation training to prompt consistent cessation interventions with tobacco users. Yet despite being ranked by the U.S. Preventive Services Task Force as the single most effective and cost-effective of all clinical preventive services for adults, primary care BIs are delivered to fewer than half of tobacco using patients.³ Healthcare providers' failure to consistently deliver BIs exposes the limitations of a healthcare system focused strategy for engaging tobacco users in cessation treatment. Additionally, tobacco use increasingly and disproportionately affects populations with socioeconomic, cultural and other barriers to accessing healthcare.^{4,5} As a sole delivery channel for BIs, the healthcare system will not reach a significant proportion of smokers.

Role Of Lay Community “Health Influencers”

The drug and alcohol treatment fields have long recognized the important influence of family and friends in treatment engagement, adherence and outcome.^{6,7} More broadly, peer and lay health educator led interventions have been found to be effective in influencing lifestyle related behaviors such as healthy eating, disease prevention (eg, breast cancer screening) and smoking reduction.⁸ Tobacco users are also surrounded by potential “health

influencers” (people who have the opportunity, motive and willingness to take action to influence another person’s health behavior, ie, encourage quitting).^{9,10}

“Health influencers” (HIs) are a diverse group of individuals, whose relationships to tobacco users are highly variable in formality and/or social distance. An HI could be a family member, friend, coworker, student, teacher, client, health care provider, casual acquaintance, or even stranger. A small pilot study of skills training for support persons (a subgroup of HIs), rather than direct intervention with smokers, found training was associated with smokers’ increased quit attempts, readiness to quit, and higher 7-day point prevalence abstinence, although the study was not powered to detect significant differences between the 2 groups.¹¹

Persons calling a quit line on a smoker’s behalf are called “proxies” (another sub group of HIs). Of all callers to the California Smokers’ Helpline from 1992–2005, 7% (more than 22,000 callers) were non-smoking proxies, despite the fact that Helpline promotions are directed at smokers, and have never targeted proxies.¹² Although little is known about this “help seeking by proxy” behavior, these callers may represent only a small fraction of the actual population of HIs interested in helping smokers quit. However, well-intentioned but repeated or misdirected efforts to change a tobacco user’s behavior (eg, “nagging”) by friends and/or family members could elicit reactance and even perpetuate or exacerbate tobacco use.¹³ Currently, when proxy callers contact quit lines to request information about assisting others in quitting, the standard practice is to provide pamphlets that are designed primarily for *tobacco users*. These materials typically do not provide information to the HI, about how best to interact with the tobacco user to encourage quitting and use of evidence based cessation aids.

The effect of mailed materials on either proxy caller intervention behavior or tobacco user behavior has not been well studied. Evidence from tobacco cessation training for health professionals indicate training does increase subsequent delivery of BIs to patients.^{14,15} However, compared to health professionals, HIs have relationships with tobacco users that are more highly variable and fundamentally quite different – in terms of the nature and context of the relationship, frequency of contact, and potential opportunities to intervene. There is little research documenting whether the factors (eg, training) that increase BI behavior of health professionals have similar effects on lay community member HI intervention behavior.

Brief interventions from community members could also have the potential to shift social norms toward quitting and contribute to a pervasive community message encouraging quitting and using cessation aids. A study of social network effects on smoking cessation found that clusters of people connected both directly and indirectly, up to 3 degrees of separation, appeared to quit smoking at roughly the same time.¹⁶ Other research on quitting suggests successful quit attempts are often unplanned, with sudden shifts in motivation - triggered by small or even trivial events - leading to a quit attempt.¹⁷

Marketing of tobacco cessation aids and services is overwhelmingly directed to tobacco users. Brief intervention training that engages diverse community members can be an

important component of comprehensive tobacco control.¹⁸ Muramoto, et al¹⁸ found HIs who received cessation BI training significantly increased knowledge and self-efficacy with tobacco intervention skills. The BI training incorporated the “5 A’s” framework (developed for training physicians to deliver BI’s): “Ask” about tobacco use; “Advise” quitting; “Assess” readiness to quit; “Assist” with quitting by offering medications or referrals; “Arrange” for follow-up.² Six months after receiving training, 80.9% of HIs reported using their BI skills; 74.8% of HIs made a referral to more intensive cessation services.¹⁶ However, a limitation of a community-based model is cost-effective training dissemination. The Internet is increasingly used to cost-effectively train health professionals in tobacco cessation, but is unproven as a means of training non-clinicians to deliver tobacco BIs.

Community HIs are a novel and plausible approach to increasing delivery of tobacco cessation BIs, but there is little research on how best to train lay HIs, and whether trained lay HIs will actually deliver interventions with tobacco users – 2 foundational questions that underlie the ability to study the efficacy of community lay HIs as interventionists.

This paper presents results from a randomized study evaluating efficacy of tobacco cessation BI training to increase delivery of BIs by community lay HI. The study compared 2 training methods (In-person training or Web-based training) to a usual practice comparison group who received mailed-materials that did *not* contain any information about BIs or how to help someone else quit tobacco. The primary objective was to test the hypothesis that either in-person or web training, addressing both tobacco cessation knowledge and BI skills, would result in a larger proportion of HIs conducting BIs when compared to mailed materials with no BI information.

METHODS

Design

Project Reach (“Reach”) randomized participants to one of 3 groups: a mailed-materials group (Mail), conventional in-person training (In-person), or a multi-media web-based training (Web). The Mail group (comparison condition) received pamphlets with basic information on quitting tobacco (from the National Cancer Institute), similar to materials distributed by various state quit lines to proxy callers. The Mail group was included as a “usual practice” comparison for 2 reasons: 1) to control for possible secular trends in a state with an active tobacco control program, 2) persons attracted to participation in a tobacco cessation training study may be more likely to “op out” following assignment to a “no action, no information” control condition and seek information elsewhere (eg, state quit line). Study data were collected from August 2004 to April 2006.

Sample

Participants were recruited from Pima and Maricopa counties in Arizona using print, broadcast, and electronic media, as well as outreach presentations to community venues (eg, worksites, college campuses, health fairs, neighborhood association meetings.) Recruitment messages invited community members to participate in a study on different methods to train people to help others quit tobacco - themes included “learn to help people in your workplace

quit tobacco” and “help someone you care about quit tobacco.” Respondents were telephone screened for inclusion criteria: age 18 years or older, available for follow-up interviews, able to access high-speed internet, interacted with at least 10 persons per week, and willing to be randomized. In addition, participants had to be willing to forego other tobacco intervention training until after study completion in order to better isolate the effects of the intervention training on the primary and secondary study outcomes. Individuals were excluded if they had received other tobacco intervention training in the past 2 years, or another household member was enrolled in the study. All screen-eligible persons were invited to a one-hour orientation during which: (1) the study was explained in detail using a PowerPoint presentation and questions answered, (2) study participation was encouraged, (3) interested attendees completed written informed consents and baseline assessment instruments. Participants who, within 8 weeks of randomization failed to log onto the Web training, failed to attend the In-person training, or whose Mail materials were undeliverable, and were non-responsive to 5+ reminders and attempts to contact, were considered lost to follow-up.

Training Intervention

The Reach training curriculum (both In-person and Web) was developed through an iterative process of review and feedback by panels of national content experts, and local community members and content experts. Social Cognitive Theory (SCT) was the underlying theoretical framework.¹⁹ The intention was to develop a “community-based” training (ie, a training that was developed with local community input) that could be readily adopted and disseminated by lay community members (ie, not dependent on tobacco expert facilitation). The training was intended for delivery in community venues, targeting an audience of lay community members (versus only health professionals) within a defined community, and which trained participants to encourage cessation by referring to existing tobacco cessation community resources. Thus, the Reach training model draws on 4 different aspects of strategies of community interventions -- “community” as: setting of change, target for change, resource for change, agent of change.²⁰

Formative research (ie, focus group and interviews) with community members revealed social risk (eg, fear of confrontation or damage to the relationship) was a key barrier to providing a BI.

Unlike proscriptive approaches commonly taught in most tobacco BI trainings, the Reach curriculum emphasized a motivational, tobacco user-centered intervention, allowing a range of behaviors by the HI in response to the situational context and the tobacco user’s readiness to change. The motivational emphasis also aims to reduce a key behavior associated with increased risk for conflict – “nagging.” More specifically, the Reach curriculum addressed: tobacco addiction (to build empathy toward tobacco users struggling to quit); communication skills (eg, active listening) that specifically guide HIs away from confrontation or nagging; assessment of readiness to quit (to reduce HI’s inclination to push tobacco users with low readiness to quit); and referral skills to connect tobacco users with established cessation services (eg, quit lines); and basic information regarding cessation aids. The 5A’s formed an overall framework guiding the intervention.

The In-person training and Web training were designed to parallel one another, delivering 4 hours of content. To help standardize training delivery and reduce variability between in-person instructors, each used instructional video to present core conceptual information, demonstrate BI skills, and emotionally engage participants with interviews and testimonials from tobacco users, HIs and tobacco experts. Video and role-play scenarios of brief interventions depicted a wide range of social contexts and relationships. Learning activities (eg, BI delivery skills practice) were interactive as appropriate to the modality, and were similar in focus and content. As a final skills assessment, participants in both active training groups watched a video of a brief intervention and then identified observed BI skills on a skills checklist.

In keeping with the study's intention to develop and evaluate a community-based training intervention, instructors for the In-person training did not have expertise or experience in tobacco cessation or tobacco control. Instructors were recruited from the local community college instructors and public health graduate students, and selected based on their interest in the project, experience as classroom instructors, and availability to deliver multiple trainings. Instructors attended a training of trainers where they had to demonstrate delivery of portions of content. Instructors were observed for delivery of their first training. Fidelity of training delivery was monitored throughout the study with intermittent direct observation, post-training surveys of participants, and follow-up telephone interviews of a random sample of in-person training participants.

Training pacing and post-test administration—In-person training lasted 4 hours with the posttest administered immediately afterwards. Web training was self-paced. Participants were directed to the post-test page immediately after their final activity, but allowed to take the post-test at any time within 8 weeks of starting the training. Mail participants' review of materials was self-paced and unstructured. Mail participants were sent a post-test (with return postage envelope) 4 weeks after the printed materials packet with instructions to complete and return the posttest within 4 weeks. The post-test was "open book" for all 3 groups.

Measures

For all groups, 3- and 6-months post-training assessment data were collected via computer assisted telephone interviews. Participants received \$20 for completing each assessment: baseline, post-test, 3- and 6-month.

Demographics—At baseline, the following demographic information was collected: age, sex, ethnicity, race, education, and occupation. Occupation was collected in a text field, and responses were categorized as follows: "Helping Professions" included teachers, coaches, social work, childcare, clergy; "Business & services" included human resources; "Healthcare" included medical and behavioral health; "Student" included students; and "Other" included law enforcement, volunteer, retired.

Brief interventions—Since the term "brief intervention" originate and is primarily used by clinicians in a clinical context, lay HIs could not be expected to be familiar with BIs.

Therefore, a BI was defined for participants as "...a non-confrontational conversation intended to encourage or support a tobacco user's desire to quit."

At baseline, 3-months and 6-months post-training, participants were asked, "Using this definition, how many brief interventions have you done in the past 30 days?" and at 3-months and 6-months, "Using this definition, how many brief interventions have you done in the past 90 days?"

Tobacco and BI knowledge and confidence with BI skills—Additional domains related to BI behavior (and Social Cognitive Theory constructs, eg, expectancy) were assessed using items to measure effects of BI training on a non-clinical, lay community audience. All 3 groups completed an assessment pre- and post-training. Methods for calculation of instrument subscale scores (attitudes, confidence, and behavior) were reported in a previous paper.⁹

Behavior, attitude and confidence items ask participants to indicate level of agreement with short declarative statements (ie, Never agree, Sometimes agree, Often agree, Always agree). Five subscales were created from the items: Core Knowledge (12 items), Advanced Knowledge (9 items), Basic Confidence (5 items), Motivational Confidence (6 items), and Quit Plan Skill Confidence (6 items). Behavior items query behaviors related to BIs and intentions to apply the training participants were about to receive, eg, "I plan to use this training on my job." Attitude items ask about various tobacco and general behavior change, eg, "Second hand smoke is harmful to others." Confidence items query abilities related to tobacco brief interventions, eg, "I can accurately assess a tobacco user's motivation to quit." Knowledge items are multiple choice questions about training content, eg, "Name the 5 A's in the proper order." Motivational and Quit Plan Skills specifically addressed confidence with using motivational techniques and helping with a quit plan.

Analysis

Participants delivering BIs—The primary outcome measures were the proportion of participants in each study group who reported delivering at least one BI, in the past 30 days, or the past 90 days at 3- and 6-months post-training. Those persons who received and completed the In-Person or the Web training were compared to the comparison Mail group.

Measures were analyzed with a generalized linear model (the *glm* procedure in Stata) using the identity link and a binomial variance specification, adjusting for the number of reported contacts with other persons per week (ie, potential opportunity for a BI) at screening and the number of *monthly BIs reported at baseline*.

Number of BIs—The number of BIs reported by an individual HI was modeled using zero-truncated Poisson regression to assess the effect on the mean number of BIs due to the Web and In-person treatment groups among those who reported any BIs, adjusting for the reported number of monthly BIs delivered before the study. Counts of BIs were Winsorized to 100, in order to reduce bias due to outliers in reporting.²¹

Previous BI experience was included in the analysis as a potential moderator of BI behavior based on Social Cognitive Theory's constructs of self-efficacy, behavioral capability, and expectations - eg, prior experience with delivering BIs could influence future likelihood of delivering a BI.¹⁸ This analysis was designed to separate the issues of average *number* of BIs, as opposed to the proportion of interventions that were reported. Over the course of analysis, it was noted that training impact depended in part on participants' pre-study experience with BIs, so that interaction effects (pre-study BI indicator times treatment group indicator) were added to the Poisson regressions.

Missing data—Missing data varied by endpoints and groups. Missing counts were imputed first by prediction from a self-reported BI log mailed monthly and every 6 months; these were not otherwise used in the analysis. Failing this, imputation was done by carrying forward the number of BIs reported at baseline. Remaining values were left missing. The numbers of imputed and missing values varied by endpoints and groups. In the Mail group, between 12% and 19% were imputed, between 7% and 18% were missing, with number non-missing ranging from 139 to 153. Corresponding figures for the other groups were: In-person 14%–21% imputed, 8%–21% missing, non-missing 186–215; Web 8%–23% imputed, 7%–18% missing, non-missing 117–135.

Knowledge and confidence—Participants who had received the treatment (training) or usual practice (mailed materials) were included in this analysis. Means of the pre- and posttest scores are shown. A regression on the change score of the confidence and knowledge scales for those who completed both the pre- and posttests were conducted to assess the effect of the In-person and the Web group compared to the Mail group. Baseline scores were included in the model. Within group change was assessed by testing a group indicator coefficient against the null value of 0, and comparisons between groups were based on contrasts in the group indicator coefficients, all using conventional t-tests.

RESULTS

Participants

A total of 1892 participants were assessed for eligibility, of whom 898 were randomized and 547 completed training and a post-test. Figure 1 displays the study flow and participant inclusion throughout the study. Study sample demographics of all randomized participants (N = 898) and those who completed training and a post-test (N = 547 “completers”) are included in Table 1. Over half of participants reported at least one prior experience delivering a BI.

Overall Delivery Of Brief Interventions

Participants delivering a BI—At 3- and 6-months follow-up, all groups showed a substantial increase in the proportion of HIs reporting delivery of BIs, but no significant differences between the 3 groups were indicated (Table 2). Irrespective of intervention type, 80 to 86% of participants reported delivering a BI in the past 90 days, and 71 to 79% reported at least one in the past 30 days.

Number of BIs—Analyses of all participants showed differences in the *percentage* of brief interventions reported, compared to the Mail group (Table 3). For the participants *with* prior intervention experience the In-person and Web groups tended to deliver fewer brief interventions in the past 90 days than the Mail group at the 3-month follow up. These findings persisted at the 6-month follow-up. For participants with *no* prior intervention experience, an opposite finding emerged. At 3-month follow-up, there were no significant differences in the In-person versus Mail comparison, but a tendency toward *more* BIs in the Web group when compared to either. However, these differences were not sustained at the 6-month follow-up.

Knowledge And Confidence

Pre and post-training subscale score means of all participants are shown in Table 4. All 3 of the study groups had similar tobacco and BI-related knowledge at baseline. Regression models on participants who completed both pre- and posttest scores (N = 547) showed that both In-person and Web groups had significant gains in knowledge scores for core and advanced concepts in comparison to the Mail group ($p < .01$). Confidence in performing the 3 types of BI skills (expressed as a percentage agreement score) was also similar across all 3 groups at baseline. Both In-person and Web groups had significant gains ($p < .01$) on both knowledge score subscales. On the 3 confidence subscales, significant gains in basic skills were seen in the In-person and Web groups in basic skills compared to Mail, but only In-person achieved scores significantly higher than Mail on the motivational and quit plan subscales.

DISCUSSION

This large-scale study demonstrated that brief tobacco intervention training for general community members can increase knowledge, self-efficacy and intervention behavior. Results indicate that for persons motivated to help a tobacco user quit, even low-intensity enlistment messages about the importance of tobacco cessation and mailed information about cessation aids can activate HIs to deliver BIs. At follow-up, all 3 study groups substantially increased the proportion of participants reporting delivery of a BI (main outcome), with no significant differences between study groups. The lack of a greater effect from the 2 active training groups compared to the mailed materials group was unexpected, given the preponderance of research showing that such low-intensity “self-help” interventions rarely result in behavior change. At least among health professionals, distribution of printed educational materials alone results in little change in practice behavior compared to more intensive strategies such as training tutorials, academic detailing, prompts and reminders.^{16,22} This raises the possibility that the substantial differences between community HIs and health professionals with regard to the social and environmental contexts surrounding BIs, may influence HI intervention behavior in ways not predicted by existing research on health professionals.

A possible explanation for the lack of difference between groups is that study recruitment, enrollment and data collection procedures, may have unintentionally transformed Mail from a usual practice comparison group into a low intensity intervention condition due to the

following factors: First, the orientation/consenting session designed to engage participants may have provided sufficient motivation to cause participants to talk to tobacco users about quitting. Qualitative data suggested that many Mail participants mistakenly believed the orientation session constituted “training.” Second, monthly BI logs (pre-printed with the 5 A’s) may have prompted interventions. It is also possible that there may have been over-reporting of BIs due to social desirability bias. In the mailed materials group participants may have viewed greater numbers of BIs as more desirable to the research team, while in the Web and In-Person groups, participants would have received training that focuses more on the content and process (eg, 5 A’s, active listening skills) of the BIs rather than the number of BIs performed as the most important aspect of their outreach to tobacco users.

Surprisingly, in this group of HIs, even minimal exposure to research recruitment messages about the importance of tobacco cessation and mailed information about cessation (ie, Mail condition) activated BI behavior. This finding held even for HIs who had never delivered a BI, in effect approximately doubling the proportion of HIs who had delivered one in the past 90 days. In contrast, existing evidence from studies of health professionals (mostly physicians) indicate a low-intensity intervention (eg, lecture, print material) leads to minimal change in intervention behaviors.^{23,24} The unexpected and substantial increase in interventions by HIs in the Mail group suggests the existing body of knowledge about impact of cessation BI training may not apply to lay, community-based HIs whose relationships with tobacco users are more varied and may have intrinsic, more personal motivations for intervening. At study entry, the 2 most frequently cited reasons for study participation were: a “general interest in helping tobacco users quit” (90%), and “to help friends/family members quit” (89%).²⁵

The number of BI’s delivered is limited by the number of potential opportunities to intervene – eg, someone who knew fewer smokers (or the known tobacco users quit) would likely have fewer potential BI opportunities over time. The decline in numbers of BIs seen in Table 3 could be a reclassification artifact where In-person and Web training participants (after training) applied a more stringent definition of a BI at follow-up than at baseline. Or it could be that possibly the tobacco users intervened upon, subsequently quit. Alternatively, the decrease in numbers of BIs among those *with* prior experience may actually reflect desirable outcomes or behavior changes, (ie, smokers quit) and/or reduced “nagging,” - thus fewer repeat BIs at follow-up. This is consistent with findings of the parallel qualitative study in which participants reported that the training enabled both themselves and the tobacco user to reframe intervention conversations in a more positive light, different from the “usual nagging.”²⁵

Compared to Mail, participants in the In-person and Web training demonstrated significantly higher scores in tobacco cessation knowledge and self-efficacy with basic intervention skills, suggesting a possible qualitative difference in BIs delivered by trained versus untrained HIs, although there was no *a priori* measure of BI quality beyond participants’ report of which of the 5 A’s was used in an “usual” intervention. Additionally, the In-person group significantly increased self-efficacy with motivational and quit plan skills, compared to Mail.

The declining trend for BI numbers from the 3 to the 6-month follow-up (in all groups, regardless of prior BI experience) could also reflect fading of intervention behavior, suppression by negative intervention experiences, or a social network “saturation effect.” The number of BI’s that could be delivered is constrained by the number of intervention opportunities. Because the social networks of most individuals are not extensive nor have high turn-over, opportunities for BIs in an individual’s social network could be quickly saturated – thereby creating a ceiling on new opportunities to intervene. A saturation effect could be mitigated if HIs expanded their delivery of BIs beyond their close social circle, thereby contributing to a pervasive community message that promoted quitting and use of evidence-based cessation aids.

The study results have potentially important implications for tobacco control with respect to changing community influences on tobacco cessation. Many persons are concerned about tobacco use and have personal reasons to help a user to quit, but may lack the knowledge or confidence to take action, or the skills to effectively encourage quitting.^{9,10,12} These persons represent an untapped, intrinsically motivated community resource in the effort to increase quit attempts and encourage use of effective cessation assistance. Moreover, even low-intensity exposure to recruitment messages and tobacco cessation information can activate HIs from a broad cross section of the community to offer BIs to tobacco users. Providing tobacco cessation training to HI’s can help ensure that the BIs and cessation information propagated by HIs encourages use of effective, evidence-based cessation aids. Although a large body of knowledge exists about factors influencing tobacco intervention behavior in healthcare providers (primarily physicians),^{26,27} there is little information about tobacco intervention behaviors by persons who are not healthcare providers. This study of HIs from the general community promoting tobacco cessation in the course of their normal lives contributes to narrowing that gap.

Limitations

A potential limitation of this study is the lack of a “no information” or a “no-action” control group (ie, in which participants received no information at all). It should be noted, however, that this research was conducted in a state with an active tobacco control program that provides mailed materials to proxy callers wishing to help someone else quit. Thus, use of a “usual care” comparison condition was deemed most appropriate to enhance participant retention (ie, control participants may have opted out in favor of seeking information from the quit line) and to increase consistency of exposure to information among individuals in this condition.

Participants may have been unusually motivated to learn and implement intervention skills, self-selecting to participate in a research study with multiple entry requirements (screening interview, orientation session, consent, random assignment). However, since randomization to group occurred after orientation, the impact of greater motivation should have been distributed evenly across all 3 groups. The more likely influence of this self-selection is in the generalizability of results to the broader population who did not self-select to participate in a research study – an issue with all research studies involving human subjects providing active consent. However, experience with previous community-based BI training programs

outside of a research context indicates a broad cross-section of community members will readily participate in training and conduct BIs.¹⁶ Data from the California quit line further support the notion that substantial numbers of the general population will take action to help a smoker quit.¹²

Lack of greater specificity of the self-reported BI behavior, and/or a retrospective pre-training self-assessment of BI behavior, gathered post-training, is a study limitation. While inclusion of a retrospective pre-course assessment could have addressed a potential post-training reclassification effect,^{28,29} retrospective assessments of pre-training behavior also have limitations.³⁰

Web participant attrition was significantly greater than In-person or Mail. Half of those who dropped out early cited dislike of using the web, or having technical or access problems, reasons consistent with the literature on web course attrition.^{31,32} Of participants who began Web, 52% completed the entire training (not all completers submitted a post-test), an attrition rate lower than reported for web intervention trials (55 – 99.5%),³³ and web-courses (70 – 80%).³¹ Among Web participants, attrition was higher among Hispanic participants and those with a high school education or less suggesting community-based training for tobacco cessation should be available in both web-based and in-person formats.

Another limitation is the difference in timing of administration of post-tests. It is possible that Mail participants' scores were lower because of possible differences in the timing of posttest completion. In-person and Web participants were prompted to take their post-test immediately after training completion, whereas the Mail group received their post-test 4 weeks after their materials. However, the post-test was "open book" for all 3 groups, which should minimize effects of different intervals between training completion and posttest. The Mail group was expected to have lower knowledge and confidence scores on posttest items related to BIs, since their materials did not include any information on BIs or how to help someone else quit tobacco.

This was not a cessation study and thus was not designed to track tobacco users' individual outcomes, so it is unknown if participant interventions resulted in changes in smoking. However, the potential for friends, family and social networks to beneficially effect treatment engagement, completion and outcome, is supported by research and experience in other drug and alcohol addictions^{6,7} and by research on social networks and smoking cessation.¹⁴ Social networks and social networking media are increasingly recognized as potentially powerful means of promoting large-scale social change. The present study suggests interventions targeting social networks warrant more consideration as a strategy to complement promotion of treatment services to smokers, and broader population-based tobacco control policy initiatives.

Conclusions

These study results indicate with training or even mailed materials and minimal prompting, motivated HIs can be activated to deliver BIs to tobacco users, even if the HI has never intervened before. In-person and Web-based training significantly increased HIs' knowledge and self-efficacy with tobacco intervention skills. Mailed materials increased BI behavior

but without the same gains in cessation knowledge and confidence in BI skills observed in the In-person and Web groups, raising research questions on qualitative differences and efficacy of interventions by trained versus untrained HIs. Other questions surround non-clinical HIs' motivations, influences on intervention behavior (eg, social distance, smoking level), behavior sustainability and influence of HI characteristics (eg, age, smoking status). Social networks' powerful influence on smoking cessation,¹⁴ raise questions about BI behaviors within networks. The gains in cessation knowledge and self-efficacy as well as frequency of BIs after In-Person and Web training has implications for new public health interventions to increase social network and grass-roots community support for quitting and use of effective cessation aids.

Important health policy changes have been influenced by consumer demand, popular opinion and family member advocacy - eg, clean air laws,³⁴ screening mammogram coverage,³⁵ and increased funding³⁶ and parity for mental health services.³⁷ Because of their large numbers,¹² broad community representation,^{12,16} and personal motivation to help tobacco users,⁹⁻¹¹ HIs that are activated and informed about tobacco cessation could have important influences on social norms, public opinion and public policy effecting tobacco dependence treatment.

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Figure 1.
Participant Flow (Consort Diagram)

Table 1
Demographics of the Study Sample for Those Randomized and Who Completed Training, by Group Assignment.

	Mail		In-person		Web	
	Randomized N = 255	Completed N = 170	Randomized N = 314	Completed N = 234	Randomized N = 329	Completed N = 143
Age (years) (mean years $\pm$ SD)	43.5 $\pm$ 13.9	44.9 $\pm$ 13.9	42.2 $\pm$ 14.4	44.2 $\pm$ 14.2	43.4 $\pm$ 14.4	44.7 $\pm$ 13.4
Sex	% (N)		% (N)		% (N)	
Female	74.5 (190)	77.6 (132)	79.9 (251)	79.9 (187)	75.7 (249)	79.7 (114)
Male	25.5 (65)	22.4 (38)	20.1 (63)	20.1 (47)	24.3 (80)	20.3 (29)
Ethnicity/Race (*non-Hispanic)						
White*	63.1 (161)	68.8 (117)	71.0 (223)	71.8 (168)	71.7 (236)	83.9 (120)
Hispanic (all races)	24.3 (62)	17.6 (30)	18.5 (58)	15.8 (37)	17.0 (56)	9.1 (13)
Black*	6.7 (17)	7.6 (13)	3.8 (12)	4.3 (10)	6.1 (20)	3.5 (5)
Native American*	2.4 (6)	2.9 (5)	1.6 (5)	2.1 (5)	1.2 (4)	1.4 (2)
Asian/Pacific Islander	.8 (2)	0.6 (1)	2.5 (8)	3.0 (7)	1.2 (4)	2.1 (3)
Other race*	2.7 (7)	2.9 (4)	2.5 (8)	3.0 (7)	2.7 (9)	-
Education						
High school graduate/GED	5.5 (14)	3.5 (6)	7.0 (22)	7.3 (17)	7.3 (24)	4.2 (6)
Some college	31.4 (80)	25.3 (43)	37.6 (118)	35.0 (82)	31.3 (103)	28.0 (40)
Associate's degree	14.4 (36)	14.1 (24)	12.1 (38)	11.5 (27)	10.0 (33)	11.2 (16)
Bachelor's degree	27.8 (71)	32.9 (56)	25.5 (80)	26.5 (62)	31.0 (102)	31.5 (45)
Post baccalaureate degree	19.2 (13)	21.8 (37)	15.3 (48)	17.5 (41)	17.7 (58)	22.4 (32)
Occupation						
Helping professions	27.1 (69)	27.6 (47)	29.3 (92)	26.9 (63)	25.2 (83)	28.7 (41)
Business & services	18.4 (47)	14.1 (24)	18.2 (57)	20.9 (49)	20.4 (67)	17.5 (25)
Health care	19.6 (50)	18.8 (32)	18.8 (59)	20.9 (49)	17.0 (56)	22.4 (32)
Other	17.3 (44)	21.2 (36)	16.2 (51)	21.2 (40)	16.1 (53)	15.4 (22)
Student	13.7 (35)	14.1 (24)	14.6 (46)	14.1 (29)	15.8 (52)	12.6 (18)
Previously conducted a BI	56.9 (145)	58.8 (100)	55.7 (175)	59.4 (139)	56.5 (186)	56.6 (81)

Table 2
Proportion of Participants Reporting Brief Interventions at Follow-Up by Study Group

	Mail		In-person		In-person vs. Mail		Web		Web vs. Mail	
	%*	Number (%*)	%*	Number	p value**	%*	Number	%*	Number	p value**
No prior experience with BIs at baseline N = 898										
3 month follow-up										
BIs in the past 90 days N = 730	43.1	110/255	44.3	139/314		43.5	143/329			
BIs in the past 30 days N = 692	83.4	186	86.4	216	0.364	80.9	208			0.481
	77.9	162	76.4	181	0.705	70.5	174			0.073
6 month follow-up										
BIs in the past 90 days N = 697	80.4	172	78.6	184	0.649	74.7	186			0.147
BIs in the past 30 days N = 651	78.7	155	75.6	167	0.450	76.0	177			0.504

* Proportion of participants reporting BIs at follow-up.

** P-values adjusted for prior BI experience as reported at baseline.

Table 3

Percent Change from Baseline to Follow-Up in Number of Brief Interventions Delivered by Treatment Group and Prior Brief Intervention Experience

Prior BI experience	In-person vs. Mail	Web vs. Mail
	<i>% difference^a</i>	<i>% difference^b</i>
3 month, follow-up		
BIs in the past 90 days	−31% ***	−18% ***
BIs in the past 30 days	−18% **	−15% **
6 month follow-up		
BIs in the past 90 days	−6% ***	−30% ***
BIs in the past 30 days	+1%	−20% **
No prior BI experience	In-person vs. Mail	Web vs. Mail
	<i>% difference</i>	<i>% difference</i>
3 month, follow-up		
BIs in the past 90 days	+6%	+27% ***
BIs in the past 30 days	−17%	−22% *
6 month follow-up		
BIs in the past 90 days	−8%	−10%
BIs in the past 30 days	−7%	+14%

*
p < .05

**
p < .01

p < .001

^a Difference between In-person and Mail, as a percent of Mail (denominator).

^b Difference between Web and Mail, as a percent of Mail (denominator).

Table 4

Binomial Logistic Regression Findings Between-Groups on the Difference Score of the Pre/Post Means, Controlling for Baseline Score. Group Comparisons Based on Training Completion (N = 547; Mail N = 170, In-Person N = 234, Web N = 143).

	Mail		In-Person		Web		IPT v Mail	Web v Mail	R ²
	Pre	Post	Pre	Post	Pre	Post			
Training Outcome									
<i>Tobacco & BI Knowledge</i>									
Core	61.87 (16.89)	62.57 (16.87)	59.63 (16.44)	73.39 (18.24)	59.50 (17.98)	75.78 (15.82)	12.15***	14.61***	0.32
Advanced	50.07 (14.91)	54.25 (14.99)	49.91 (15.07)	64.39 (16.86)	51.83 (14.50)	69.70 (15.10)	10.20***	14.82***	0.35
<i>Confidence with BI Skills</i>									
Basic	55.67 (22.78)	67.81 (18.02)	56.38 (21.82)	76.71 (15.42)	55.91 (21.66)	73.29 (17.31)	8.70***	5.41**	0.51
Motivational	71.34 (20.33)	80.87 (16.10)	73.46 (21.43)	85.62 (14.72)	72.25 (21.58)	82.91 (15.56)	4.17***	1.79	0.55
Quit Plan Skills	47.93 (30.39)	72.98 (22.12)	51.99 (31.52)	78.23 (18.31)	54.13 (30.79)	74.73 (19.65)	4.54***	0.66	0.64

* p < .05

**

p < .01

*** p < .001