The Impact of Smoking-Cessation Intervention by Multiple Health Professionals

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Background: Smokers have contact with many different types of health professionals. The impact of tobacco intervention by multiple types of heath professionals is not known.

Methods and Materials: As part of the 2003 Minnesota Adult Tobacco Survey, smokers (n=1723) reported on tobacco treatment by medical doctors, nurses, dentists, pharmacists, or other health professionals. This analysis examined: (1) smokers' report of tobacco intervention by different types of healthcare providers, (2) the proportion of smokers who report intervention by multiple provider types, and (3) the relationship between smokers' report of intervention by multiple provider types and readiness to quit, quit attempts, and recent quitting.

Results: Among past-year smokers, 65% had visits with two or more types of health professionals. Among smokers who visited health professionals (n=1523), only 34% reported being asked about smoking by two or more types of professionals. Among current smokers (n=1324), advice or assistance from more than one type of professional was uncommon (26% and 7%, respectively). Being asked about smoking by two or more types of professionals substantially increased the odds of recent quitting (OR=2.37; 95% CI=1.15–4.88). Among current smokers, being advised to quit by two or more types of professionals increased the odds of having made a quit attempt in the past year (OR=2.92; 95% CI=1.56–5.45) or intending to quit in the next 6 months (OR=2.17; 95% CI=1.10–4.29).

Conclusions: Smoking-cessation interventions by more than one type of health professional have the potential to substantially increase quitting and readiness to quit in the population.
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Introduction

Most smokers have contact with many different parts of the healthcare system, including hospitals,[1–3] medical clinics,[4–6] dental offices,[6,7] and pharmacies.[8,9] Smoking-cessation treatments are effective when provided by physicians as well as nonphysician clinicians (e.g., nurses, dentists, pharmacists)[10–15] with a trend toward greater efficacy for interventions that involve two or more types of health professionals (e.g., doctor and nurse versus doctor only).[10–16] At present, there is little information regarding how often smokers discuss cigarette use or receive advice to quit or assistance in quitting from more than one type of health professional. Prior studies have reported suboptimal rates of intervention by different types of professionals (e.g., physicians,[6,17] nurses,[18] dentists,[6,7,19–21] and pharmacists[9,22]). However, it is unclear how these practice patterns influence the experience of an individual smoker who may visit many different types of health professionals over time. It is also unclear how cessation interventions by more than one type of health professional in actual practice might influence an individual's cigarette use.

The 2003 Minnesota Adult Tobacco Survey (MATS), a population-based survey of adults in Minnesota, provides an opportunity to address these unanswered questions. The MATS collected information from smokers on the provision of cessation treatments separately for several different types of health professionals (e.g., doctors, nurses, dentists, pharmacists, and others). The purposes of this paper are: (1) to describe smokers' reported receipt of smoking-cessation intervention from different types of health professionals; (2) to determine the proportion of smokers who report intervention from two or more types of health professionals; and (3) to determine how intervention by two or more types of health professionals influences readiness to quit, quit attempts, and recent quitting. Results of this analysis will provide a clearer understanding of how activation of multiple parts of the

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healthcare system might influence smoking cessation in the population.

Methods

The MATS was a telephone survey administered from November 2002 to June 2003 to estimate smoking behavior and attitudes in a representative sample of Minnesota adults and for a representative sample of adult members of the Blue Cross and Blue Shield of Minnesota (Blue Cross) health plan. Blue Cross is the largest health plan in Minnesota, insuring approximately 24% of the state's adult population.

The MATS employed a complex survey design. The sample included a statewide random-digit-dial (RDD) sample and an enrollee list of Blue Cross members. Survey questions were derived from the Centers for Disease Control and Prevention (CDC)'s Adult Tobacco Survey and other large population surveys (i.e., California Tobacco Surveys).[23] The survey response rate was 56.5%.[24] After completion of all interviews, the data from subsamples were merged in order to create the final sample file (RDD n=5527, Blue Cross n=3294, total=8821). Post-stratification weights were applied to adjust sample estimates to match independent estimates of the statewide adult population by age, gender, and geographic region. The survey's design and confidentiality procedures were approved by Institutional Review Boards at the University of Minnesota and the Minnesota Department of Health.

To determine smoking status, survey respondents who reported they had ever smoked 100 or more cigarettes in their lifetime were asked if they were currently smoking "every day," "some days," or "not at all." Current smokers were defined as individuals who reported smoking "every day" or "some days." Ex-smokers were defined as individuals who reported they had ever smoked 100 cigarettes but were not smoking at the time of the survey.[5] Recent ex-smokers were defined as ex-smokers who stopped smoking within the past 12 months.[6]

Survey respondents were asked to identify which types of heath professionals (categories: medical doctor, dentist, nurse or nurse practitioner, pharmacist, another type of healthcare provider) they had seen for their own health in the past year. Current and recent ex-smokers who reported visiting a healthcare provider were asked, "In the past 12 months, did any doctor, nurse, or other health professional ask if you smoke?" and to identify the type of professional that asked them this question. Questions regarding advice to quit and assistance in quitting were asked only of current smokers. Current smokers were asked "In the past 12 months, did any doctor, nurse, or other health professional advise you to stop smoking?" and asked to identify the type of professional that provided this advice. To determine offers of assistance with quitting, current smokers were asked if any health professional had in the past 12 months: (1) recommended or prescribed medications to help them stop smoking (i.e., nicotine patch, nicotine gum, nicotine nasal spray, nicotine inhaler, or pills such as "Zyban, Wellbutrin, or bupropion"); (2) suggested setting a specific date on which to stop smoking; (3) suggested the individual use a smoking-cessation class or program, telephone quit line, or counseling; or (4) offered to schedule a return visit or phone call to help them quit. If the individual reported receiving any of these forms of assistance, they were then asked to identify the type of health professional that offered the assistance.

To examine the relationship between health professional intervention and smokers' cessation behavior, cessation behavior was characterized in terms of the proportion of smokers who quit in the year prior to the survey,[6] the proportion of smokers who attempted to quit, and readiness to quit among current smokers. In terms of readiness to quit, current smokers were defined as being in precontemplation (not intending to quit in the next 6 months), contemplation (intending to quit in the next 6 months but not in the next 30 days), or preparation (intending to quit in the next 30 days and having made a quit attempt in the past 12 months).[25]

Analysis

All analyses were performed in 2005–2006 using the STATA 9.0 statistical software package using sampling weights to account for the complex survey design. This analysis collapsed the number of professional types who asked about smoking, gave advice to quit, or offered assistance in quitting into three categories (none, one type of professional, two or more professional types).

Four logistic regression models were constructed to examine the effects of provider intervention. The first model (Model 1) included current and recent ex-smokers and examined the association between the number of professional types asking about smoking and the odds that a smoker quit in the past year (i.e., that they became a recent ex-smoker). Health professional advice and assistance were not included in this model because these questions were not asked of ex-smokers. Models 2–4 focused on current smokers and examined the effects of health professional intervention on the odds that a smoker had made an attempt to quit in the past year (Model 2) or was in precontemplation (Model 3) or preparation (Model 4) at the time of the survey. All models included age, gender, ethnicity, level of education, health status, and the number of provider types seen in the past year as covariates. Models 2–4 that focused on current smokers also included the number of health professionals offering advice and assistance in the past year as well as the number of cigarettes smoked per day and time to first morning cigarette as additional covariates.

Results

The overall prevalence of smoking among adults in Minnesota in 2003 was 18.0%. The demographic and smoking-related characteristics of individuals who smoked in the past year (i.e., current and recent ex-smokers) are shown in Table 1. Nearly 60% of smokers made a quit attempt in the past year. Nine percent of respondents who had smoked in the past year reported they were not smoking at all at the time of the survey (i.e., were recent ex-smokers).

Table 1. Characteristics of past-year cigarette smokers

	N (raw)	% weighted	95% CI
Current and recent ex-smokers	N=1723	100%	
Age (years)			
18–24	342	21.9	19.1–25.0
25–44	685	41.2	37.1–45.3
45–64	574	30.9	27.4–34.7
65 or older	122	6.0	4.8–7.4
Gender			
Male	785	55.7	51.7–59.6
Female	938	44.3	40.4–48.2
Education			
Less than high school	144	7.8	6.3–9.7
High school	619	36.5	32.0–40.4
Some college	667	36.0	32.2–40.0
College graduate	288	19.7	16.8–23.0
Ethnicity			
Non-white	139	10.7	8.1–14.1
White	1584	89.3	85.9–91.9
Health status			
Excellent	253	14.1	11.7–17.6
Very good	664	39.1	35.3–43.0
Good	570	33.4	29.7–37.4
Fair	178	10.6	8.3–13.3
Poor	52	2.5	0.2–3.5
Quit attempt in past year			
Yes	1040	59.8	55.7–63.7
Current smoking			
Every day, some days	1544	91.3	89.4–92.8
Not at all	179	8.7	7.2–10.5
Among current smokers	N=1544	100%	
Average cigarette use			
<1/2 pack	698	46.6	42.3–50.9
½ pack-<1 pack	237	14.6	12.3–17.4
1 pack	398	26.5	22.7–30.7
>1 pack	178	12.3	9.7–15.6
Time to first AM cigarette			
5 minutes or less	263	18.5	15.1–22.4
6–30 minutes	443	27.4	24.0–31.1
31–60 minutes	259	18.9	15.2–23.3
>60 minutes	561	35.2	31.4–39.2
Readiness to quit			
Precontemplation	446	36.0	31.7–40.5
Contemplation	549	38.8	34.6–43.2
Preparation	336	25.2	21.3–29.6

Smokers' reports of visits to and intervention by different types of health professionals are shown in Table 2. Reported rates of intervention by nonphysician health professionals were all much lower than physician rates. There was a particularly sharp decline in the rates of advice to quit and offers of assistance in quitting. For example, physicians were approximately twice as likely as dentists to ask about smoking (83% vs 39%) but nearly ten times as likely to offer assistance in quitting (32% vs 3.4%).

Among current and recent ex-smokers (n=1723), nearly two thirds (65.5%) reported visits with two or more types of healthcare providers and nearly one quarter (24.4%) reported visits with four or more types

Table 2. Smoking cessation intervention by different types of health professionals

	Medical doctor		Nurse/nurse practitioner		Dentist		Pharmacist		Other	
All smokers	**N[a] 1713**	**%[b] (95% CI)**	**N[a] 1713**	**%[b] (95% CI)**	**N[a] 1713**	**%[b] (95% CI)**	**N[a] 1713**	**%[b] (95% CI)**	**N[a] 1713**	**%[b] (95% CI)**
% visit	1258	65.6 (61.2–69.7)	671	34.7 (31.3–38.2)	949	55.7 (51.8–59.6)	934	48.7 (44.7–52.6)	482	25.7 (22.5–29.2)
Smokers with visits	**N[a] 1258**	**%[b] (95% CI)**	**N[a] 671**	**%[b] (95% CI)**	**N[a] 949**	**%[b] (95% CI)**	**N[a] 934**	**%[b] (95% CI)**	**N[a] 482**	**%[b] (95% CI)**
% asked	1006	82.9 (80.0–85.5)	421	64.6 (59.3–69.5)	344	38.5 (33.5–43.8)	92	10.7 (7.8–14.6)	201	44.9 (37.6–52.3)
% advised	688	58.9 (54.9–62.8)	241	39.8 (34.4–45.4)	186	19.6 (15.7–24.1)	61	7.5 (4.8–11.3)	122	29.0 (22.7–36.3)
% assisted	369	31.9 (27.9–36.2)	88	14.9 (11.2–19.7)	32	3.4 (2.2–5.4)	11	0.8 (0.4–1.7)	21	5.1 (2.9–8.6)

[a]Raw N.
[b]Weighted %.

Table 3. Effects of health professional intervention on recent quitting, quit attempts, and readiness to quit

	Current smokers only							
	Model 1		Model 2		Model 3		Model 4	
	Quit in past year		Quit attempt		Intent to quit next 6 months		Plan to quit next 30 days	
	(*n*=1703)		(*n*=1471)		(*n*=1294)		(*n*=1294)	
Types of professionals	OR[a]	95% CI	OR[b]	95% CI	OR[b]	95% CI	OR[b]	95% CI
Ask								
0	Ref.		Ref.		Ref.		Ref.	
1	1.56	0.87–2.80	1.25	0.77–2.02	1.03	0.62–1.72	1.58	0.86–2.88
2+	**2.37**	**1.15–4.88**	1.36	0.74–2.48	1.48	0.76–2.87	1.82	0.83–4.01
Advise								
0	—	—	Ref.		Ref.		Ref.	
1	—	—	1.54	0.96–2.48	1.21	0.72–2.04	1.06	0.61–1.84
2+	—	—	**2.92**	**1.56–5.45**	**2.17**	**1.10–4.29**	1.91	0.84–4.32
Assist								
0	—	—	Ref.		Ref.		Ref.	
1	—	—	1.15	0.74–1.79	1.58	0.93–2.68	1.58	0.91–2.74
2+	—	—	0.88	0.43–1.81	1.25	0.56–2.81	0.87	0.39–1.94

[a]Adjusted for number of types of health professionals seen in the last year, gender, ethnicity, education, and health status.
[b]Adjusted for number of types of health professionals seen in the last year, gender, ethnicity, education, health status, time to first morning cigarette, and cigarettes smoked per day.

of healthcare providers. Health professional intervention was much less frequent. Of current and recent ex-smokers who reported visiting health professionals in the past year (*n*=1523), only 34.3% reported that they were asked about smoking by more than one type of health professionals. Among current smokers who reported visiting health professionals (*n*=1354), advice or assistance from more than one type of heath professional was uncommon (25.7% and 7%, respectively). In fact, a substantial proportion reported that no health professional advised them to quit (37.2%) and a majority reported no offers of assistance in quitting from any health professional (68.1%).

The effects of health professional intervention on recent quitting, quit attempts, and readiness to quit are shown in Table 3. Model 1 shows that having only one type of professional ask about smoking in the past year was not associated with a significant increase in the odds of recent quitting. In contrast, having two or more types of health professionals ask about smoking was associated with a substantial increase in the odds of recent quitting (OR= 2.37; 95% CI=1.15–4.88). Models 2–4 demonstrate that current smokers who report having had two or more types of health professionals provide advice to quit are more likely to have tried to quit in the past year (OR=2.92; 95% CI=1.56–5.45) and are more likely to be considering quitting in the next 6 months (OR=2.17; 95% CI=1.10–4.29). There was no association between health professional intervention and smoker's reported intention to quit in the next 30 days.

Discussion

This study found that smokers who were asked about cigarette use by two or more types of health professionals had more than twice the odds of having stopped smoking in the prior year. Among current smokers, having received advice to quit from two or more types of health professionals was associated with an increase in quit attempts and readiness to quit in the next 6 months. These findings support conclusions of the national guidelines regarding the effectiveness of brief provider interventions, the effectiveness of physicians and nonphysician clinicians in providing smoking-cessation treatment, and the greater effectiveness of interventions that involve more than one type of clinician.[10]

This study did not find an increase in quit attempts or readiness to quit associated with offers of assistance from healthcare providers. The low proportion of smokers (7%) who reported offers of assistance from more than one type of health professional likely limited analysis of this association. This study also did not find any significant increases in quitting, quit attempts, or readiness to quit among smokers who reported intervention by only one type of health professional. The confidence intervals for estimates related to intervention by just one type of health professional overlaps estimates from recent studies that focused on specific professions (i.e., nurses, medical doctors)[6,11,12] and do not exclude potentially meaningful benefits. Still, the greater effects associated with intervention by two or more professions highlights the importance of activat-

ing multiple parts of the healthcare system to increase cessation rates in the population.

The differences in smoking-cessation practice patterns for different types of health professionals reported here are similar to those observed previously.[6,17,18,21,26,27] Low rates of intervention by nonphysician clinicians suggest that increased support for a range of health professionals may be a particularly promising strategy for increasing the total dose of smoking-cessation treatments provided by the healthcare system as a whole. It is encouraging to note that the magnitude of the effect of smoking-cessation intervention by more than one type of health professional is comparable to that observed for other important tobacco-control policies. The increased odds of being a recent ex-smoker associated with more than one type of professional asking about cigarette use (OR=2.37) is comparable to increased cessation rates associated with home (OR=1.65) or workplace bans (OR=1.21)[28] or to exposure to antitobacco media campaigns (OR=1.45).[29] The observed increase in intention to quit in the next 6 months associated with receiving advice to quit from more than one type of health professional suggests that routine intervention by all health professionals has the potential to bring about a major shift in the readiness to quit in the population.[30]

Improving performance in delivery of smoking-cessation interventions across a range of health professionals will be a challenge. The literature identifies many common perceived barriers across the professions, including competing demands and time pressure during patient contacts, lack of familiarity with effective treatments, provider perceptions of low receptivity to tobacco intervention, and the absence of adequate reimbursement for providing treatment.[6,18,31–34] Simply providing additional training for health professionals is unlikely to overcome these barriers.[35] Prior reviews that identify the importance of creating a demand for important preventive treatments,[36] restructuring the healthcare financing and delivery systems to support vital services,[37] and using multicomponent interventions (i.e., education, feedback, systems changes) to improve clinician performance[38] provide an important foundation for plans to bring about these changes. The chronic care model promoted by Wagner and others could certainly be applied to improve delivery of smoking-cessation interventions across the health professions.[39] Establishing clinical systems to help connect smokers to more intensive evidence-based treatments (i.e., referral for additional in-person counseling or phone counseling) during their visits to medical clinics, dental offices, and pharmacies could strengthen the effect of brief clinician interventions in actual practice.[34]

Several additional factors need to be considered in interpreting the findings of this study. First, the response rate to this survey (56.5%) was modest. Because this was a phone survey combining a statewide and health plan population sample, smokers without a stable residence, phone number, or without health insurance would be less likely to have been reached. Additional work is needed to examine access to and delivery of tobacco treatments to underserved populations. It is also important to acknowledge that this was an observational study based on a single cross-sectional survey and thus it is not possible to make definitive statements regarding causality. Confounding factors could have contributed to the observed associations between health professional intervention and quitting behavior. For example, physicians are more likely to intervene with sicker smokers and at the same time medical illness provides strong motivation for individuals to quit. Smokers who recently quit also may be more likely to recall and report interventions by health professionals. While an attempt was made to control for possible confounders, such as the number of types of health professionals visited in the past year, self–reported health status, tobacco-use characteristics (e.g., cigarettes smoked per day, time to first morning cigarette),[40–44] and demographic characteristics (e.g., gender, education), longitudinal or experimental studies are needed to more definitively address the issue of causation. Due to the cross-sectional nature of the MATS survey, detailed information regarding the timing of events (healthcare provider visits and interventions, quit attempts, quitting) was not available. For examination of recent quitting (i.e., Model 1), it cannot be ascertained whether healthcare-provider discussions of smoking occurred before or after the individual stopped smoking. The lack of detailed information on the timing of health professional intervention also may account for the absence of an observed association between health professional intervention and intention to quit in the next 30 days. More immediate readiness to quit may be related to health professional intervention at more recent visits. The MATS instrument allows only for an overall description of health professional interventions that occurred at any time in the past year. The MATS survey also did not collect information on receipt of advice to quit or offers of assistance in quitting for ex-smokers. Health professional advice to quit or offers of assistance in quitting may have been significant predictors had these measures been available. Finally, the MATS instrument did not provide information on the total number of visits within a given profession (e.g. two vs five doctor visits) or the proportion of health professional visits at which tobacco was addressed (i.e., smoking addressed at 90% of visits vs 20% of visits). The frequency and timing of health professional intervention may be an important feature to consider in future studies.[45]

Despite these limitations, this study identifies potentially important changes in quitting behavior and intention to quit among smokers who received interventions

from more than one type of health professional. Clearly, tobacco use and tobacco-related diseases are a challenge to all professionals involved in providing health care. Encouraging all health professionals to routinely ask about tobacco use, give advice to quit, and offer assistance in quitting has the potential to substantially increase quitting and readiness to quit in the population of smokers. Reducing the burden of tobacco-related disease will take concerted effort and change across a range of health professionals in all parts of the healthcare system.

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