Original Article

Effectiveness of group behavioral counseling on long-term quit rates in primary health care

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Background: Smoking is a major cause of cancer and related death. Although systems change, brief clinician intervention, and intensive behavioral counseling promote smoking cessation, few studies measure their combined effect on long-term quit rates. The present study examined data for tobacco users in primary care referred for group behavioral counseling that did or did not attend counseling and compared their long-term post-treatment quit status.

Methods: A retrospective, cohort study design was used to analyze electronic data covering from 2005 to 2009 for a cohort of 8,549 tobacco users in Louisiana's seven-facility public hospital system. Descriptive statistics and logistic regression analysis were used to compare the control (scheduled only) and intervention (scheduled and attended) group characteristics and sustained quit rates at least 1-year after the intervention.

Results: Attendees of group behavioral counseling with follow-up information (n=2,060, 42%) were primarily female (72%), white (64%), between 45 and 59 years old (60%), and uninsured (58%). Adjusting for demographics and insurance status, attendees had significantly higher long-term quit rates (18%, P<0.001) compared to non-attendees (12%). Logistic regression analysis indicated that attendees had greater odds [adjusted odds ratio (AOR)=1.52; 95% confidence interval (CI) =1.21, 1.90] of sustained abstinence than non-attendees. Compared to uninsured patients, commercially insured patients had higher sustained quit rates (AOR =1.49, 95% CI =1.08, 2.05).

Conclusions: A guideline-based, comprehensive tobacco control program implemented in primary care clinics in a public hospital system resulted in substantial long-term quit rates. When access to free group behavioral counseling was made available to smokers of low socioeconomic status, nearly half of those with follow-up information attended counseling. Those who attended had higher abstinence rates than non-attendees. Thus, healthcare systems have an opportunity to integrate screening and onsite behavioral counseling using systems changes that help patients quit smoking and enhance transdisciplinary, translational behavioral research toward guideline integration.

Keywords: Long-term smoking cessation; counseling; tobacco use; translational research; primary care

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Introduction

Smoking continues to be a primary modifiable risk behavior for cancer and, among cancer survivors, has a profound impact on prognosis (1). In 2011, 168,000 deaths, almost 50% of all cancer deaths, were attributed to smoking, with lung cancer deaths accounting for the highest proportion (2). Smoking increases the risk of 12 specific types of cancer, with newly reported links to colon and liver cancer (1).

The most recent report of the National Adult Tobacco Survey shows that 21.3% of U.S. adults 18 and older currently smoke (i.e., smoke every day or some days) (3), representing a marked decline in smoking rates over the past 50 years. Despite this progress, smoking remains the primary preventable cause of disability, disease, and death in the U.S., accounting for 1 in 5 deaths, or over 480,000 deaths each year (3).

U.S. cancer control efforts to improve population health must continue to promote smoking cessation interventions, especially among groups with higher smoking prevalence, such as low-income, less educated, minority groups in the South (3). One approach is through translational behavioral research. For primary care patients, clinical cessation interventions that are supported by electronic health systems can be effective in engaging smokers, increasing cessation treatment, promoting quit attempts, and sustaining quit rates (4,5).

In 2002, the Louisiana legislature enacted a cigarette excise tax and dedicated a portion of the proceeds to establishing, for public hospital patients, a statewide tobacco control program, the Tobacco Control Initiative (TCI) (6). At the time, these patients were more likely to be in low-income, less educated, minority populations, with higher smoking rates compared to the general population (7). TCI used the 2000 U.S. Public Health Service Clinical Practice Guideline for Treating Tobacco Use and Dependence (Guideline) (8) as the foundation for developing and integrating a model for theory-based systems change to guide implementation of evidence-based cessation services and treatment (7). TCI cessation services include clinical screening, designated personnel [Certified Tobacco Treatment Specialists, (CTTSs)], treatment policies, clinician training, and provider performance appraisal and feedback. Cessation treatments include individual and group behavioral counseling, free or low-cost medication, and state Quitline referral. Although the TCI offers all treatments to tobacco users, patients most often select group behavioral counseling (9).

Personal behavior contributes to disease and death (10-12). The present research furthers transdisciplinary, translational behavioral research at the T4 level (13) by examining wide-scale implementation, by a public hospital system, of tobacco use Guideline recommendations. The present report relates to referral, by primary care providers, of tobacco users to CTTSs for group behavioral counseling. Such counseling doubles a smoker's chance of quitting and is more effective compared to no treatment or self-help materials alone (14). Of note, the reported results are inconclusive in comparing group counseling to individual counseling and other advice to quit, and these findings relate to 6-month quit rates as opposed to longer-term (i.e., ≥12-month) quit rates.

The present study involved examination of data for tobacco users in primary care that were referred and scheduled for group behavioral counseling and who did or did not attend. Their long-term, post-treatment quit status was compared.

Methods

Program description

To develop its program, the TCI used systems thinking to understand the interactions of the system, clinician, and the CTTSs with the tobacco users. The Transtheoretical Model (TTM) Stages of Change theory (15) and the guideline-recommended clinical protocol of 5 A's (ask, advise, assess, assist, arrange) (8) were used as a framework for this behavioral intervention within the healthcare delivery system (*Figure 1*). Together, these represent four intervention touch points:

(I) System: brief intervention—the system was configured to prompt the change agent (provider) to screen for tobacco use (ask), beginning the 5 A's clinical protocol;

(II) Provider: TTM stage of change 1 (provider) —pre-contemplation (advise and assess); contemplation (assist and arrange); preparation (plan and schedule); prompt the next change agent (CTTS) to act using TTM-based behavioral counseling;

(III) CTTS: TTM stage of change 2—action (attend class, 90-day quit);

(IV) System: TTM stage of change 3-maintenance (180-day quit); termination (1-year quit).

The behavioral intervention was designed to include the guideline-recommended components of problem-solving

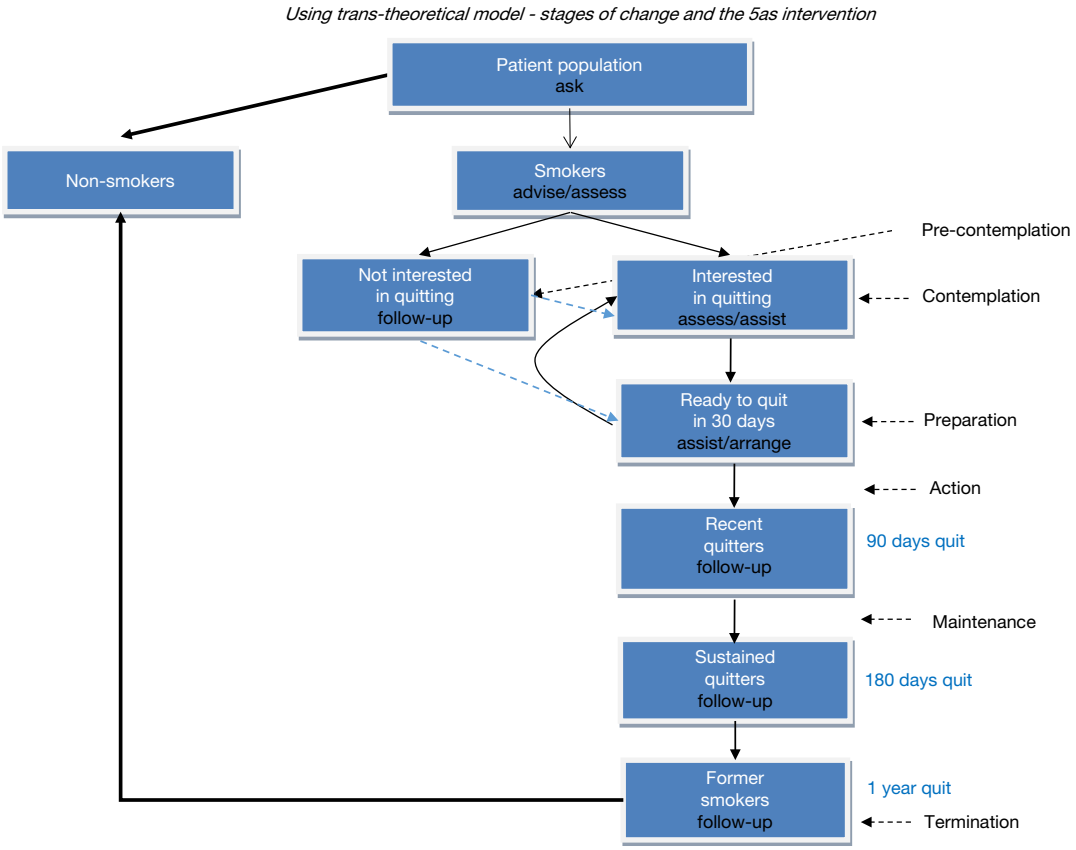

Figure 1 Combined Transtheoretical Model (TTM) Stages of Change Theory and the Clinical Practice Guideline 5 A's protocol framework.

and skills-building, as well as intra-treatment support and encouragement.

Participants

Eligibility criteria

Eligible participants were adult patients who were 18 and older, who were identified as tobacco users, and who were served between 2005 and 2009 in any one of seven facilities managed by the Louisiana State University Health-New Orleans (LSUH-NO) hospital system located in population centers across South Louisiana.

Sample population

The sample population (n=8,549) included patients who: (I) were identified as tobacco users; (II) expressed readiness to quit within 30 days of their clinic visit; (III) selected one or more cessation treatments including group behavioral counseling; and (IV) were referred to TCI to schedule group behavioral counseling between 2005 and 2007. This cohort of patients was then tracked to determine their quit status by use of clinic visit information obtained through their electronic health records (EHRs) between 2008 and 2009.

The control group included 4,728 patients who were scheduled but did not attend group behavioral counseling. The intervention group consisted of 3,821 patients who scheduled and attended group behavioral counseling. See *Figure 2* for a participant flow diagram.

Intervention

Control group

The control group received standard care according to the guideline 5 A's clinical protocol. Standard care included clinician screening, advice to quit and provision of self-help material, assessment of readiness to quit, and, if ready to quit, assistance with selecting a treatment option. Treatment options available were Quitline phone counseling, group

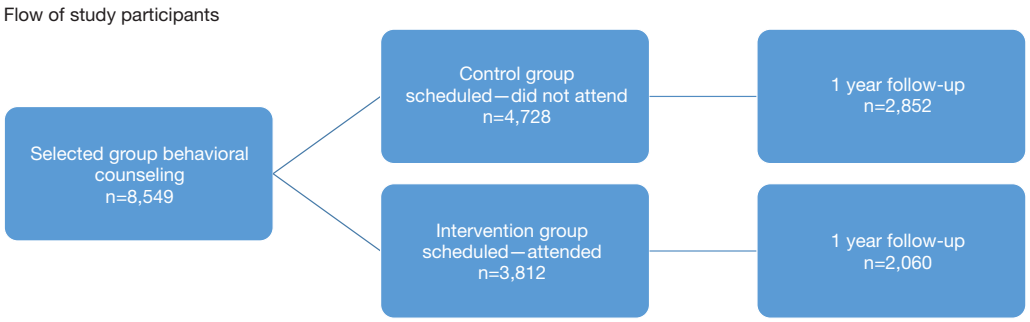

Figure 2 Flow of study participants.

behavioral counseling, medication, and any combination thereof. Any assistance selected by the patient prompted referral to an on-site CTTS to arrange a follow-up contact via phone or mail to schedule group behavioral counseling, facilitate a Quitline referral for telephone counseling, or obtain a prescription for cessation medication.

Intervention group

The intervention group received standard care, as outlined above, and group behavioral counseling within two weeks of referral. CTTSs conducted counseling in a classroom at the referring hospital. They used an adapted version of the American Lung Association's Freedom from Smoking program (16), consisting of four one-hour sessions conducted once a week within a 1-month period and covering a range of topics, including problem-solving, skills training, and intra-treatment support identified in the Guideline (8). During the initial session, CTTSs distributed state Quitline information to the participants. No incentives were provided to increase participation or completion of the sessions.

Measurement

Three electronic data sources were accessed. First, LSUH-NO's internally-developed EHR, Clinical Inquiry (CliQ), was used to determine implementation and documentation of the 5 A's protocol (ask, advise, assess, assist, arrange) conducted during clinic visits by nurses, medical assistants, providers, or other health professionals. Appraisal of clinician performance and feedback were used to enhance the quality of these measurements. Second, LSUH-NO's Disease Management and Evaluation Database (DMED), a separate database populated with additional clinical and financial data, was matched with CliQ data to conduct system-level analyses of clinically related information. Data included patient demographics, such as age, gender, race, financial class, as well as inpatient stay records and co-morbidities, which were defined as diagnoses recorded at least twice during the follow-up period. Comorbidities included coronary artery disease (CAD), congestive heart failure (CHF), chronic kidney disease (CKD), chronic obstructive pulmonary disease (COPD), human immunodeficiency disease (HIV), hypertension (HTN), cancer, and diabetes. Third, data in TCI's Cessation Management and Evaluation Database, a self-maintained Microsoft Access Database, were matched with CliQ and DMED data to analyze scheduling of group behavioral counseling and attendance data entered by CTTSs.

The primary outcome measure was sustained post-treatment quit status, which excluded patients lost to follow-up. The denominator included patients with two follow-up assessments of smoking status within a 1-year period. A patient was considered as having sustained quitting if he/she (I) provided a "no" response to the question "have you smoked within the past 30 days"; and (II) had a retained consecutive status for at least 1 year after the intervention.

STAT 11 software was used to analyze data. Three sets of analyses were conducted. First, the follow-up rate of patients referred for counseling (i.e., who continued receiving care through LSUH-NO) was determined by calculating the percentage of patients with two documented assessments of smoking status within one year after referral. Second, the socio-demographic characteristics, co-morbidities, in-patient stays, and screening and counseling data for the intervention and control groups were compared. Patient demographic information, including age (18–29, 30–39, 40–49, 50–64, and ≥65 years), sex (male, female), and race (African American, White, other) was extracted from the EHRs for use in analyses as potential confounders. At each visit, a medical provider collected information related to

patient insurance, listed as either commercial, free-care, Medicaid, Medicare, prisoner, or self-pay. Each was further categorized into uninsured (free care and self-pay) and insured (commercial, Medicaid, and Medicare). Pearson Chi-square tests or *t*-tests were performed, depending on the type of covariate.

Finally, factors affecting the one-year sustained quit rate were examined. Because of the imbalanced distribution of covariates in the intervention and control groups, covariates were adjusted for in determining how counseling affected quit rates. Quit rates were calculated for various patient sub-groups and examined for unadjusted odds ratios (UORs) and adjusted odds ratios (AORs) with 95% 2-sided confidence intervals obtained from logistic regression models.

Results

Follow-up rates

Of the 8,549 patients in the sample, 4,912 (57%) remained LSUH-NO patients throughout the study period. However, the follow-up rate (54%, n=2,060) for the intervention group was lower than for the control group (60%, n=2,852).

Socio-demographic and co-morbid characteristics of the control vs. the intervention group

Table 1 shows demographic comparisons of the control (patients who were scheduled for counseling but did not attend) and the intervention group (patients who attended counseling). There were statistically significant differences between the control and intervention groups for age (P<0.01), gender (P<0.05), race (P<0.01), financial class (P<0.01), and all co-morbid conditions (P<0.01), except CHF, CKD and diabetes. The groups also differed significantly in the average number of admissions per year (P<0.01) and times screened per year for tobacco use (P<0.01).

Table 1 Characteristics of control and intervention and group participants with follow-up information

Variable	Control, # patients (%)	Intervention, # patients (%)	Total	P value
Age				<0.01
18–30	239 [74]	84 [26]	323	
31–44	812 [65]	445 [35]	1,257	
45–59	1,519 [55]	1,229 [45]	2,748	
60+	282 [48]	302 [52]	584	
Gender				0.05
Male	885 [60]	586 [40]	1,471	
Female	1,967 [57]	1,474 [43]	3,441	
Race				<0.01
African American	1,235 [65]	666 [35]	1,901	
White	1,493 [53]	1,326 [47]	2,819	
Other	124 [65]	68 [35]	192	
Financial class				<0.01
Free care (uninsured)	1,608 [57]	1,196 [43]	2,804	
Self-pay (uninsured)	233 [69]	105 [31]	338	
Medicaid (insured)	450 [66]	236 [34]	686	
Medicare (insured)	423 [52]	387 [48]	810	
Commercial (insured)	138 [50]	136 [50]	274	

Table 1 *(continued)*

Table 1 *(continued)*

Variable	Control, # patients (%)	Intervention, # patients (%)	Total	P value
Comorbidity				
CAD				<0.01
No	2,316 [59]	1,589 [41]	3,905	
Yes	536 [53]	471 [47]	1,007	
CHF				0.30
No	2,560 [58]	1,830 [42]	4,390	
Yes	292 [56]	230 [44]	522	
CKD				0.25
No	2,622 [58]	1875 [42]	4,497	
Yes	230 [55]	185 [45]	415	
COPD				<0.01
No	1,922 [62]	1,202 [38]	3,124	
Yes	930 [52]	858 [48]	1788	
HIV				<0.01
No	2,715 [58]	1,998 [42]	4,713	
Yes	137 [69]	62 [31]	199	
HTN				<0.01
No	713 [62]	440 [38]	1,153	
Yes	2,139 [57]	1,620 [43]	3,759	
Cancer				<0.01
No	2,228 [59]	1,537 [41]	3,765	
Yes	624 [54]	523 [46]	1,147	
Diabetes				0.49
No	1,991 [58]	1,419 [42]	3,410	
Yes	861 [57]	641 [43]	1,502	
Inpatient stay	974 [60]	655 [40]	1,629	0.084
Counseling classes attended				
1 class	–	781 [38]	781	
2 classes	–	527 [26]	527	
3+ classes	–	752 [37]	752	
Totals	2,852 [100]	2,060 [100]	4,912	
Average # admissions per year	0.05	0.13	0.14	<0.01
Average # tobacco screenings per year	3.50	3.70	3.58	<0.01

CAD, coronary artery disease; CHF, congestive heart failure; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; HIV, human immunodeficiency disease; HTN, hypertension.

Factors affecting the sustained quit status

Table 2 shows factors affecting the long-term quit status for all patient subgroups, categorized by covariates. Because the distributions among most covariates were imbalanced between the control and intervention group, AORs were used. There were several covariates with statistically higher long-term quit rates before and after adjustment. First, counseling attendees had higher long-term quit rates [18%; AOR 1.52; 95% confidence interval (CI) 1.21 to 1.90] compared to non-attendees (12%). Second, commercially insured participants had higher long-term quit rates (22%; AOR 1.49; 95% CI 1.08 to 2.05) compared with "free care" patients (14%). As the number of follow-up years increased, the likelihood of long-term quitting increased (AOR 1.19, 95% CI 1.12 to 1.26). Finally, as the number of screenings for tobacco use increased, the likelihood of long-term quitting increased (AOR 1.10; 95% CI 1.06 to 1.14).

There were no significant differences regarding race or gender. Before adjustment, patients over age 60 had higher long-term quit rates (22%; UOR 2.36; 95% CI 1.58 to 3.52) compared to 18–30 years old (11%). Also, before adjustment, patients with an inpatient stay had higher long-term quit rates (17%, UOR 1.29, 95 % CI 1.10 to 1.52) compared to those with no inpatient stays (14%). When analyzed alone, comorbidities, except for COPD and HIV, showed statistically significant UOR effects on the quit rate. However, after adjusting for other covariates, statistical significance did not hold for any comorbidity. Oddly, while COPD showed no unadjusted statistical significance, after adjustment, COPD status showed a statistically significant effect on the quit rate (from UOR 1.01 CI 0.86 to 1.19, to AOR 0.75 CI 0.63 to 0.90).

Discussion

The present study examined the relationship between long-term quit status and the characteristics of tobacco users in primary care who were referred and scheduled for group behavioral counseling that did or did not attend. The results indicate that tobacco users who attended counseling were 1.52 times more likely to sustain a long-term quit status (P<0.001), compared to non-attendees, similar to one other comparable study (17). The 18% long-term quit rate for attendees of group counseling was higher than rates reported for similar studies involving group counseling (18,19), as well as those for a meta-analysis (8), but lower than those for two other group counseling studies (17,20). Results may be due to a larger proportion of attendees, deleterious health effects, and health gains from quitting. An additional study found higher quit rates among older participants compared to younger participants (17).

More than a third of tobacco users in the U.S. are 45 and older, and, since health and wellness deteriorate as age increases, quitting among this group can decrease the risk of disability, disease, and death, and improve health outcomes (3). This later stage (T-4) translational research investigated how the effect of Guideline-based interventions could be scaled up within a healthcare setting by utilizing the expertise of a transdisciplinary team to target tobacco users at increased risk of poor health outcomes. In fact, 40% of the study population had an inpatient stay during the study period. Although more than half of the participants were between the ages of 45 and 59, their hospitalization rates were similar to those who are 65 and older (21). There are no other reports of similar findings regarding the effect of commercial insurance, the number of follow-up years, or the number of screenings for tobacco use on the long-term quit rates resulting from the attendance of group counseling.

The strengths of this study include its large number of primary care participants, implementation at multiple sites in a real-world clinical environment, the use of EHR data, and implementation as a multi-level intervention in a US public hospital system serving high-risk tobacco users. This type of T4 transdisciplinary, translational behavioral research is appropriate for examining the wide-scale implementation of Guideline recommendations to affect population health.

Conduct of this study in a real-world setting, using only data available in EHRs, presented several limitations. First, we were unable to determine what specific components of the TCI program (e.g., brief provider intervention, self-help material, intensive group counseling) were most responsible for the observed rates. Other studies report a similar limitation (14). Second, EHR data did not include information on medication, quit-line usage, differences in tobacco dependence, previous quit success, or spousal or partner support, all of which may have influenced quit-rates. Third, due to resource limitations, the TCI was structured in such a way that only those persons who were ready to quit proceeded to the next level of intervention (i.e., were assisted with selection of a treatment option). However, the systems approach used by the TCI to identify and treat tobacco users promoted prompting and engagement (i.e., brief intervention) of all tobacco users on a recurring basis (4,7). Fourth, cessation was based on self-

Table 2 Factors affecting long-term quit rates

Variable	#Quit/total (% quit)	UOR	P	95% CI	AOR	P	95% CI
Age							
18–30	35/323 [11]						
31–44	138/1,257 [11]	1.01	0.942	(0.69, 1.50)	0.84	0.409	(0.56, 1.26)
45–59	420/2,748 [15]	1.48	0.034	(1.03, 2.14)	1.09	0.673	(0.73, 1.61)
60+	130/584 [22]	2.36	0.000	(1.58, 3.52)	1.55	0.058	(0.99, 2.43)
Gender							
Male	229/1,471 [16]						
Female	494/3,441 [14]	0.91	0.273	(0.77, 1.08)	0.94	0.525	(0.79, 1.13)
Race							
African American	280/1,901 [15]						
White	413/2,819 [15]	0.99	0.940	(0.84, 1.17)	1.03	0.705	(0.87, 1.23)
Other	30/192 [16]	1.07	0.739	(0.71, 1.61)	1.08	0.709	(0.71, 1.65)
Financial class							
Free care	392/2,804 [14]						
Commercial	59/274 [22]	1.69	0.001	(1.24, 2.30)	1.49	0.015	(1.08, 2.05)
Medicaid	79/686 [12]	0.80	0.091	(0.62, 1.04)	0.78	0.067	(0.60, 1.02)
Medicare	156/810 [19]	1.47	0.000	(1.20, 1.80)	1.07	0.598	(0.84, 1.35)
Self-pay	37/338 [11]	0.76	0.126	(0.53, 1.08)	0.96	0.830	(0.67, 1.39)
Comorbidity							
CAD							
No	537/3,905 [14]						
Yes	186/1,007 [18]	1.42	0.000	(1.18, 1.71)	0.96	0.693	(0.77, 1.19)
CHF							
No	614/4,390 [14]						
Yes	109/522 [21]	1.62	0.000	(1.29, 2.04)	1.23	0.133	(0.94, 1.61)
CKD							
No	632/4,497 [14]						
Yes	91/415 [22]	1.72	0.000	(1.34, 2.20)	1.16	0.293	(0.88, 1.52)
COPD							
No	458/3,124 [15]						
Yes	265/1,788 [15]	1.01	0.879	(0.86, 1.19)	0.75	0.002	(0.63, 0.90)
HIV							
No	700/4,713 [15]						
Yes	23/199 [12]	0.75	0.200	(0.48, 1.17)	0.79	0.335	(0.50, 1.27)

Table 2 (*continued*)

Table 2 (*continued*)

Variable	#Quit/total (% quit)	UOR	P	95% CI	AOR	P	95% CI
HTN							
No	122/1,153 [11]						
Yes	601/3,759 [16]	1.61	0.000	(1.31, 1.98)	1.13	0.332	(0.89, 1.43)
Cancer							
No	519/3,765 [14]						
Yes	204/1,147 [18]	1.35	0.001	(1.13, 1.62)	1.10	0.306	(0.91, 1.33)
Diabetes							
No	450/3,410 [13]						
Yes	273/1,502 [18]	1.46	0.000	(1.24, 1.72)	1.14	0.144	(0.96, 1.37)
Inpatient stay							
No	447/3,283 [14]						
Yes	276/1,629 [17]	1.29	0.002	(1.10, 1.52)	1.15	0.112	(0.97, 1.38)
Follow-up							
# Follow-up years		1.20	0.000	(1.14, 1.27)	1.19	0.000	(1.12, 1.26)
Tobacco use screening							
# Screenings per year		1.11	0.000	(1.08, 1.15)	1.10	0.000	(1.06, 1.14)
Counseling class							
Not attended	346/2,852 [12]						
Attended	377/2,060 [18]	1.62	0.000	(1.38, 1.90)	1.52	0.000	(1.21, 1.90)
# Counseling classes attended							
Attended 1 class	130/781 [17]						
Attended 2 classes	96/527 [18]	1.12	0.461	(0.83, 1.49)	0.99	0.933	(0.73, 1.33)
Attended 3+ classes	151/752 [20]	1.26	0.083	(0.97, 1.63)	0.96	0.778	(0.73, 1.26)
Total	723/4,912 [15]						

UORs, unadjusted odds ratio; AOR, adjusted odds ratio; CI, confidence interval; CAD, coronary artery disease; CHF, congestive heart failure; CKD, chronic kidney disease; COPD, chronic obstructive pulmonary disease; HIV, human immunodeficiency disease; HTN, hypertension.

report by patients during clinic visits. While biochemical validation of cessation may be optimal (14), in a clinical setting, this type of validation is prohibited by cost and time constraints. Finally, there may have been differences in the groups by facility and facilitator. However, TCI is a standardized program whereby all CTTSs receive the same training and use a standard curriculum to facilitate group counseling.

Several study findings offer guidance for conducting future cancer control research in clinical settings. First, the theoretical framework used by the TCI should be further examined to understand the specific elements, dose-response relationships, and system contexts in which behavior occurs and can be changed. Second, the limitation of only using EHR data warrants further study of data enhancements to combine technology and delivery of care. Such studies would give a more accurate account of factors which may influence long-term quit rates, including treatment utilization, patient disposition, and external support. Finally, while half of scheduled smokers attended group behavioral counseling, more research is needed to determine how to improve rates of service demand and

program reach among smokers who did not attend. Such theoretical, technological, and program advancements will further efforts to eliminate the health consequences of smoking and the cancer deaths attributable to smoking.

Conclusions

The comprehensive tobacco control program implemented in Louisiana's public hospital system was effective at increasing and sustaining long-term quit rates for participants in group behavioral counseling, especially for those who were commercially insured, remained in the system for an extended period, and were consistently screened for tobacco use. If population-wide interventions are to improve smoking cessation, cancer prevention, and prognosis of cancer survival, more T4-level translational research is needed to determine the influence of intervention components and tailored approaches to behavior change.

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Footnote

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Ethical Statement: The authors are accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. The protocol for this cohort research study was approved by the Louisiana State University Health Sciences Center Institutional Review Board (IRB Study no. 7899) and conforms to provisions according to the Helsinki Declaration as revised in 2013. The IRB granted a waiver of informed consent for this study. Study outcomes will not affect the future management of the patients.

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