

The Impact of Not on Tobacco on Teen Smoking Cessation: End-of-Program Evaluation Results, 1998 to 2003

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This review summarizes end-of-program quit rates from 6 controlled and 10 field-based Not on Tobacco (NOT) evaluations. Approximately 6,130 youth from 5 states and 489 schools participated. Intent-to-treat and compliant quit rates were calculated at 3 months postbaseline (end-of-program). Results from controlled evaluations revealed an aggregate quit rate of 15% and 19%, respectively. The field-based evaluations revealed an aggregate quit rate of 27% and 31%, respectively. NOT youth were two times more likely to quit than comparison youth (OR = 1.94; $p = .002$; 95% CI 1.267-2.966). This is the first multiyear, multisite review of a teen smoking cessation program reported in the literature and the first longitudinal review of NOT. NOT participants showed consistent, significant positive smoking behavior change across evaluations.

Keywords: *teen smoking cessation; tobacco prevention; adolescent health*

Research highlights the immediate need for effective and available cessation options for youth who want to quit smoking (Lynch & Bonnie, 1994; U.S. Department of Health and Human Services, 1994; Youth Tobacco Cessation Collaborative, 2000). Teen smoking cessation programs reported in the literature have shown limited success and none (at the time of this

Funding for these evaluations was provided by several sources: Centers for Disease Control and Prevention, the Prevention Research Centers Program (Cooperative Agreement #U48/CCU-31083), National Office of the American Lung Association, American Lung Association of Wisconsin, American Lung Association of Florida, American Lung Association of New Jersey, Florida Department of Health, West Virginia Department of Education, and West Virginia Bureau for Public Health and the Division of Tobacco Prevention. The contents of this article are solely the responsibility of the authors and do not necessarily represent the official views of the Centers for Disease Control and Prevention, or other funders.

Journal of Adolescent Research, Vol. 20 No. 6, November 2005 640-661

DOI: 10.1177/0743558405274891

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writing) have reported longitudinal, multistudy results (Burton, 1994; DiGiusto, 1994; Gillespie, Stanton, Lowe, & Hunter, 1995; Institute of Medicine, 1994; Sussman, Dent, Burton, Stacy, & Flay, 1995; Sussman, 2002; U.S. Department of Health and Human Services, 1994). In recent years, youth smoking has been elevated to a national health priority as prominent national organizations and expert scientists have joined together to emphasize the importance of evaluating, understanding, and reporting youth smoking cessation efforts. For example, one national proponent for effective tobacco treatment among youth is the Tobacco Etiology Research Network (TERN), comprised of a number of individual scientists committed to improving the understanding of tobacco use trajectories and transitions among youth (Clayton, Merikangas, & Abrams, 2000). Another important multigroup effort is the Youth Tobacco Cessation Collaborative (YTCC; YTCC, 2000). Made up of many key health organizations,^a YTCC has a mission to address the youth smoking cessation knowledge gap. Critical for cessation programming, the YTCC national blueprint has a goal to ensure that every youth tobacco user “has access to appropriate and effective cessation interventions by the year 2010” (YTCC, 2000, p. 5).

The YTCC blueprint also provides guidance for the implementation of effective cessation options for youth (Orleans et al., 2003; YTCC, 2000). Recommendations include (a) promoting a variety of science- and theory-based cessation strategies, (b) using interventions that are flexible and easily implemented in a variety of settings, (c) using interventions that can be replicated, (d) using quality control processes and mechanisms for standardization or accreditation, (e) including intervention as part of comprehensive school- or community-based programming, (f) building on school- and community-based tobacco prevention and control mandates, (g) advocating for financial support via the Master Settlement Agreement (MSA),^b (h) developing consistent evaluation criteria, (i) developing best practice dissemination methods and criteria (i.e., the most effective methods to widely distribute the program), (j) identifying promising implementation settings (e.g., schools, alternative settings, churches, clinics, etc.), and (k) establishing a network for technical assistance, training, incentives, and widespread access.

Program Description

The American Lung Association’s (ALA) Not on Tobacco (NOT) program (Dino et al., 1998; Dino et al., 2001c; Horn et al., 2004) is one youth smoking cessation option that is consistent with the current YTCC guidance and recommendations in the teen smoking cessation literature (Clayton et al.,

TABLE 1: Not on Tobacco (NOT) Program Adherence to the YTCC Guidelines

<i>YTCC Guidelines</i>	<i>Corresponding Relevance to the NOT Program</i>
Promote a variety of science- and theory-based cessation strategies Use interventions that are flexible and easily implemented in a variety of settings	Grounded in social cognitive theory, NOT involves a variety of behavioral techniques to aid the quitting process. NOT is used in schools, community sites, and churches. The program has been translated into Spanish, and culturally tailored versions for American Indian and rural youth are under way.
Use interventions that can be replicated	The program has been disseminated across the United States and in regions of Europe and Canada using the ALA's master trainer infrastructure and train-the-trainer certification program.
Use quality control processes and mechanisms for standardization or accreditation	NOT uses a highly prescribed facilitator manual and training is required before delivery. Training is provided by ALA master trainers. The ALA does not release copies of the manual for use without training.
Include intervention as part of comprehensive school- or community-based programming Build on school- and community-based tobacco prevention and control mandates	Many states have adopted NOT as a part of statewide school-based comprehensive health programming (e.g., West Virginia, New Jersey, Florida, Wisconsin, Virginia). Many states (e.g., West Virginia, Florida) offer NOT as a part of required cessation programming for youth who smoke. NOT is designed to be offered as part of voluntary rather than punitive services. NOT also offers an alternative to suspension component for school-based antitobacco efforts.
Advocate for financial support via the Master Settlement Agreement (MSA) Develop consistent evaluation criteria	Funding from a variety of private, state, and federal sources, including MSA funding, has been used to support NOT programming and research across the United States. NOT has been rigorously evaluated during a 5-year period, resulting in more than a dozen NOT-related publications. NOT has been evaluated by several academic institutions, private evaluation organizations, and state agencies across the United States. Results are monitored by the ALA.

<i>YTCC Guidelines</i>	<i>Corresponding Relevance to the NOT Program</i>
Develop best practice dissemination methods and criteria	<p>The ALA supports the NOT train-the-trainer training through its Best Practices Division. There are 10 national master trainers who train regionally. All NOT trainers and facilitators must be certified by the ALA national office. Dissemination is tracked by the ALA through its local offices across the United States.</p>
Identify promising implementation settings (e.g., schools, alternative settings, churches, clinics, etc.)	<p>NOT is used as a part of faith-based initiatives, alternative schools, and as noted above, culturally tailored versions for American Indian and rural youth are under way. NOT also is designated as a model program by the Substance Abuse Mental Health Services Administration.</p>
Establish a network for technical assistance, training, incentives, and widespread access	<p>A national listserv and e-newsletter, the NOT Connection provides ongoing technical assistance to facilitators and affiliates across the United States and internationally. Also, a NOT networking meeting has been sponsored annually by the ALA since 2000 (in association with the National Conference on Tobacco or Health).</p>

YTCC = Youth Tobacco Cessation Collaborative; ALA = American Lung Association.

2000; McDonald, Colwell, Backinger, Husten, & Maule, 2003; Milton, Maule, Backinger, & Gregory, 2003; Sussman, 2002; see Table 1). Developed in collaboration with the West Virginia University Prevention Research Center, NOT is designed for 14- to 19-year-old youth who are daily smokers and volunteer to participate in a group cessation program in school or community settings. NOT includes 10 hour-long weekly sessions and four booster sessions, delivered to males and females separately by same gender, trained facilitators. Sessions are facilitated in school and other community settings by teachers, school nurses, counselors, and other staff and volunteers specially trained by the ALA. Training includes the bound curriculum and evaluation tools. No more than 10 to 12 participants are recommended per group. Major program goals are to help participants (a) quit smoking, (b) reduce the number of cigarettes smoked by youth who are unable to quit, (c) increase healthy lifestyle behaviors (e.g., physical activity and nutrition), and (d) improve life skills such as stress management, decision-making, coping, and interpersonal skills.

NOT is based on social cognitive theory and incorporates training in self management and stimulus control, social skills and social influence, stress management, relapse prevention, and techniques to manage nicotine withdrawal, weight management, and family and peer pressure. NOT is designed to help participants analyze their own smoking behavior, set realistic and attainable goals for change, monitor their progress, reinforce themselves appropriately, and understand the immediate negative consequences of continuing to smoke and the immediate benefits of adopting healthy habits in the areas of nutrition, physical activity, and stress management. As part of behavior change, participants are assisted with (a) identifying reasons for smoking and excuses for not quitting, beliefs and behaviors that reinforce smoking, triggers for smoking, beliefs and behaviors that reinforce negative self talk, self-defeating behaviors, and barriers to the quitting process; (b) recognizing and understanding the process of nicotine addiction, advertising ploys to encourage youth smoking, and situations that may enhance the likelihood of relapse; and (c) skill development in cognitive restructuring, stress and peer pressure coping, social support identification and maintenance, goal setting, assertiveness, identification of opportunities for community involvement, and behavior change in general and for smoking cessation in particular. New social-emotional and life skills are intended to replace ineffective or underdeveloped skills that may lead to unhealthy behaviors. NOT emphasizes experiential learning; consistently, the program uses role playing and rehearsal, journaling, and relaxation techniques (Dino, Horn, Zedovsky, & Monaco, 1998; Dino et al., 2001c; Horn, Dino, Gao, & Momani, 1999). The NOT curriculum and training are provided nationally by the ALA. Refer to ALA's

website (<http://www.lungusa.org/>) for information about program implementation and training (American Lung Association, 2002).

NOT was designed to address multiple risk and protective factors developmentally relevant to adolescents at individual, peer, family, school, and community levels. At the individual level, NOT builds on key attributes and issues affecting each gender. It recognizes the important and distinct needs of each gender and has been shown as effective for males and females (Horn et al., 1999). NOT fosters a resilient temperament by building on emotional strength and assertiveness so that youth are not as easily disrupted by stress. NOT also promotes positive social experiences through group interactions, bonding, team building activities, and peer support (Dino, et al., 1998).

Furthermore, the program promotes positive peer interaction by using fellow NOT members as sources of support and positive role models and teachers; encourages family support through effective and positive child or parent communication; fosters attachment to school by providing training for facilitators to provide a comprehensive, caring, nonpunitive, and supportive environment; and provides participants with opportunities to bond with adult facilitators and peers in the school setting. At the community level, NOT provides ways for teens to make positive contributions to their schools and communities via community advocacy and volunteerism (Dino et al., 1998; Horn et al., 1999; Dino et al., 2001b).

Two YTCC research objectives are especially important to the present review: (a) to develop cessation programs and test program efficacy and (b) to conduct replication studies (Orleans et al., 2003; YTCC, 2000). Consistent with these important national research objectives, this review summarizes 16 NOT evaluations from 1998 to 2003 from both rigorous research and field-based, real world evaluations (i.e., a two-tier evaluation strategy based in research and routine practice). A two-tier evaluative approach is consistent with YTCC's better practices model that posits that "good solutions to complex problems draw on both science and experience" (Maule, Moyer, & Lovato, 2003, p. 142). This review includes both published and unpublished data. Although the NOT goals go beyond smoking outcomes, the focus of this review is to summarize quit rates only. The primary purpose of this longitudinal review is to examine the range and consistency of program quit rates across a variety of conditions (i.e., state, year, gender, evaluation strategy). It is important to underscore that extensive detail about the research methodology used in these evaluations is published elsewhere (Dino et al., 2001a, 2001c). For the purposes of this review, the methodology is only briefly summarized.

METHODS

Evaluation Procedure

During a 5-year period, two types of NOT school-based evaluations were conducted: controlled research studies (i.e., following rigorous, quasi-experimental standards) and field-based, real-world evaluation (i.e., employing single group program evaluation without hands-on researcher involvement or control and comparison groups). One purpose of having a two-tier evaluation approach was to balance scientific rigor with field-based urgency for teen smoking cessation access. As with any new intervention program, efficacy testing and general program evaluation (understanding *delivery as usual*) are critical. This two-tier evaluation strategy allowed the researchers and the ALA to do address efficacy testing and routine program evaluation simultaneously. As such, the ALA was able to release the program to local ALA offices on a limited basis with the understanding that the program remained in evaluative stages. The demand for the program was partially satisfied, and at the same time, evaluation data were collected. A second purpose of this evaluation strategy was to compare the consistency between scientifically controlled results with results obtained under *delivery as usual* circumstances. Consistent with the fundamental principles of evaluation, our approach allowed us to use basic research methodologies to assess the merit and utility of NOT and make subsequent improvements. Moreover, this flexible evaluation approach was well suited to the dynamic nature of the program and the information needs of the program developers and ALA decision makers. Institutional Review Board approval was obtained for all evaluations. The two types of program evaluations are discussed separately.

Controlled Evaluation

Intervention protocol. There were two study conditions in the six controlled studies: NOT and brief intervention (BI). A one-time, single-dose intervention, the BI served as a comparison group and was designed to reflect what youth might typically receive in a school setting. BI participants received approximately 10 to 15 minutes of scripted quit smoking advice and self-help brochures widely available to the public from the ALA and National Cancer Institute. Materials included 3 generic brochures with smoking cessation tips as recommended by the National Cancer Institute. At the time of the first NOT study, limited cessation materials were available for youth. These ALA and National Cancer Institute self-help materials were

viewed by the researchers and the ALA as the most appropriate for an adolescent smoker. For purposes of research integrity and protocol consistency, use of these BI materials was maintained across all studies (although more appropriate materials emerged over time). NOT and BI facilitators were trained by the research team across years using an internally developed manual called "From Practitioner to Researcher: Tips and Tools for Collecting Evaluation Data" (Office of Drug Abuse Intervention Studies, 1998). All NOT facilitators received the standard day-long NOT training as conducted by the ALA; the same highly-prescribed NOT curriculum was used across evaluations. Baseline and follow-up data collection for all participants occurred within a reasonable time frame (more than 2.5 weeks average). Refer to other published NOT studies for detailed methodology (Dino et al., 2001a).

Methods of site selection. Participating states included West Virginia, Florida, and North Carolina. These states were selected based on a variety of factors. Some of these factors included but were not limited to (a) geographic proximity to researchers, (b) availability of MSA funding to support programming, (c) availability of ALA's NOT training, and (d) severity of youth tobacco use rates.

The controlled evaluations used a matched design. Specifically, in each evaluation, a given NOT school was matched to a BI school on factors such as racial and ethnic composition of the students, socioeconomic status (based on the percentage of students receiving free or reduced lunches), geographic location of school, school population size, ratio of male and female students, student-teacher ratio, and percentage of tobacco policy violations in the previous academic year. In each evaluation, the result was a series of matched pairs. Across the controlled studies, there were 88 schools and 44 matched pairs. Matching allowed control of variables that could potentially affect or obscure the effect of the program on smoking outcomes (e.g., quit rates). Performed correctly, matching has some of the same advantages and limitations of pure randomization (Sussman et al., 1995). In addition, a matched design rather than a randomized design, permitted the selection of NOT schools that were already trained to administer NOT and of BI schools that did not have the NOT program in place, reducing the possibility of contamination. Notably, the matching procedure does not account for possible confounders that might occur because the NOT schools chose to participate rather than being randomly assigned to either a treatment or comparison group.

Field-based Evaluation

Intervention protocol. The protocol for implementing the NOT program under field-based conditions was conducted in the absence of rigorous comparison or control groups. The 10 real world evaluations followed a simple quasi-experimental predesign and post-test design, as recommended in the NOT curriculum.

Methods of site selection. Participating states included Florida, New Jersey, and Wisconsin. These states were selected based on a variety of factors. Some of these factors included but were not limited to (a) availability of MSA funding to support programming, (b) availability of ALA's NOT training, (c) capacity of local ALA offices to provide evaluation oversight, (d) severity of youth tobacco use rates, and (e) willingness of ALA local office to participate in the ALA-designated NOT evaluation.

Selection of school sites in the field-based evaluation was based on convenience sampling per ALA general NOT requirement. Essentially, schools registered to participate in NOT at a local ALA office. All facilitators subsequently received the standard day-long ALA training and the prescribed NOT curriculum. They subsequently returned to their schools to deliver the NOT program. Across evaluations, 401 schools participated.

Participants

During a 5-year period, approximately 6,130 youth from 5 states and 489 schools enrolled in these NOT-related evaluations. There were 1,283 youth in the controlled evaluation and 4,847 youth in the field-based evaluation. Because NOT is designed for regular (vs. experimenting) smokers, youth were included in the study only if they smoked at least one to five cigarettes per day. Adjusting for the baseline criteria related to smoking intensity (i.e., smoked at least one to five cigarettes per day), there were 1,131 youth in the controlled evaluation and 4,568 youth in the field-based evaluation who provided data for this evaluation review. More specific, youth who did not smoke at least one to five cigarettes per day were excluded from analyses. Conservatively, this decision was made because (a) NOT is designed for youth likely to be addicted to nicotine and (b) light or experimenting smokers may quit more easily than daily smokers and consequently may falsely inflate cessation rates, given the target population.

Among all participants, 43.8% were male and 56.2% were female. At baseline, the daily smoking rate in the controlled evaluations was 14.4 cigarettes; the daily rate was 14.2 cigarettes in the field-based evaluations. Across

evaluations, the baseline mean was 14.23 cigarettes per day. Youth ranged in age between 12 and 19 years, with a mean age of 16.04. Grade levels spanned 7th grade to 12th grade; the majority of youth were in high school Grades 9th to 12th (98%). Consistent with the demographics of the participating states, nearly 76% of the participants were Caucasian, followed by 12.6% Hispanic, 3.4% African American, 1.5% American Indian, 1.2% Asian American, and 0.4% Native Hawaiian or other Pacific Islander.

Measurement

Across evaluations, standard surveys were administered to participants at baseline and at the end of the program (approximately 3 months postbaseline) to assess smoking status. Data were collected by researchers in the controlled evaluations and by trained NOT facilitators in the field-based evaluations, as required by the ALA. The NOT curriculum and training include a basic evaluation protocol. All evaluations benefited from ALA local-level support and coordination of routine programming. In addition, the researchers were available to local and national ALA offices for consultation as needed during the field-based evaluations.

Quit status was determined by (a) the self-reported answer no to the question "Are you currently smoking?" and (b) indicated at least 24 hours of smoking abstinence in response to a query about the date of their last cigarette. However, data of continuous days of abstinence also were collected in the controlled evaluations allowing for a variety of point prevalence calculations. In the controlled studies, a Carbon Monoxide (CO) test^c was used to validate self-reported quit rates (CO > 9 parts per million; Dino et al., 2001a, 2001c; Sussman, Dent & Lichtman, 2001). CO validation was not obtained in the field-based evaluations as CO monitoring devices were not feasible or affordable. Important, a recent study by Kentala and colleagues found that biochemical validation and self-reports among teen smokers were independently consistent, with sensitivity of 81% to 96% and specificity of 77% to 95% (Kentala, Utriainen, Pakkala, & Mattila, 2003).

Analyses

Overview. Two methods can be used to determine quit rates in cessation studies: intent-to-treat versus compliant subsample. An intent-to-treat analysis includes all participants who initially enrolled in the treatment and assumes that youth who are not present at follow-up failed to quit or reduce smoking; the reason for participant absence at follow-up is not considered.

Past NOT studies revealed that participants' lack of attendance at follow-up was often beyond their control (e.g., relocation, graduation, work scheduling) and not necessarily related to continued smoking. Compliant sample analysis assumes that, with appropriate attrition analysis, the available sample of participants who provided follow-up data were representative of the total sample (Little, 1993). Specifically, to assure the validity of the compliant subsample analyses, reasons for youth absence and baseline factors must be analyzed to assess potential attrition biases (Dino et al., 2001a, 2001c; Horn, Dino, Kalsekar, & Massey, 2004; Tabachnick & Fidell, 1996). In addition, baseline data of participants who provide end-of-program data should be compared to the data of youth who do not. In all controlled and published NOT evaluations, such attrition analyses did not find systematic baseline differences (e.g., age, race, gender, daily smoking, nicotine dependence, motivation) between youth who were available at follow up and youth who were unavailable (Dino et al., 2001a, 2001c). There was no evidence of differential attrition between NOT and BI groups. Therefore, primary analyses were performed using the compliant subsample of participants. That is, youth who attended baseline and postprogram assessments served as the denominator. Youth who quit smoking served as the numerator. However, to present a conservative estimate of program effects, intent-to-treat analyses also were performed. This approach used the full sample as the denominator and assumed that unavailable youth remained smokers. Again, youth who quit smoking served as the numerator.

Additionally, to maintain uniformity in reporting results across controlled and field-based evaluations, all data were analyzed using self-reported quit rates. In support, results from the controlled evaluations demonstrated a high level of agreement between self-reported and CO-validated end-of-program quit rates ($\kappa = 1, p = .001$; Horn et al., 2004). As noted previously, the field-based evaluations did not use CO monitoring to validate self-reported quit rates. Finally, consistent with other research in the area of adolescent smoking cessation (Dino et al., 2001a, 2001c; Sussman, 2002; Sussman et al., 2001) quit rates were computed using individual participants as units of analyses. Quit rates also were computed separately on basis of gender. Conservatively, a two-sided level of significance was used for all tests.

Controlled research studies. A Fisher's exact test (Agresti, 1996) was used to compare the differences in quit rates between NOT and BI participants for each of the six controlled evaluations. The chi-square test of independence can also be used in such situations, but it is only an approximation. Taking a conservative approach, the Fisher's exact test returns exact one-tailed and two-tailed p -values, especially when the total sample size and the

expected values are small (Agresti, 1996). As some of the individual evaluations had small sample sizes, Fisher's exact test was used for analysis of quit rates.

Mean days of smoking abstinence were calculated for youth in the controlled evaluations using self-reported date of last cigarette during postintervention assessment. Finally, data from the six controlled evaluations were aggregated and overall quit rates were determined and compared using Fisher's (Agresti, 1996) exact test. Additionally, a multiple logistic regression analysis was performed on the aggregated data to examine the differences in quit rates between NOT and BI participants. The model controlled for factors such as age, gender, race, state, motivation to quit, duration of smoking, and number of cigarettes per day.

Field-based evaluations. Quit rates were computed for each of the 10 field-based evaluations. Owing to the lack of a control or comparison group in the field-based evaluations, no comparison statistics were computed. Data from the 10 field-based evaluations also were aggregated and an overall quit rate was reported.

RESULTS AND DISCUSSION

Controlled Evaluations

Outcome analyses for controlled analyses included data from participants who smoked more than one to five cigarettes per day at baseline and who received at least one dosage of the intervention (i.e., participation in at least one NOT session other than the session for baseline data collection). Of the eligible 1,131 participants at baseline, 233 (i.e., 20.6%) were absent at follow-up and failed to provide the end-of-program data. There were no significant differences in the attrition rate for NOT (22.5% absent) and BI (18.5% absent) groups, leaving an overall follow-up rate of approximately 80%.

Across controlled evaluations, compliant analysis revealed a NOT quit rate between 6.4% and 29.6%. The range for females was 9.1% to 30.6%, and the range for males was 4.0% to 27.3%. When the data for all six controlled studies were aggregated and analyzed, the compliant quit rate for NOT was approximately 19% compared to a BI quit rate of 9% ($p > .01$). Refer to Table 2. A logistic regression analyses also was performed on the aggregated data adjusting for the following factors: group (NOT vs. BI), age, gender, race, state, motivation to quit, duration of smoking, and number of cigarettes

TABLE 2: Summary of End-of-program Quit Rates for Not on Tobacco (NOT) Controlled Evaluations, Compliant Rate

State/Year/Study	Overall			Male			Female									
	n	%	BI	n	%	BI	n	%	BI							
Florida																
1997 to 1998 feasibility study	116	29.6	21	4.4	2	0.001*	27.3	6	4.3	1	0.047*	30.6	15	4.8	1	0.027*
1998 to 1999 demonstration study	233	20.5	26	11.3	12	0.075	21.8	12	21.1	8	1.000	19.4	14	5.9	4	0.022*
1999 to 2000 demonstration study	188	19.6	20	15.1	13	0.448	26.2	11	15.8	6	0.287	15.0	9	14.6	7	1.000
2000 to 2001 demonstration study	143	19.3	17	18.2	10	1.000	26.3	10	10.0	2	0.187	14.0	7	22.9	8	0.388
West Virginia																
2000 to 2001 demonstration study	110	12.0	6	3.3	2	0.138	4.5	1	5.3	1	1.000	17.9	5	2.4	1	0.037*
North Carolina																
2001 to 2002 demonstration study	108	6.4	3	1.6	1	0.315	4.0	1		0	0.455	9.1	2	3.2	1	0.563
Aggregate controlled evaluations	898	19.2	93	9.7	40	0.000*	20.1	41	10.7	18	0.015*	18.5	52	9.0	22	0.002*

Note: BI = Brief intervention.

* $p > .05$.

per day. Results demonstrated that the adjusted odds of a NOT participant quitting smoking were nearly twice that of a BI participant ($OR = 1.94$; $p = .002$; 95% CI 1.267 to 2.966). The mean number of days of complete smoking abstinence (i.e., not even one puff) was 19.25; 20.57 for NOT youth and 16.96 for BI youth.

Intent-to-treat analysis showed that overall NOT quit rates ranged from 4.9% to 20.8%, with quit rates ranging between 6.5% and 23.4% for females and between 3.3% and 20% for males. The aggregated intent-to-treat quit rate for NOT was approximately 15% compared to a BI quit rate of 8% ($p > 0.01$). Refer to Table 3. Logistic regression analysis also was performed on intent-to-treat quit rates adjusting for the same factors listed above. The adjusted odds of a NOT participant quitting smoking were nearly two times that of a participant in the comparison BI group ($OR = 1.894$; $p = .003$; 95% CI 1.249 to 2.874). This indicates statistically significant treatment effects.

Field-based Evaluations

Of the eligible 4,568 participants at baseline, 807 (17.6%) were absent at follow-up and did not provide the 3-month postbaseline data (end-of-program). Similar to the controlled evaluations, the follow-up rate exceeded 80%. Compliant analysis across the 10 field-based evaluations showed an overall quit rate between 15.5% and 36.9%. The range among females was between 14.6% and 36.7%, and between 16.7% and 38.8% among males. When the data for all 10 field-based studies were aggregated, the overall NOT quit rate was 31%. Refer to Table 4.

Intent-to-treat analyses revealed quit rates between 10.2% and 36.9% across the 10 field-based evaluations. The quit rates among males ranged between 11.2% and 37.1%, and between 9.4% and 36.7% among females. When data from the 10 field-based studies were collapsed, the overall NOT quit rate was 26%. Refer to Table 5.

DISCUSSION AND CONCLUSION

Most important, this review revealed that youth who participated in NOT consistently demonstrated positive smoking-behavior change. Considering both types of analyses (i.e., compliant and intent-to-treat), end-of-program quit rates in NOT controlled evaluations suggest a range of quit rates between 15% and 19%. Although different in terms of percentage points, some of the individual study results were not statistically significant. The sample size in those studies did not render adequate power to detect the effect size (differ-

TABLE 3: Summary of End-of-program Quit Rates for Not on Tobacco (NOT) Controlled Evaluations, Intention-to-treat Rate

State/Year/Study	Overall			Male			Female			P value	n	P value			
	%	n	BI	%	n	BI	%	n	BI						
Florida															
1997 to 1998 feasibility study	20.8	21	3.8	2	0.004*	15.0	6	3.8	1	0.231	24.6	15	4.0	1	0.032*
1998 to 1999 demonstration study	16.4	26	8.2	12	0.037*	16.0	12	12.5	8	0.633	16.7	14	4.9	4	0.023*
1999 to 2000 demonstration study	15.4	20	12.1	13	0.573	20.0	11	12.2	6	0.426	12.0	9	12.1	7	1.000
2000 to 2001 demonstration study	14.3	17	14.9	10	1.000	20.0	10	8.7	2	0.317	10.1	7	18.2	8	0.261
West Virginia															
2000 to 2001 demonstration study	10.9	6	2.7	2	0.074	4.5	1	3.7	1	1.000	15.2	5	2.2	1	0.077
North Carolina															
2001 to 2002 demonstration study	4.9	3	1.6	1	0.619	3.3	1		0	1.000	6.5	2	3.2	1	1.000
Aggregate controlled evaluations	14.9	93	7.9	40	0.000*	15.1	41	8.2	18	0.025*	14.7	52	7.7	22	0.006*

NOTE: BI = Brief intervention.

* $p > .05$.

TABLE 4: Summary of End-of-program Quit Rates for Not on Tobacco (NOT) Field-based Evaluations, Compliant Rate

<i>State/County/Year</i>	<i>n</i>	<i>Overall</i>		<i>Male</i>		<i>Female</i>	
		<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>
Florida							
1999 state pilot	583	30.5	178	38.8	93	24.8	85
2000 state pilot	1,085	31.9	346	33.9	171	30.1	175
2001 state pilot	892	36.9	329	37.1	146	36.7	183
Dade County, Florida							
1999	319	35.1	112	33.6	46	36.3	66
2000	127	29.1	37	30.5	18	27.9	19
2001	45	33.3	15	34.8	8	31.8	7
New Jersey							
2002 statewide	168	15.5	26	16.7	12	14.6	14
2003 statewide	120	18.3	22	18.9	10	17.9	12
Wisconsin							
2002 statewide	198	22.2	44	22.5	18	22.0	26
2003 statewide	224	27.7	62	26.3	20	28.4	42
Aggregate field-based	3,761	31.1	1171	33.1	542	29.6	629

ence in the quit rates between the two groups). In addition, analyses maintained the use of a two-tailed test of significance to be conservative in our estimates of quit rates. However, when examining aggregate data, pooling data across evaluations provided adequate statistical power needed to detect the differences in the quit rates between the two groups. Regardless of the analytic approach, NOT youth were twice as likely to quit smoking compared to youth who received a BI. The NOT aggregate quit rates in the controlled evaluations were significantly different from the BI quit rates for both types of analyses, overall, and by gender. Overall quit rates for the NOT field-based evaluations indicated a potential range of quit rates between 26% and 31% across analyses. It is important to note that given only slight variations in quit rates by gender across evaluations, the program appears to be equally effective for males and females. This finding is particularly important given NOT's gender-tailored approach. Interesting, youth who quit smoking reported being abstinent for almost 3 weeks at follow up. This time frame coincides with the quit week in the NOT program, suggesting that youth maintained commitments to their quit dates.

Although data from these NOT evaluations have not been computed using meta-analysis, meta-analysis may be the next step to determine a single estimate of program impact. Important, the longitudinal review as conducted provided an opportunity to explore a range of potential program outcomes

TABLE 5: Summary of End-of-Program Quit Rates for Not on Tobacco (NOT) Field-based Evaluations, Intention-to-Treat Rate

<i>State/County/Year</i>	<i>n</i>	<i>Overall</i>		<i>Male</i>		<i>Female</i>	
		<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>
Florida							
1999 state pilot	846	21.0	178	25.8	93	17.5	85
2000 state pilot	1,096	31.6	346	33.6	171	29.8	175
2001 state pilot	892	36.9	329	37.1	146	36.7	183
Dade County, Florida							
1999	433	25.9	112	25.1	46	26.4	66
2000	195	19.0	37	18.8	18	19.2	19
2001	47	31.9	15	32.0	8	31.8	7
New Jersey							
2002 statewide	256	10.2	26	11.2	12	9.4	14
2003 statewide	176	12.5	22	11.9	10	13.0	12
Wisconsin							
2002 statewide	253	17.4	44	17.3	18	17.4	26
2003 statewide	374	16.6	62	14.1	20	18.1	42
Aggregate field-based	4,568	25.6	1171	27.0	542	24.5	629

across year, state, and evaluation strategy. Comparatively, the quit rates found in these NOT evaluations are consistent with or exceed the mean overall rates found by Sussman, Lichtman, Ritt, & Pallonen (1999) in a recent state-of-the-art review of teen smoking cessation programs. Sussman et al. (1999) reported a mean end-of-program quit rate for school-based programs of 12% and roughly 14% across all types of cessation programs.

The current NOT review only included evaluations administered or monitored by the authors to assure consistency in study protocol and to enhance confidence in reporting reliable outcomes. However, the quit rates found in this current NOT review are consistent with rates found in other NOT controlled and field-based replication evaluations conducted by other researchers. For example, using compliant analyses, a NOT evaluation conducted in 17 Wisconsin public schools during the 2001 to 2002 academic year showed that NOT youth (23%) had significantly higher end-of-program quit rates compared to BI youth (7%; The American Lung Association of Wisconsin and the Pacific Institute for Research and Evaluation, 2002). A field-based evaluation of NOT among 269 students in 30 public schools in Virginia reported a quit rate of 43.5% (The American Lung Association of Virginia and the Virginia Commonwealth University's Survey and Evaluation Research Laboratory, 2002).

The two-tier evaluation approach used in this review attempted to balance scientific rigor with the field-based demand for teen smoking cessation options (Maule et al., 2003). However, an important issue warrants further discussion. Quit rates for the 16 evaluations were generally consistent regardless of state or year. In particular, one controlled evaluation with rural West Virginia and North Carolina youth found that the immediate, 6-month, and 12-month postbaseline quit rates were lower than rates found in other NOT studies of nonrural youth. These findings suggest that special care may be needed to address the challenges of cessation programming among youth from rural, tobacco growing areas with high rates of tobacco use (Horn et al., 2004; Horn, Dino, Kalsekar, et al., 2004). In response, efforts are underway to develop an adaptation of the NOT program that will better meet the needs of rural youth.

Limitations

Some experts might argue that the compliant sample analysis does not provide a valid assessment of program outcomes. Historically, intent-to-treat has been the widely accepted standard in adult smoking cessation research. This approach assumes that participants who do not attend follow up either never quit or relapsed (i.e., missing data assumes failure). Compliant analyses acknowledges that reasons youth do not attend follow up may be beyond their control (e.g., parent relocation, graduation, work schedules) and may be unrelated to smoking status or missing completely at random (Sloboda & Bukoski, 2003). Although we assert that compliant analyses have merit, the results of both types of analyses are reported.

Another potential limitation could be using self-reported quit rates rather than biochemically validated quit rates. Under many conditions, this would be a valid criticism. However, past NOT studies have shown high agreement between CO-validated and self-reported quit rates using kappa statistics. In addition, other studies have found low rates of false reporting among youth smokers (Horn et al., 2004; Sussman et al., 2001; Sussman et al., 1999).

Although the primary focus of this review was on end-of-program outcomes, a third potential limitation is the lack of longer term follow up in all but one of the controlled studies. In this instance, a 15-month postbaseline (12-month postprogram) assessment was conducted; results showed that NOT youth demonstrated higher quit rates than did their BI counterparts (Horn et al., 2004). Studies of teen smoking cessation should consider data collection at numerous points in time (e.g., 3-month, 6-month, and 12-month postprogram) to increase understanding of long term cessation.

Finally, the lack of scientific control in the field-based evaluations could pose a threat to the reliability and validity of the data. Given these potential threats, the ALA and the investigators employed several procedures to enhance data quality, including (a) use of standard evaluation tools in the NOT curriculum; (b) provision of facilitator training on evaluation and the use of program evaluation tools; (c) provision of ongoing and readily available technical assistance to facilitators (via ALA local and national offices); (d) manual participant survey reviews for elimination of errors, inaccuracies, and unreliable data (by researchers); and (e) ongoing evaluation consultation meetings between the ALA and researchers.

In summary, multiyear and multistate results suggest NOT is one option for effective, evidence-based teen smoking cessation programming. The review demonstrates program impact on quit rates during a 5-year period in various regions of the United States. NOT follows state-of-the-art guidance (Clayton et al., 2000; Sussman et al., 1995; U.S. Department of Health and Human Services, 1994; YTCC, 2000) is grounded in theory, and is widely accessible across the United States as a result of the long-standing ALA infrastructure.

NOTES

1. Members include the American Cancer Society; American Legacy Foundation; ALA; Canadian Tobacco Research Initiative; Centers for Disease Control and Prevention; National Cancer Institute; National Cancer Institute of Canada; National Heart, Lung, and Blood Institute; National Institute of Drug Abuse; and Robert Wood Johnson Foundation.

2.

“On November 23, 1998, leading United States tobacco product manufacturers entered into a settlement agreement, entitled the Master Settlement Agreement, with the state. The MSA obligates these manufacturers, in return for a release of past, present, and certain future claims against them as described therein, to pay substantial sums to the state (tied in part to their volume of sales); to fund a national foundation devoted to the interests of public health; and to make substantial changes in their advertising and marketing practices and corporate culture, with the intention of reducing underage smoking” (Master Settlement Agreement, 1998).

3. CO was used as the validation measure over the other available measures (e.g., saliva cotinine) because CO is lower in cost, easier to collect (Lichtenstein & Glasgow, 1992; Sussman et al., 1995; Velicer, Prochaska, Rossi, & Snow, 1992), may be less threatening to participants and school personnel (Dino et al., 2001b; Lichtenstein & Glasgow, 1992), and because it was preferred by the school settings because it did not involve the collection of bodily fluids (Dino et al., 2001b). Moreover, at the time these evaluations were initiated, studies with both adolescents and adults suggested that there was little advantage of using more costly cotinine data over CO data (Dino et al., 2001b; Sussman et al., 1995; Velicer et al., 1992).

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