

## Implementation of an inpatient smoking cessation programme in a Veterans Affairs facility

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**Aims and objectives.** To test the transportability and implementation of the Tobacco Tactics intervention using the Reach, Effectiveness, Adoption, Implementation and Maintenance framework, for inpatient units at the Jesse Brown Veterans Affairs Medical Center.

**Background.** Smoking rates are high among veterans. While the Department of Veterans Affairs has standardised outpatient cessation clinics, inpatient cessation services, known to be efficacious, are only sporadically provided.

**Design.** This was a phase 4, pre and postimplementation study of the Tobacco Tactics intervention.

**Methods.** A unique convenience sample of inpatient veteran smokers was recruited both before ( $n = 54$ ) and after ( $n = 50$ ) implementation of the Tobacco Tactics programme. Participants completed baseline and 30-day follow-up surveys along with urine cotinine test kits. In addition, staff completed anonymous surveys during the preintervention period ( $n = 158$ ) and two months after ( $n = 81$ ) the Tobacco Tactics training. Bivariate analyses compared preintervention vs. postintervention patient and staff characteristics using Chi-square, Fisher's Exact or Student's  $t$ -test.  $p$ -values  $< 0.05$  were considered significant.

**Results.** Patient-reported receipt of services and satisfaction was 10% higher in the postintervention compared to the preintervention group. Quit rates were 3% higher in the postintervention than in the preintervention group. The mean number of cigarettes smoked per day increased from 13 to 15 in the preintervention group, while the mean number of cigarettes smoked per day decreased from 14 to 9 in the postintervention group. Staff's confidence in their ability to provide cessation services improved greatly posttraining ( $p = 0.0017$ ) as did self-reported delivery of cessation services ( $p = 0.0154$ ).

**Conclusions.** With as little as one-hour training for nurses, the Tobacco Tactics intervention has the potential to be widely disseminated in the Department of Veterans Affairs.

**Relevance to clinical practice.** The implementation of inpatient smoking interventions has the potential to improve quit rates and decrease morbidity and mortality in the Department of Veterans Affairs.

**Key words:** health services research, nursing intervention, research implementation

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## Introduction

Cigarette smoking causes approximately 438,000 deaths annually (Centers for Disease Control and Prevention 2007) and is disproportionately higher among veterans (Cui *et al.* 2006, Sherman *et al.* 2006, Hamlett-Berry *et al.* 2009). The efficacious, nurse-administered, Tobacco Tactics intervention was tested in the Department of Veterans Affairs (VA) among head and neck cancer patients, a group of highly recalcitrant smokers (Duffy *et al.* 2006). Since that randomised control trial, the Tobacco Tactics intervention was refined and packaged into a toolkit for nurses and patients and disseminated in a VA Service Directed Project (Duffy *et al.* 2010a). This project tested the transportability of the Tobacco Tactics intervention to the Jesse Brown VA Medical Center (JBVAMC).

## Background

### Smoking services in the VA

As a result of the high prevalence of tobacco use among military personnel, the Department of Defense spends an estimated \$564 million per year for smoking-related medical care (Dall *et al.* 2007). VA practitioners exceed national standards in terms of identifying smokers and offering general quit advice (Sherman *et al.* 2008). However, in the VA, smoking cessation services are offered sometimes in primary care, but primarily in the outpatient setting (Duffy *et al.* 2008). Unfortunately, outpatient cessation programmes tend to be underutilised among the smoking population (Miller *et al.* 1997). In contrast, inpatient cessation programmes have the potential to reach a vast number of smokers (Hennrikus *et al.* 2005, Duffy *et al.* 2008, Wolfenden *et al.* 2008).

### Nurse-based smoking cessation interventions

With approximately 2.9 million registered nurses (RNs) in the United States, nurses are the largest number of front line providers (The Center for Nursing Advocacy 2006) and thus nurses interact with patients more than any other healthcare provider (Chouinard & Robichaud-Ekstrand 2005). It is well documented that nurses effectively deliver smoking cessation interventions (Gomm *et al.* 2002, Thompson *et al.* 2007, Gies *et al.* 2008, Ergul & Temel 2009, Rice & Stead 2008, Duffy *et al.* 2010a). Although nursing staff is ideally situated to provide smoking cessation services, several barriers exist that prevent nurses from delivering these services, including competing priorities, lack of knowledge and training, lack of confidence in the ability to provide appropriate smoking

cessation support and concern about upsetting patients (Duffy *et al.* 2008, Gies *et al.* 2008). Hence, many inpatient healthcare providers fail to seize the window of opportunity during hospitalisation to provide cessation services (Duffy *et al.* 2008, Ginn *et al.* 2008).

### Current evidence-based inpatient cessation interventions

Hospitalisation creates an excellent opportunity to implement smoking cessation efforts, as hospitalised patients are in a heightened state of readiness to quit smoking (Davies *et al.* 2005); many tobacco users are admitted for smoking-related illnesses making them more receptive to cessation interventions (Rigotti *et al.* 2007, Duffy *et al.* 2008, Fiore *et al.* 2008, Ginn *et al.* 2008, Wolfenden *et al.* 2008). Additionally, the hospital setting can increase access to smoking cessation interventions, decrease exposure to environmental smoking cues and create an environment that is unfavourable to smoking (Duffy *et al.* 2008, Wolfenden *et al.* 2008, Targhetta *et al.* 2011). A Cochrane review conducted by Rigotti *et al.* (2007) provided support for inpatient smoking cessation programmes that are multi-component and provide cessation medications, counselling and provide at least one month of supportive contact postdischarge. The Tobacco Tactics programme is a multi-component, inpatient smoking cessation programme that incorporates guidelines from the Agency for Healthcare Research and Quality (AHRQ) for treatment of smoking and is individualised to meet the needs of the hospitalised veteran who smokes. The Tobacco Tactics programme has been found to increase the receipt of nurse-delivered smoking cessation (Duffy *et al.* 2006, 2010a).

### Theoretical model

Numerous theoretical models have been used to incorporate research into patient care including the Reach, Effectiveness, Adoption, Implementation and Maintenance (RE-AIM) framework used in this study (Abildso *et al.* 2010, Caperchione & Coulson 2010). The overall goal of the RE-AIM framework is to enhance the applicability of a research-based intervention in clinical practice (RE-AIM.org). Utilisation of the RE-AIM framework is intended to ease the process of planning, conducting, reporting and selecting interventions to be implemented on a large scale (Kaiser Permanente Colorado Region Institute for Health Research 2010). In addition, the RE-AIM framework assists in determining the individual and global impact of a given intervention (Glasgow *et al.* 2006). Evaluation of smoking cessation interventions, using the RE-AIM

framework, has been demonstrated in previous publications (France *et al.* 2001, Prochaska *et al.* 2009, Reid *et al.* 2010, Anesetti-Rothermel *et al.* 2011, Meyer *et al.* 2011).

The constructs of the RE-AIM framework are: (1) Reach (quantity of individuals in receipt of an intervention), (2) Effectiveness (impact of an intervention on measured outcomes), (3) Adoption (proportion of agents willing to deliver the intervention), (4) Implementation (extent to which the intervention is implemented as intended), and (5) Maintenance (long-term sustainability of an intervention) (Bakken & Ruland 2009). Reflecting the RE-AIM framework, the specific aims of this study were to: (1) determine if inpatient smokers report an increase in receipt of services and satisfaction with services (Reach), (2) measure cessation rates after implementation of the intervention (Effectiveness), (3) identify the number of inpatient nurses who were trained to conduct the Tobacco Tactics intervention, determine the degree and quality of implementation of the intervention and assess change in staff attitudes and behaviours about the delivery of cessation services preimplementation and postimplementation of the Tobacco Tactics intervention (Adoption), (4) identify preintervention and postintervention self-reported implementation of specific components of the Tobacco Tactics intervention (Implementation), and (5) evaluate the sustainability of the intervention (Maintenance).

## Methods

### Design

This quasi-experimental, phase 4 implementation study used a preintervention, postintervention design to assess moving the evidence-based Tobacco Tactics programme into practice (Titler 2004). In this design, two unique convenience samples of veteran inpatient smokers were recruited before and after the hospital-wide roll-out of the Tobacco Tactics intervention and compared on self-reported receipt of and satisfaction with cessation services (Reach) and posthospitalisation quit rates (Effectiveness); the preintervention and postintervention samples were not linked. To evaluate the preintervention and postintervention changes in the number of inpatient providers trained (Adoption), self-reported implementation of the Tobacco Tactics intervention (Implementation), and sustainability of the intervention (Maintenance), two convenience samples of providers were also surveyed before and after the roll-out of the intervention; the preintervention and postintervention provider samples may have had some overlap of participants, but were not necessarily the same nurses and were not linked. Human studies approval was obtained from the JBVAMC/Northwestern University/University of Illinois

at Chicago (UIC) collaborative Institutional Review Board and the JBVAMC Department of Research and Development.

### Setting and sample

The setting was the JBVAMC, an urban, 200-bed acute care facility which provides services to approximately 58,000 veterans. The veterans who receive care at the JBVAMC are predominately African-American men of low socioeconomic status (SES).

To evaluate the Reach and Effectiveness of the intervention in accordance with the RE-AIM framework, this study included two unique convenience samples of veteran inpatient smokers recruited before and after the hospital-wide roll-out of the Tobacco Tactics intervention that were: (1) over the age of 18, (2) admitted as inpatients to general medical, surgical, intensive care unit, telemetry, psychiatric and extended care units, and (3) willing to complete the smoking survey. Exclusion criteria were those veterans who were: (1) too ill or impaired to participate, (2) in terminal stages of illness, and (3) non-English speaking. Patients were recruited both preintervention and postintervention.

To evaluate the Adoption, Implementation and Maintenance of the study in accordance with the RE-AIM framework, two convenience samples of providers were surveyed preintervention and postintervention; some, but not all of the preintervention respondents, were also included in the postintervention sample. Registered nurses who worked on the inpatient units were specifically targeted in this study. Other healthcare providers (i.e. outpatient staff nurses, respiratory therapists and licensed practical nurses) interested in smoking cessation were also included.

### Procedures

#### *Patient recruitment*

Veteran smokers were identified by obtaining an electronically generated list of daily admissions and then reviewing the Computerized Patient Record System (CPRS) to identify smokers. Unique inpatient smokers were approached by a co-investigator or graduate nursing student at their bedside and, after signing informed consent, completed a baseline survey in both the preintervention and postintervention period. The preintervention group was recruited prior to the implementation of the Tobacco Tactics intervention and received usual care whereas the postintervention group was recruited following the implementation of the intervention and had the chance for exposure to the Tobacco Tactics programme. Fifty patients were targeted in both the

preintervention and postintervention period, which was less than what was needed to be powered to detect significant differences in quit rates, but enough to determine whether results were in the expected direction for this implementation study. The response rate was 50% in the preintervention group and 38% in the postintervention group.

In addition, a co-investigator collected general information from CPRS about their admission and medical conditions. Findings from the chart review were documented on the Medical History Instrument Form. This form contained information such as the unit where the patient received the Tobacco Tactics intervention, dates of admission and discharge, admission and discharge diagnoses, comorbidities, length of stay, transfer and surgery dates (if applicable).

To evaluate differences in preintervention and postintervention receipt of and satisfaction with services (Reach) and quit rates (Effectiveness), 30-day follow-up surveys and urine cotinine tests were mailed to participants using a modified Dillman (1978) technique. All participants, regardless of their exposure to the intervention, received a follow-up survey along with a urine cotinine test kit 30 days postdischarge. Participants were given \$5.00 canteen vouchers for each survey and \$15.00 canteen vouchers for returning the cotinine test.

#### *Staff recruitment*

To identify preintervention and postintervention staff Adoption, Implementation and Maintenance behaviours regarding the provision of smoking cessation services, staff were given an anonymous survey at the beginning of each training session. Staff attendance at the training sessions was strongly encouraged by the nurse managers, but not mandatory. Incentives were offered including continuing education units (CEU) and refreshments. The sessions were publicised by mass emailing, public address announcements, flyers posted on the inpatient units, JBVAMC Nursing Service Newsletter and telephone reminders to the charge nurses. Multiple sessions were held during all shifts, and several sessions occurred directly on the nursing units. Unit managers were kept abreast of staff attendance at these sessions via email correspondences. In addition, individual letters addressed to RNs who did not attend a session were delivered to each inpatient unit for distribution by the charge nurse or unit manager. The survey was again administered to staff on the units two months after receiving the training session. As surveys were completed on work time, staff did not receive any reimbursement for completing the surveys.

#### *Exportation of the intervention*

While in the past, the Tobacco Tactics intervention was implemented using a face-to-face, train-the-trainer model, in

this study the intervention was exported via satellite broadcast from the Ann Arbor VA Medical Center (AAVAMC) to the JBVAMC. Four AAVAMC staff members were present for the 1.5 hour training of the six trainees who were present at the JBVAMC. All six trainees at the JBVAMC had some experience with conducting tobacco cessation interventions. The six trainees consisted of three nurses practitioners, one nurse educator and two pharmacists. These six trainees were responsible for disseminating the intervention in terms of training the staff nurses. AAVAMC staff also facilitated the exportation of the Tobacco Tactics intervention by mailing programme materials to the JBVAMC and training JBVAMC co-investigators regarding recruitment procedures and paperwork (via telephone conferencing). An in-person fidelity check was made by Ann Arbor personnel to the JBVAMC where three staff training sessions were observed and feedback was provided.

### **Intervention**

#### *Patient level intervention*

The Tobacco Tactics intervention is based on an efficacious intervention previously tested (Duffy *et al.* 2010a) which incorporates the AHRQ recommendations for treatment of smoking and tailors the intervention to the patient's medical condition and lifestyle. The Tobacco Tactics patient toolkit includes: (1) a smoking cessation brochure (Tips for Quitting Smoking), (2) the 'Smoking: Getting Ready to Quit' video (Milner-Fenwich Inc. n.d.), (3) Tobacco Tactics manual, (4) pharmaceuticals, (5) the 1-800-QUIT-NOW help line (Smokefree.gov, <http://www.smokefree.gov/expert.html>; accessed 9 July 2009), and (6) follow-up telephone calls from trained veteran volunteers. Providing the brochure, video and manual in advance of cessation counselling saves the nurses' time at the bedside. The patient reviews the video on their own (shown twice daily on the overhead television at breakfast and dinner time) and meets with the staff nurses for 10–20 minutes for cessation counselling. This counselling can be broken into smaller units (e.g. four five-minute sessions) and conducted while providing routine care. A pharmaceutical protocol, initiated by the nurse and solidified by the physician, was developed. See Appendices 1 and 2 for an outline of the behavioural and pharmaceutical protocols.

#### *Nurse level intervention*

The Tobacco Tactics nurse toolkit includes: (1) one CEU for attending the Tobacco Tactics training session, (2) a Power-Point presentation on behavioural and pharmaceutical interventions, (3) a pocket card 'Helping Smokers Quit: A

Guide for Clinicians' (United States Department of Health and Human Services n.d.), (4) pharmaceutical and behavioural protocols, and (5) a computerised template for nurse documentation.

#### *System level interventions*

*Achieving nursing buy-in.* As the Tobacco Tactics programme is nurse-driven, buy-in from Nursing Service was essential. Hence, information about the Tobacco Tactics intervention was presented at several nurse-based committees such as the Nursing Education Council, the Nursing Practice Counsel and the Nursing Research Council. To secure nursing management support, information regarding the Tobacco Tactics programme was also disseminated to the nurse executives and to nurse managers during their regularly scheduled meetings.

*Documentation.* Documentation templates used in Ann Arbor were modified for use at the JBVAMC and activated in CPRS after approval was obtained from the JBVAMC Medical Record Committee. The template was used to document the delivery of smoking cessation services.

*Tobacco Tactics materials.* After securing the broadcast licensing agreement, the Patient Education Coordinator placed the 'Smoking: Getting Ready to Quit' video on the closed circuit patient education channel. The video was scheduled to play at breakfast and dinner time. The Patient Education Coordinator was identified as the appropriate person to maintain and distribute the Tobacco Tactics materials on the inpatient units. Two pharmacists who oversee the outpatient smoking cessation clinic revised the content of the Pharmaceutical Management Protocol to reflect prescribing practices at the JBVAMC.

## Measures

#### *Reach and effectiveness of the programme*

To evaluate the Reach of the programme, patient survey questions asked whether or not (yes/no) they received a variety of tobacco cessation services and if they were satisfied with these services. To evaluate the Effectiveness of smoking cessation services 30 days postdischarge from the hospital, the following question was asked: 'Have you used any tobacco products in the past seven days; answer yes even if only one puff or chew of any tobacco product?' Participants were mailed a urine cotinine test kit to complete and mail back to the research team. The test kit is an inexpensive, accurate, easy-to-use method to measure a person's exposure to tobacco smoke (Studts *et al.* 2006). For

those who refused to complete the urine test kit, we accepted a statement from the spouse or significant other regarding the patient's smoking status. Spousal proxy reports have been shown to be reliable with VA populations (Chen *et al.* 1995, Simon *et al.* 1997). For those patients who continued to smoke, harm reduction was evaluated by asking continuing smokers about the number of cigarettes/day smoked, addiction and quit attempts. Smoking reduction is a feasible first step towards improved health and may ultimately lead to quitting in people unwilling to stop abruptly (Duffy *et al.* 2007, Song *et al.* 2008).

#### *Adoption, implementation and maintenance of the Tobacco Tactics program*

Staff survey questions rated on a five-point scale included: (1) confidence in abilities to provide tobacco cessation services, (2) perceived level of importance of providing services, (3) satisfaction with the material presented, and (4) perception of understanding the elements of the smoking cessation intervention. Nurses were also asked: (1) if they personally provided smoking cessation services to veterans (yes/no), (2) anticipated barriers to implementation (yes/no and open-ended), and (3) 'is there anything else the VA could do to improve the provision of smoking cessation services to veterans?' (open-ended). Results from another study using similar survey questions have been previously published (Duffy *et al.* 2008, 2010a).

Variables known to be associated with smoking and cessation were measured using previously validated tools. Nicotine addiction was assessed using the six-question Fagerström Test for Nicotine Dependence (FTND), a valid self-reporting measure of nicotine dependence that can assist providers in determining adequate cessation treatments (Heatherton *et al.* 1991). The Alcohol Use Disorders Identification Test (AUDIT) was used to measure alcohol use (Saunders *et al.* 1993). Depression was measured using the abbreviated Center for Epidemiologic Studies Depression Scale (CESD) (Lewinsohn *et al.* 1997). The Medical Outcomes Study social support survey was used to measure social support. As stress may exacerbate smoking (Todd 2004), the Perceived Stress Scale (Cohen *et al.* 1983) was used because it is concise and has been extensively used. Self-reported comorbidities were measured using a validated comorbidity instrument (Mukerji *et al.* 2007). Three belief questions, scored on a five-point Likert scale, asked about beliefs regarding the benefit to quitting. Confidence to stay off cigarettes was measured on a five-point Likert scale ranging from not at all confident to extremely confident. Age, race/ethnicity (using the US Census bureau two-tiered question), marital status, education and employment status were also collected.

## Data analysis

Mean values or frequencies were examined for all variables. Bivariate analyses compared preintervention- vs. postintervention staff and patient characteristics using Chi-square, Fisher's Exact or Student's *t*-tests. Chi square was used to calculate significance in categorical data (i.e. gender, employment status). As all of the respondents did not answer all of the questions, the sample size varied for different results. The Fisher's Exact test was used to calculate significance in categorical data when there was less than five respondents for a given question. Student's *t*-test was used for interval data (i.e. cigarette use, social support scale scores). Descriptive statistics (i.e. percentages) were used when reporting staff perceptions of Tobacco Tactics training as this could not be examined prior to the training sessions and hence there was no comparative data. *p*-values < 0.05 were considered significant.

## Results

### Reach and effectiveness of the Tobacco Tactics programme

A total of 104 patients were recruited from October 2009 through March 2010. Table 1 shows that the baseline characteristics of patients recruited in the preintervention (*n* = 54) period compared to the postintervention period (*n* = 50) were relatively similar on all but a few characteristics. The baseline characteristics of all recruited patients are included in Table 1. Compared to postintervention patients, more preintervention patients had never married (*p* = 0.0456) and lived alone (*p* = 0.0271). Over 30% of preintervention patients and over 46% of postintervention patients (*p* = 0.0875) had problem drinking. There was also a marginal association of having greater rates of hypertension

**Table 1** Baseline characteristics of smokers preintervention and postintervention (*n* = 104)

	Preintervention ( <i>n</i> = 54)		Postintervention ( <i>n</i> = 50)		<i>p</i> -value
	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	
Number of cigarettes smoked per day in past month	49	12.67 (9.32)	45	13.84 (13.15)	0.6215
Number of years smoked cigarettes regularly	52	31.88 (13.14)	49	31.30 (14.46)	0.8307
Number of times quit	42	4.02 (4.49)	38	4.03 (5.90)	0.9983
Perceived Stress Scale	52	1.99 (0.80)	49	1.81 (0.60)	0.2125
Social Support Scale	52	18.54 (6.66)	49	19.53 (6.53)	0.4518
	<i>n</i> (%)		<i>n</i> (%)		
How important do you think quitting smoking is to your health?					
Not at all/somewhat/moderately important	9 (17.0)		13 (26.5)		0.2414
Very/extremely important	44 (83.0)		36 (73.5)		
How difficult do you think it would be to quit smoking?					
Not at all/somewhat/moderately difficult	22 (41.5)		26 (52.0)		0.2861
Very/extremely difficult	31 (58.5)		24 (48.0)		
How likely do you think it is that quitting smoking will make you feel nervous?					
Extremely/moderately unlikely	13 (24.5)		15 (30.6)		0.6952
50/50 chance	20 (37.7)		19 (38.8)		
Moderately/extremely likely	20 (37.7)		15 (30.6)		
Currently thinking of quitting smoking or using other tobacco products					
Yes, within the next 30 days	27 (50.9)		27 (54.0)		0.7513
Yes, within the next six months	15 (28.3)		11 (22.0)		
No, I am not thinking of quitting	11 (20.8)		12 (24.0)		
Nicotine dependent	24 (46.2)		20 (40.8)		0.5887
Problem drinking					
Yes	16 (30.2)		22 (46.8)		0.0875
No	37 (69.8)		25 (53.2)		
Depressive symptoms	32 (61.5)		32 (64.0)		0.7971
Self-rated health status					
Excellent/very good	11 (21.2)		8 (16.3)		0.8249
Good	13 (25.0)		13 (26.5)		
Fair/poor	28 (53.8)		28 (57.1)		
Lives alone	26 (51.0)		14 (29.2)		0.0271
Person closest to smokes	21 (41.2)		20 (41.7)		0.9605
Ever tried to quit smoking	42 (79.3)		38 (77.6)		0.8353

Table 1 (Continued)

	Preintervention ( <i>n</i> = 54)		Postintervention ( <i>n</i> = 50)		<i>p</i> -value
	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	
Gender					
Male	52 (96.3)		50 (100)		0.4959
Female	2 (3.70)		0 (0.00)		
Hispanic or Latino					
Yes	4 (7.41)		2 (4.00)		0.6796
No	50 (92.6)		48 (96.0)		
Race					
White	12 (22.2)		10 (20.0)		0.9262
African American	40 (74.1)		39 (78.0)		
Other	2 (3.70)		1 (2.00)		
Education					
High School or less	15 (28.9)		22 (44.0)		0.1115
Some college or more	37 (71.1)		28 (56.0)		
Marital status					
Married	6 (11.3)		14 (28.0)		<b>0.0456</b>
Separated/widowed/divorced	32 (60.4)		29 (58.0)		
Never married	15 (28.3)		7 (14.0)		
Employment status					
Employed	6 (11.32)		4 (8.33)		0.4506
Unemployed	15 (28.30)		14 (29.17)		
Retired	7 (13.21)		12 (25.00)		
Disabled	25 (47.17)		18 (37.50)		
Homemaker	0 (0.00)		0 (0.00)		
Medical history					
History of cancer	10 (18.5)		5 (10.0)		0.2701
History of lung disease	19 (35.2)		26 (52.0)		0.0838
History of heart disease	19 (35.2)		18 (36.0)		0.9309
History of hypertension	36 (66.7)		41 (82.0)		0.0747
History of stroke	7 (13.0)		6 (12.0)		0.8821
History of psychiatric problems	41 (75.9)		34 (68.0)		0.3678
History of diabetes	13 (24.1)		15 (30.0)		0.4960
History of Arthritis	37 (68.5)		35 (70.0)		0.8701

Bold values represent  $p < 0.05$ .

( $p = 0.0747$ ) and lung disease ( $p = 0.0838$ ) in postintervention patients. Overall, veterans were primarily male, African-American, single and disabled. Among both groups, probable depression rates were over 61%, which is much higher than population norms of 6.7% (Kessler *et al.* 2005).

Table 2 shows the 30-day follow-up of veterans recruited to the preintervention group ( $n = 27$ , 50% follow-up rate) compared to the postintervention group ( $n = 19$ , 38% follow-up rate). While underpowered to determine significant differences, quit rates were 3% higher in the postintervention than in the preintervention group. Smoking behaviours also changed; while the mean number of cigarettes smoked per day actually increased in the preintervention group from 13 to 15, the mean number of cigarettes smoked per day in the postintervention group decreased from 14 to 9. Moreover, reported receipt of services was 10% higher, and satisfaction rates were

also 10% higher in the postintervention patients compared to the preintervention patients. Preintervention patients were more likely to report that quitting smoking was very or extremely difficult compared to postintervention patients.

### Adoption, implementation and maintenance of the Tobacco Tactics programme

A total of 31 training sessions were offered to staff at various times and in several different locations for staff convenience. Although the training sessions were open to all staff interested in smoking cessation, promotional efforts were targeted for inpatient RN staff. Of the 162 RNs working in the inpatient units at the time of this study, over two-thirds (67%,  $n = 109$ ) of the RN inpatient staff attended the Tobacco Tactics training over a three-month period. Table 3

Table 2 Thirty-day follow-up to the Tobacco Tactics intervention (*n* = 46)

	Preintervention ( <i>n</i> = 27)		Postintervention ( <i>n</i> = 19)		<i>p</i> -value
	<i>n</i> (%)		<i>n</i> (%)		
30-day quit rate	2 (7.69)		2 (10.53)		N.S.
Received help to quit during hospital stay	14 (51.9)		11 (61.1)		0.5403
Satisfied with the level of help the VA provides to help people quit smoking					
Extremely/somewhat satisfied	13 (52.0)		13 (68.4)		0.2725
Neutral/undecided/somewhat/extremely not satisfied	12 (48.0)		6 (31.6)		
How important do you think quitting smoking is to your health?					
Not at all/somewhat/moderately important	3 (12.5)		3 (18.7)		0.6678
Very/extremely important	21 (87.5)		13 (81.3)		
How difficult do you think it would be to quit smoking?					
Not at all/somewhat/moderately difficult	10 (41.7)		12 (75.0)		<b>0.0379</b>
Very/extremely difficult	14 (58.3)		4 (25.0)		
How likely do you think it is that quitting smoking will make you feel nervous?					
Extremely/moderately unlikely	4 (17.4)		3 (18.7)		0.6080
50/50 chance	15 (65.2)		8 (50.0)		
Moderately/extremely likely	4 (17.4)		5 (31.3)		
Currently thinking of quitting smoking or using other tobacco products					
Yes, within the next 30 days	8 (36.4)		5 (31.3)		0.9160
Yes, within the next six months	10 (45.5)		7 (43.8)		
No, I am not thinking of quitting	4 (18.2)		4 (25.0)		
Nicotine dependent	6 (22.2)		7 (36.9)		0.2782
Problem drinking					
Yes	10 (37.0)		6 (37.5)		0.9758
No	17 (63.0)		10 (62.5)		
Depressive symptoms	21 (77.8)		12 (63.2)		0.2782
Self-rated health status					
Excellent/very good	6 (22.2)		5 (26.3)		N.S.
Good	10 (37.0)		7 (36.9)		
Fair/poor	11 (40.7)		7 (36.8)		

  

	<i>n</i>	Mean (SD)	<i>n</i>	Mean (SD)	<i>p</i> -value
Number of cigarettes smoked per day in past month	23	15.0 (24.6)	17	8.8 (7.90)	0.2680
Perceived Stress Scale	25	1.94 (0.77)	18	1.64 (0.61)	0.1765
Social Support Scale	27	20.7 (6.34)	19	25.9 (13.3)	0.1248

N.S., not significant with sample sizes too small to report.

Bold values represent *p* < 0.05.

shows the staff surveys from both preintervention (*n* = 158) and postintervention (*n* = 81) period. Both before and after the dissemination of the Tobacco Tactics intervention, staff felt that the VA should be doing more to assist smokers to quit and felt that providing cessation services was important. Staff confidence in their ability to provide smoking cessation services improved greatly posttraining (*p* = 0.0017) as did self-reported delivery of smoking cessation services (*p* = 0.0154).

There were no significant demographic differences in the staff who were surveyed prior to the intervention compared to

those who were surveyed after the intervention. Most of the staff were non-smokers, over age 44, woman, Asian or Black and RNs with a Bachelor of Science in Nursing (BSN) degree. Staff who did not attend the training sessions cited scheduling conflicts, competing patient care responsibilities and lacking awareness of the training schedule as barriers for attending.

Table 4 shows questions asked by staff on the two-month postintervention survey only (*n* = 81). The vast majority of staff surveyed were extremely/somewhat satisfied with the Tobacco Tactics training sessions. About two-thirds rated the behavioural and pharmaceutical management sessions as



**Table 3** Staff characteristics, attitudes and behaviours regarding cessation services preintervention and postintervention

	Preintervention ( <i>n</i> = 158)	Postintervention ( <i>n</i> = 81)	<i>p</i> -value
	<i>n</i> (%)	<i>n</i> (%)	
Feel the VA should be doing more to assist inpatient smokers to quit smoking	132 (85.2)	65 (83.3)	0.7156
How important do you think it is to provide smoking cessation services to veterans?			
Not at all/somewhat/ moderately important	16 (10.4)	8 (10.1)	0.9501
Very/extremely important	138 (89.6)	71 (89.9)	
How confident are you in your abilities to provide smoking cessation services to smokers?			
Not at all/somewhat/ moderately confident	92 (60.9)	31 (39.2)	<b>0.0017</b>
Very/extremely confident	59 (39.1)	48 (60.8)	
Currently provide smoking cessation services to veterans	82 (54.0)	55 (70.5)	<b>0.0154</b>
Of those who do not provide services, the reason is			
Lack of confidence	3 (4.29)	1 (4.35)	N.S.
Not enough training	28 (40.0)	6 (26.1)	0.2294
Not enough time	15 (21.4)	5 (21.7)	N.S.
Hesitant to upset patients	12 (17.1)	3 (13.0)	0.7547
Other	18 (25.7)	7 (30.4)	0.6578
Smoking status			
Current smoker	8 (5.16)	7 (8.86)	0.5494
Former smoker	24 (15.5)	12 (15.2)	
Never smoker	123 (79.4)	60 (76.0)	
Age			
< 35	25 (17.1)	8 (10.8)	0.3296
35–44	23 (15.8)	11 (14.9)	
45–54	41 (28.1)	29 (39.2)	
55–64/ > 64	57 (39.0)	26 (35.1)	
Gender			
Male	24 (15.4)	12 (15.8)	0.9363
Female	132 (84.6)	64 (84.2)	
Race			
White	20 (12.9)	8 (10.4)	0.2861
Black	44 (28.4)	19 (24.7)	
Hispanic/Latino	5 (3.23)	3 (3.90)	
Asian/Pacific Islander	82 (52.9)	40 (52.0)	
American Indian/ Eskimo/Aleutian/ other	4 (2.58)	7 (9.09)	
Four-year college degree			
Yes	126 (80.3)	59 (76.6)	0.5212
No	31 (19.7)	18 (23.4)	
Current position			
RN	120 (78.4)	63 (81.8)	0.8157
LPN/nursing assistant	13 (8.50)	6 (7.80)	
Other professional	20 (13.1)	8 (10.4)	

N.S., not significant with sample sizes too small to report.

Bold values represent  $p < 0.05$ .

excellent/very good. Over 92% strongly agreed or agreed that they had a good understanding of the elements of the Tobacco Tactics intervention and about 85% felt that the intervention would be helpful to veterans. The most commonly provided services were advice, counselling,

handout materials and medications. On average, staff spent about 11.6 minutes counselling the average smoker. Unfortunately, postdischarge telephone calls were not initiated, as it was difficult to identify staff to conduct the follow-up process.

**Table 4.** Staff perceptions about and responses to Tobacco Tactics training ( $n = 101$ )

	<i>n</i>	%
Participated in training for smoking cessation	81	80.2
Satisfied with the material presented		
Extremely/somewhat satisfied	71	87.7
Neutral/undecided/somewhat/extremely not satisfied	10	12.3
Pharmaceutical management session		
Excellent/very good	51	69.9
Good/fair/poor	22	30.1
Behavioural management session		
Excellent/very good	23	69.7
Good/fair/poor	10	30.3
Good understanding of the elements of the Smoking Cessation Intervention		
Strongly agree/agree	75	92.6
Neutral/disagree/strongly disagree	6	7.4
How helpful do you think the smoking cessation programme you received training on is to veteran smokers?		
Extremely/somewhat helpful	67	84.8
Neutral/undecided/somewhat/extremely unhelpful	12	15.2
Of those who do provide services, which do they provide?		
Advice ( $n = 55$ )	53	96.4
Individual counselling ( $n = 36$ )	26	72.2
Group counselling ( $n = 46$ )	20	43.5
Medications ( $n = 33$ )	23	70.0
Hand-out materials ( $n = 55$ )	50	91.0
Video about quitting smoking ( $n = 34$ )	11	32.4
Phone calls from the VA ( $n = 43$ )	15	35.0
	Mean	SD
Average number of minutes spent counselling the average smoker (min = 0; max = 37.5)	11.60	9.50

## Discussion

There was an improvement in the Reach and Effectiveness of the Tobacco Tactics intervention postintervention as compared to preintervention. In terms of Reach, veteran smokers reported an increase in receipt of cessation services and satisfaction with these services postintervention compared to preintervention. This finding is congruent with a Cochrane review which demonstrated that health professional training increases the delivery of smoking cessation interventions (Lancaster *et al.* 2000). In terms of Effectiveness, albeit non-significant, there was a modest improvement in 30-day quit rates in the postintervention group compared to the preintervention group. Research has shown that when smoking cessation services are offered, quit rates increase (Doll *et al.* 2004).

Moreover, for those still smoking, there was also a substantial decrease in the number of cigarettes smoked per

day. Although not as advantageous as smoking cessation, reduction in tobacco consumption results in numerous health benefits. In a systematic review, tobacco use reduction was found to decrease morbidity by reducing the incidence of smoking-related cancers, improve respiratory symptoms and decrease the risk of cardiovascular disease (Pisinger & Godtfredsen 2007). In addition, lowering cigarette consumption improves cessation rates (Song *et al.* 2008).

There were some differences in the characteristics between the preintervention and postintervention groups that may have affected quit rates. Both groups screened over three times higher than population norms for problem drinking which can be largely attributed to the fact that 50% of patients recruited were admitted to the psychiatric unit. Compared to the preintervention group, most of those recruited to the postintervention group screened positive for problem drinking; yet at 30-day follow-up this difference was no longer present suggesting that many of the problem drinkers were perhaps non-responders accounting for the lower response rate in this group. Problem drinking, common among veterans (Lambert *et al.* 2005) is associated with smoking, higher nicotine dependence and greater difficulty quitting (Dawson 2000, Leeman *et al.* 2008).

While there were no differences between the groups in probable depression rates, depression rates were alarmingly six times the population norms. The disproportionate number of psychiatric patients included in this sample may explain the high depression rate. Patients hospitalised primarily for psychiatric disorders may be just as motivated to quit smoking than inpatients admitted for medical reasons (Siru *et al.* 2010). However, depression is highly correlated with smoking, and depressed smokers often have a harder time quitting; the high rates of depression coupled with the high rates of drinking among this sample make smoking cessation particularly challenging (Duffy *et al.* 2002, 2006, 2010b, Lambert *et al.* 2005). Combination interventions that target multiple behaviours/conditions (i.e. smoking, alcohol and depression) such as the one implemented by Duffy *et al.* (2006), may be particularly helpful for veteran smokers with multiple behavioural and psychological comorbidities. At the 2009 National Institutes of Health (NIH) meeting on the Science of Behavior Change (NIH 2009), it was acknowledged that risk behaviours often occur in 'bundles' and we should move away from focusing on one disorder at a time.

There were more smokers with hypertension and lung disease in the postintervention group. Comorbidities have been shown to be associated with motivation to quit smoking. For example, smokers with lung disease tend to be more nicotine dependent and have a decreased readiness to quit (Jimenez-Ruiz *et al.* 2001). In addition, patients with

lung disease have a higher incidence of depression that could adversely influence their willingness to quit smoking (Wagena *et al.* 2005).

Smokers in the preintervention group were more likely than those in the postintervention group to believe that quitting smoking would be difficult at 30-day follow-up. Perceived difficult quitting is a marker of self-efficacy and self-efficacy to quit smoking has had mixed results in the literature. While some studies show that perceived high self-efficacy can enhance quitting, others show that those with perceived high self-efficacy are less likely to perceive the need to participate in interventions (Duffy *et al.* 2010b).

In terms of the Adoption, Implementation and Maintenance phases of the RE-AIM framework, this study showed that, once packaged into a toolkit, the nurse-administered Tobacco Tactics intervention can be easily transported to another institution. By mailing the components of the toolkit to the institution and training six trainers via satellite broadcast, over two-thirds of the nurses were trained during a three-month period. Overall, staff were very satisfied with the training sessions, confidence levels improved and consequently the provision of services improved.

Despite the success of transporting the Tobacco Tactics intervention to the JBVAMC, there were several barriers to implementation. Although attendance was strongly encouraged by unit managers among nursing personnel, some nurses were not relieved of patient care responsibilities to attend the Tobacco Tactics training. Several staff members accepted the role of Tobacco Tactics trainer; however, discomfort in presenting course materials and competing demands limited their availability.

Planning is ongoing to improve the Effectiveness, Adoption and Maintenance of the Tobacco Tactics intervention at the JBVAMC. Relaxing prescribing practices and launching postdischarge follow-up calls are two strategies that will be pursued to enhance the Effectiveness of the Tobacco Tactics intervention. To ensure sustainability of the intervention, in collaboration with Nursing Education, the Tobacco Tactics training will be incorporated into nursing orientation and will also be offered online via the *Mosby's Nursing Skills* website for annual review by the nursing staff. Lastly, medical residents will be offered brief training during regularly scheduled conferences.

## Limitations

This study was a preintervention and postintervention study without a comparison group and was therefore unable to control historical effects that may influence the results. While a predesign postdesign is not as strong as other designs that

offer comparison groups, implementation research, which is designed to get evidence into practice, often uses predesign postdesigns because of the low cost, convenience and simplicity (Songer n.d.). Although the 30-day quit rates were biochemically verified, 30-day quit rates are not as reliable as six-month quit rates, but have been found to be highly correlated with six-month quit rates and are thus a reasonable marker to measure smoking for short-term evaluation projects (Ockene *et al.* 2000). While the inclusion of self-reported questionnaires and return of urine cotinine samples are standard measures in tobacco studies (Studs *et al.* 2006), both the preintervention and postintervention response rates were low perhaps because of factors such as problem drinking, low SES, unstable housing and/or the possibility that these hospitalised smokers became sicker and were unable to respond to the survey. Although patients were referred to the 1-800-QUIT-NOW telephone hotline for follow-up counselling, proactive telephone outreach from the VA was not yet implemented which is problematic as post-discharge cessation telephone support has been shown to improve quit rates (Chouinard & Robichaud-Ekstrand 2005, Davies *et al.* 2005, Stansby & McCaslin 2006, Gies *et al.* 2008, Duffy *et al.* 2010a, Siru *et al.* 2010).

## Relevance to clinical practice

In July 2011, the Joint Commission released new standards for inpatient smoking, which include screening for tobacco use, provision of treatment during the hospital stay, provision of treatment at discharge and one month postdischarge follow-up; the nurse-delivered Tobacco Tactics intervention meets these standards. Using the RE-AIM implementation framework, this implementation study showed that the Tobacco Tactics intervention can be easily transported to other hospitals. Evaluation of the Reach of the programme showed that smokers reported greater receipt of services and were more satisfied with services postintervention. Evaluation of the Effectiveness of the programme showed that quit rates improved, and for those smoking, the number of cigarettes decreased in the postintervention group. In terms of the Adoption, Implementation and Maintenance of the Tobacco Tactics programme, nurses were satisfied with the training, showed improved confidence after the training, increased their delivery of cessation services after the training and continued to provide cessation services. Hence, the Tobacco Tactics intervention has the potential to be widely disseminated and is currently being tested in a large NIH-funded study outside of the VA system. Wide-scale dissemination of the nurse-delivered Tobacco Tactics intervention has the potential to reduce smoking-related morbidity and mortality.

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## Contributions

Study design: LV, SD, KR; data collection and analysis: LV, LE, KR and manuscript preparation: LV, SD, LE, KR, CZ.

## Conflict of interest

No conflicts of interest to declare.

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## Appendix 1

## Appendix 2

### Smoking cessation behavioural management protocol

### Smoking cessation pharmaceutical management protocol

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Assess if patient interested in quitting  
 If patient not interested, leave brochure at bedside  
 If patient interested, leave brochure and arrange for patient to view video  
 After video, provide patient with patient manual to read if able  
 Using patient manual, assist patient with behavioural intervention including  
     Self assessment  
     Smoker type  
     Smoking costs  
     Handling cravings  
     Relapse prevention  
     Medication options  
 Along with patient, identify and arrange for cessation medications (see pharmaceutical protocol)  
 Arrange for follow-up calls

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Recommend nicotine replacement (patch, gum or lozenge) if  
     Never used patch, gum or lozenge before  
     Used patch, gum or lozenge successfully in the past (smoke-free greater than three months)  
 Recommend nicotine replacement (patch AND gum OR lozenge) if  
     Smoke greater than one pack per day  
     Failed nicotine replacement therapy in past  
 Recommend referral to appropriate service (i.e. pulmonary, psychiatry and/or pharmacy/addiction therapy clinic) for a thorough evaluation if  
     Failed nicotine replacement therapy in the past (smoke-free less than three months)  
     Failed nicotine replacement and bupropion monotherapy in the past  
     Patch, gum or lozenge intolerant (i.e. rash, etc.)  
     History of depression or currently has depressive symptoms  
     Intolerance or treatment failure to nicotine replacement and bupropion

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