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BRIEF REPORT

Effectiveness of a Clinic-Based Strategy for Implementing the AHRQ Smoking Cessation Guideline in Primary Care[1,2]

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Background. **The Agency for Healthcare Research and Quality Smoking Cessation Practice Guideline recommends systematic assessment of smoking status and counseling of smokers at every visit, but the actual effectiveness of the guideline in primary care practice is unknown.**

Methods. **We conducted a nonrandomized, controlled before–after trial of a guideline-derived intervention that includes routine identification and brief counseling of smokers by nurses and medical assistants, coupled with free nicotine replacement therapy (NRT) and telephone counseling of those smokers who are willing to make a quit attempt, and feedback on performance of guideline-recommended activities. The intervention was pilot tested at 1 family practice (FP) clinic over a 2-month period; patterns of usual care were observed concurrently at four control FP clinics. We obtained exit interviews of 651 consecutive adult smokers who presented for routine, nonemergency care. Abstinence (7-day point prevalence) was determined by telephone interview during 6-month follow-up.**

Results. **Concordance with guidelines was significantly greater for all recommended actions at the test site during the intervention versus baseline ($P \leq 0.05$). Significantly more intervention versus baseline patients at the test site reported abstinence at 2-month follow-up (21 vs. 4%, $P = 0.0004$), and more patients tended to be abstinent at 6-month follow-up (21 vs. 11%, $P = 0.08$). No significant differences in 2- or 6-month quit rates between intervention and baseline patients were observed at the control sites.**

Conclusions. **Implementation of a guideline-driven smoking cessation intervention that focuses primarily on smokers who are interested in making a quit attempt is associated with increased abstinence in primary care practice.**

Key Words: **smoking cessation; tobacco use disorder; guidelines; evidence-based medicine.**

BACKGROUND

Based on an extensive literature review and rigorous meta-analyses of various smoking cessation interventions, the Agency for Healthcare Research and Quality (AHRQ) Smoking Cessation Practice Guideline recommends the systematic assessment of smoking status and counseling of smokers at every visit [*1*]. National data, however, suggest that most smokers are not advised and assisted with cessation in a given visit with a clinician [*2–4*]. In one recent study, 60% of general practitioners felt that discussing smoking cessation with all presenting smokers was not an appropriate use of time [*5*].

While many of the specific intervention components recommended in the AHRQ Smoking Cessation Guide-

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line have been demonstrated to be efficacious in randomized controlled trials, there is little experimental evidence on the actual effectiveness of the guideline in primary care practice. Thus, the aim of this controlled trial is to determine the effectiveness of a comprehensive intervention that emphasizes the involvement of intake clinicians, including medical assistants and nurses, on smoking cessation rates and incorporates system changes recommended by the original 1996 guideline and the recently updated version.

METHODS

Study Design

We conducted a controlled, before–after trial of the AHRQ Smoking Cessation Guideline intervention versus usual care [*6*]. The purpose of the current trial was to pilot test the guideline intervention at a single clinic prior to the start of a randomized trial of the AHRQ guideline involving eight clinics. During the study period of the current trial, there were four "usual care" sites and one test site. In both arms of the trial, patients were enrolled across two study periods: (a) baseline period (August 1999 to January 2000) and (b) intervention period (February to March 2000). All patients were followed prospectively for 6 months. We contrast the change in performance of guideline-recommended actions and smoking cessation rates during the baseline and intervention periods at the test site to that observed for patients enrolled at the four usual care sites. As a variety of statewide initiatives pertaining to tobacco control were in the process of being implemented during the study period, a control arm was essential to account for the presence of secular trends in smoking cessation during the study period.

Study Sites

We worked with local and regional clinic organizations and the Wisconsin Research Network [*7*] to identify potentially eligible community-based clinics for this study. Eligible clinics met the following criteria: (a) at least five full-time physicians or mid-level clinicians (physician assistant or nurse practitioner), (b) assignment of intake clinicians to specific physicians or mid-level clinicians (with minimal crossover), (c) absence of an on-site, nurse-based smoking cessation program during the study period, (d) no recent participation in a smoking cessation trial or prevention trial which addressed smoking cessation (within 2 years prior to the start date of the trial), (e) absence of residency training program, and (f) location within a 60-mi radius of Madison, Wisconsin.

Of the 12 eligible clinics that agreed to an initial meeting and presentation, 9 of 12 agreed to participate. At one of the 9 sites, major clinic reorganization was planned during the latter half of the main trial; this site agreed to serve as a pilot site to pretest the study intervention. We also obtained the cooperation of local health plans to refrain from disseminating other smoking cessation programs at participating clinics during the study period.

Intake Clinicians

Sixty-six percent of the intake clinicians at the test site were registered nurses (RNs) or licensed practical nurses (LPNs), whereas 34% were medical assistants (MAs). Of the intake clinicians at the control sites, 69% were RNs or LPNs and 31% were MAs.

Patient Inclusion Criteria

We enrolled consecutive adult patients who (a) smoked at least one cigarette daily (on average), (b) were at least 18 years old, (c) had an appointment with a physician or mid-level clinician for routine, nonemergency care, and (d) were willing to complete a brief exit interview. We included patients who were willing to be contacted by telephone in the longitudinal portion of this study.

Clinic Intervention

We worked with a designated physician and nursing facilitator at the test site to implement the guideline intervention. The medical facilitator was also invited to the tutorial session to emphasize its importance. Based on social marketing principles [*8*], the intervention was designed to be easy for clinic staff to implement and responsive to the needs of patients (as well as convenient). It included the following specific components (Table 1):

Tutorial. Over a 1-h session, intake clinicians were trained in the use of a guideline algorithm to stratify patients according to their readiness to make a quit attempt (Fig. 1) [*1*,*9*]. Clinicians were instructed to provide a brief cessation message to all smokers at every visit and were trained by using role-play to demonstrate counseling techniques for hypothetical patients at varying stages of readiness to change [*10*]. Because of the need to keep the intervention brief, we designed the brief counseling to be conducted within a 2- to 3-min intake encounter [*11*].

Real-time reminder. A modified vital signs stamp was applied to the progress notes for adult patients seen during the intervention period and was designed to remind the intake clinician to ask those questions required for stratification of smokers and to offer each smoker stage-specific cessation advice (Fig. 2).

Pharmacotherapy and self-help material. Those patients who were willing to set a quit date within 30 days of the clinic visit were also offered an 8-week supply of transdermal nicotine patches (Nicoderm CQ)

TABLE 1

Implementation of Recommended Smoking Cessation Actions by Clinic Support Staff and Research Personnel

Clinic support staff	Research team
1. Ask and document smoking status at every nonemergency visit	Provide vital signs stamps for all charts of adults
2. Offer brief counseling message for all smokers[a]	Be available to smokers for additional telephone counseling as needed
3. Identify patients willing to quit on vital signs stamp	
4. Offer additional support for patients who are willing to quit:	
(a) Assist patients in setting a quit date	Call all patients with set plans to quit just prior to and 1 week after quit date
(b) Provide voucher for free transdermal nicotine	Provide free transdermal nicotine and advise on its appropriate use at end of clinic visit
(c) Provide supplementary material[b]	Ensure that adequate supplementary materials are available and readily accessible

[a] For example: "As your nurse, I need you to know that the best thing you can do for your health is to stop smoking, and I would advise you to stop as soon as possible. I know it can be hard and many patients try several times before they can finally make it."
[b] Includes smoking cessation pamphlet and business card of the telephone counselor.

and proactive telephone counseling by a trained cessation counselor (who was also available by toll-free number for questions or concerns related to quitting smoking). Only those patients who smoked ≥10 cigarettes per day (on average) were provided with transdermal nicotine [*1*]. Each intake clinician was provided with a supply of patient self-help material (AHRQ pamphlet entitled "You can quit smoking") for distribution to patients who expressed an interest in quitting smoking.

Telephone counseling. Contact information for all patients who were determined to be eligible for telephone counseling was recorded by intake clinicians and was faxed daily to the coordinating center, where the cessation counselor telephoned the patient just prior to and approximately 1 week after the scheduled quit date. The timing of telephone contacts was based on the observation that the risk of relapse in smoking cessation is greatest within the 1–2 weeks after quitting [*12,13*]. The effectiveness of telephone counseling has been demonstrated in previous investigations [*14,15*].

During the initial session, which typically lasted 20–30 min, the following items were discussed: (a) the patient's smoking history, prior quit attempts, and reasons for quitting; (b) preparations for quitting; (c) coping with nicotine withdrawal symptoms; and (d) problem-solving skills (e.g., dealing with urges to

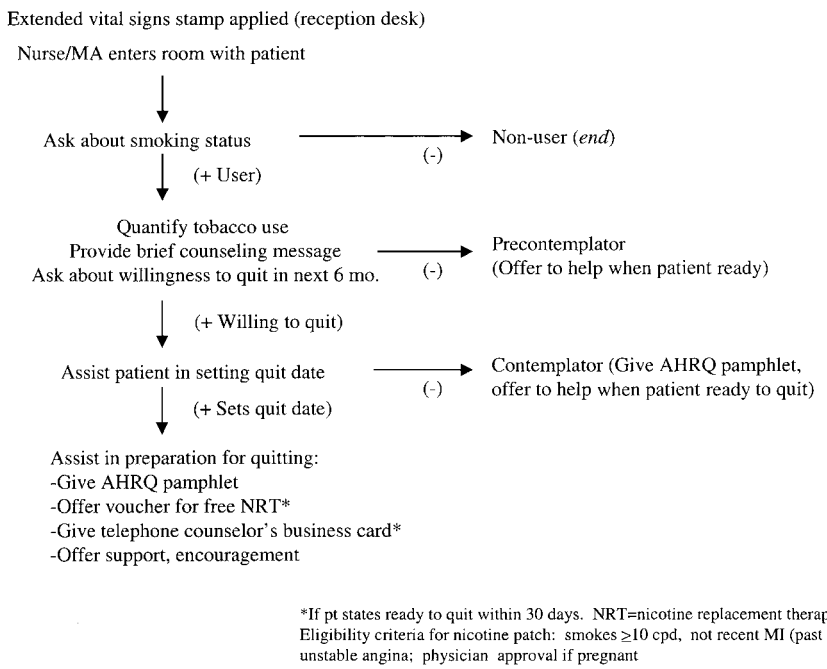

FIG. 1. Guideline algorithm for smoking cessation brief assessment and counseling.

VITAL SIGNS

BP: _____ Pulse:_____ Respiratory rate: ____ Temp: _____ Weight: _____

Tobacco Use (*circle one*): Current Former Never		
How many cigarettes per day do you smoke on average?	_____	
Have you used chewing tobacco or snuff over the past week?*	Yes	No
Are you interested in quitting in the next 6 months?	Yes	No
If yes, are you willing to make a quit attempt at this time?	Yes	No
If yes, are you willing to commit to a quit date? (specify _____)	Yes	No
Nurses and MAs: Was a nicotine patch voucher given to the patient?	Yes	No

*Because a secondary aim of this trial was to determine whether implementation of the AHRQ guideline leads to improved management of spit tobacco users, the modified vital signs stamp also included this item.

FIG. 2. Modified vital signs stamp.

smoke and high-risk situations) [*16*]. During the follow-up session, which typically lasted 10–15 min, the following items were reviewed: (a) events over the preceding week pertinent to cessation, including any "slips" that may have occurred; (b) any adverse effects possibly related to transdermal nicotine; and (c) specific concerns raised by the patient (e.g., weight gain, mood disturbance).

Feedback to intake clinicians. Baseline and interim data on the performance of guideline-recommended activities by clinic staff at the test site were presented. In addition to group feedback, we provided confidential individual feedback on performance for each intake clinician.

Usual Care

Staff at usual care sites were provided with general information about the AHRQ guideline evaluation trial but did not receive any specific training or additional resources for implementing the guideline. Identification and brief counseling of smokers was performed at the discretion of the clinic staff.

Data Collection Procedures

Exit interviews. Study personnel performed exit interviews of all consecutive patients who met with a physician (or mid-level clinician) to determine the impact of the intervention on performance of guideline-recommended activities. Eligible patients were asked questions regarding smoking and cessation counseling; at the conclusion of the exit interview, identified smokers were notified that they would be asked about their smoking habit during the follow-up phase of the study.

Self-reported smoking behavior at follow-up. After the initial exit interview, study personnel who were not involved in telephone counseling interviewed patients by telephone to ascertain current smoking status and quit attempts at 2 and 6 months following enrollment. In addition, we asked patients who reported abstinence to indicate the date of the last cigarette smoked and any quit attempts they had made since the previous contact. Utilizing an algorithm for telephone follow-up similar to that used in the Doctors Helping Smokers trial [*17*], repeated attempts were made until successful contact had been established. Patients who were not successfully contacted by telephone had a follow-up survey (with self-addressed stamped envelope) sent to their home. If these measures failed, the patient was considered lost to follow-up.

We asked patients at 2 and 6 months following enrollment about their smoking over 7 days prior to the interview (point prevalence). The advantages of a point prevalence measure of short duration are its increased sensitivity to early effects of an intervention and its recognition of the dynamic process of quitting (i.e., multiple relapses may occur before an eventual quit); a disadvantage of this measure is that some patients who are counted as former tobacco users at one point in time will be current tobacco users at the next point in time [*18*]. Estimates of self-reported abstinence are conservative, as we assumed that all patients who could not be reached at follow-up were smokers.

Data management. All exit interview and telephone follow-up data were checked for missing, incomplete, or illogical entries and were entered into a Microsoft Access database. Errors were checked against the original case report forms and were corrected in the database.

Institutional approval. This project was approved by the University of Wisconsin Institutional Research Board.

Statistical Analysis

The primary outcomes of this study are the performance of recommended smoking cessation activities and self-reported quit rates. Continuous abstinence was defined based on self-report of abstinence at 2 and 6 months, plus no evidence of smoking between 2 and 6 months. Patients at the test site who were initially interviewed during the baseline period and were later reinterviewed at the time of a subsequent clinic visit during the intervention period were handled as inter-

TABLE 2

Recruitment and Follow-Up of Patients in the Baseline and Intervention Periods[a]

	Pilot intervention site		Control sites	
	Baseline period	Intervention period	Baseline period	Intervention period
No. of patients screened	859	666	1402	346
Smokers who completed exit interview, *n* (% of those screened)	150 (17)	132 (20)	302 (22)	67 (19)
Smokers who agreed to follow-up, *n* (% of exit interviewees)	139 (93)	130 (98)	291 (96)	64 (96)
Number who completed 2-month follow-up (%)	110 (90)[b]	123 (95)	255 (88)	61 (95)
Number who completed 6-month follow-up (%)	107 (91)[b]	120 (92)	256 (88)	57 (89)

[a] The study intervention was designed to last 6–8 weeks and required continuous staffing by a research interviewer; a second research interviewer rotated through the four usual care sites during the intervention period. The shorter duration of the intervention period and staffing constraints led to fewer patients being enrolled at usual care sites during this period (compared to the number enrolled during the baseline period).

[b] Based on denominator of 122 smokers who had not crossed over from the baseline to the intervention cohort (see text).

vention patients (data obtained for these 17 patients during the baseline period were dropped from the analysis). Differences in the distribution of patient characteristics between the baseline and intervention samples were tested using the Pearson χ^2 test for categorical variables and Student's *t* test for continuous variables; the Wilcoxon rank sum test was used for variables with highly skewed distributions.

By using logistic regression modeling, we also report the effect of the intervention on smoking cessation rates as an odds ratio (with the corresponding 95% confidence interval), after adjustment for several demographic and clinical variables that have been associated with smoking cessation in the medical literature (age, gender, education, daily cigarette consumption, self-rated health, alcohol use, presence of another smoker in the household, and prior advice to stop smoking in the past year). As cessation rates for individual patients are naturally grouped under individual intake clinicians, we constructed hierarchical logistic regression models to account for the nested structure of the data (see Appendix) [*19*]. For this analysis, we used MLwiN software [*20*].

RESULTS

A summary of recruitment and subsequent follow-up of enrolled patients is shown in Table 2. Exit interviewees who refused follow-up ($n = 27$) were less likely to have a plan to quit smoking in the next six months (22 vs. 53%) and were less likely to have consumed alcohol in the prior 3 months (48 vs. 69%). Of those patients who completed the exit interview and agreed to participate in follow-up, 91 and 92% of patients at the test site completed follow-up at 6 months during the baseline and intervention periods, respectively; follow-up was similar in the control arm (88 and 89%, respectively). The remaining patients were either lost to follow-up or withdrew participation during the follow-up period. Comparison of baseline and intervention smokers demonstrated no statistically significant differences, with the exception that more control patients had used alcohol within the prior 3 months during the intervention versus baseline periods (Table 3).

The proportion of patients at the test site who received guideline-recommended actions during the baseline and intervention periods is shown in Table 4. Significant increases in performance across all guideline-recommended actions were observed. With regard to identification of smokers, clinic staff were performing at a very high level at baseline, as smoking status was already being assessed routinely in a high proportion of office visits. The observed increase in performance of guideline-recommended actions was specifically attributable to the enhanced involvement of intake clinicians in tobacco use screening and brief counseling. Significant increases in performance between baseline and intervention periods were also noted at control sites for the following actions: (a) asking about willingness to quit, (b) advising patients to stop smoking, and (c) discussing pharmacotherapy (Table 4); these increases were smaller in magnitude than those observed at the test site.

The gains in performance of guideline-recommended actions at the test site translated into improved smoking cessation outcomes over the short term. At the test site, 14% more patients enrolled during the intervention period reported having made a quit attempt during 6-month follow-up, compared to those enrolled during the baseline period (60 vs. 46%, adjusted OR = 1.8, $P = 0.03$); no significant change was noted at the control sites (47 vs. 43% for intervention and baseline periods, respectively). Similarly, 17% more patients enrolled during the intervention period reported abstinence from smoking at 2 month follow-up, compared to those patients enrolled during the baseline period (21 vs. 4%, adjusted OR = 6.2, $P = 0.0004$) (Table 5). At the control sites, there was no significant difference in the proportion of patients who made a quit attempt or in

TABLE 3

Characteristics of Study Patients Who Agreed to Follow-Up at the Pilot Test Site and at the Control Sites

Variable	Pilot site		Control sites	
	Baseline period (N = 139)	Intervention period (N = 130)	Baseline period (N = 291)	Intervention period (N = 64)
Age, mean	41.9	40.7	40.7	40.5
Gender, % male	48	54	44	47
Highest grade, median	12	12	12	12
Health excellent–very good, %	37	37	36	39
Routine follow-up visit, %	89	85	88	84
Saw regular clinician, %	54	53	62	63
Cigarettes per day, median	20	20	18	19
Advised to quit in past year, %	65	64	63	52
Alcohol in past 3 months, %	70	78	63	78*
Smoker in household, %	52	52	45	58

* P = 0.02.

2-month quit rates during the two periods (3 vs. 4%, adjusted OR = 0.6, P = 0.50).

At 6-month follow-up, however, the quit rates between test and control sites tended to converge (Table 5). At the test site, 10% more patients enrolled during the intervention period reported abstinence from smoking, compared to those enrolled during the baseline period (21 vs. 11%, adjusted OR = 1.9, P = 0.08); there was also a trend toward higher continuous abstinence during the intervention period (10 vs. 2%, P = 0.13). At the control sites, 5% more patients enrolled during the intervention period reported abstinence from smoking, compared to those enrolled during the baseline period (13 vs. 8%, adjusted OR = 2.0, P = 0.17); continuous abstinence remained similar during both periods (3 vs. 2%, P = 0.72). Of note, the between-clinician variance in quit rates was not statistically significant at either the test or the control sites, although the number of clinicians was relatively small.

To explore whether the effects of the intervention were consistent across light (<10 cigarettes per day (cpd)), moderate (10–20 cpd), and heavy (>20 cpd) smokers, we performed a subgroup analysis of cessation rates across these categories (Table 5). For light smokers at the test site, there was a trend toward increased quit rates in the intervention versus baseline periods; however, similar trends were observed across these periods at the control sites. A significantly higher proportion of moderate smokers reported abstinence at 2-month follow-up as well as continuous abstinence at 6-month follow-up (14 vs. 4% during the intervention and baseline periods, respectively, P = 0.02). For heavy smokers, there was a trend toward increased quit rates at 2-month follow-up but not at 6-month follow-up. The cessation rates for moderate and heavy smokers at control sites showed no significant changes during the intervention and baseline periods.

Results for the complete regression model show that increased education (≥12 years) and light smoking (<10 cpd) were significantly associated with abstinence at 6-month follow-up in the control sites ($P \leq$ 0.05) (Table 6). No consistent patterns were observed for other model covariates. These results should be interpreted with caution, however, as the standard errors for parameter estimates were large.

Prior to the intervention, most intake clinicians at the test site believed that their role in counseling patients to stop smoking was marginal and that the phy-

TABLE 4

Proportion of Exit Interviewees at the Pilot and Control Sites Who Received Recommended Counseling Activities during the Baseline and Intervention Periods of the Trial

	Pilot site		Control sites	
	Baseline period (n = 150)	Intervention period (n = 132)	Baseline period (n = 302)	Intervention period (n = 67)
Ask about smoking	87 (79)	95 (92)*	68 (52)	73 (60)
Ask about willingness to quit	21 (9)	87 (82)*	25 (8)	40 (11)*
Advice to quit	29 (10)	66 (53)*	28 (9)	54 (12)*
Quit literature	1 (0)	40 (39)*	4 (0)	9 (0)
Set quit date	1 (0)	37 (32)*	0 (0)	0 (0)
Discuss pharmacotherapy	3 (0)	47 (37)*	12 (0)	27 (0)*

Note. The proportion of patients who received counseling from an intake clinician (RN or MA) is shown in parentheses.
* $P \leq$ 0.05.

TABLE 5

Cessation Outcomes for Patients Who Agreed to Follow-Up in the Pilot Intervention Site and the Control Sites[a]

	Pilot test site		Control sites	
	Baseline	Intervention	Baseline	Intervention
2-month quit rate, %	4	21*	4	3
Less than 10 cpd, % (*n*)	5 (19)	16 (19)	6 (50)	10 (10)
10–20 cpd, % (*n*)	5 (85)	25 (87)**	4 (202)	2 (45)
Greater than 20 cpd, % (*n*)	0 (18)	13 (24)	0 (39)	0 (9)
6-month quit rate, %	11	21	8	13
Less than 10 cpd, % (*n*)	11 (19)	26 (19)	18 (50)	40 (10)
10–20 cpd, % (*n*)	13 (85)	24 (87)	6 (202)	9 (45)
Greater than 20 cpd, % (*n*)	6 (18)	8 (24)	3 (39)	0 (9)
Continuous abstinence, %	2	10	2	3
Less than 10 cpd, % (*n*)	5 (19)	16 (19)	6 (50)	10 (10)
10–20 cpd, % (*n*)	4 (85)	14 (87)***	2 (202)	0 (45)
Greater than 20 cpd, % (*n*)	0 (18)	0 (24)	3 (39)	0 (9)

Note. The total number of patients in each subgroup is shown in parentheses.

[a] All comparisons are based on hierarchical logistic regression models (adjusted for age, sex, educational level, alcohol use, cigarettes per day (cpd), self-reported health status, smoker in household, prior advice to quit).

* $P = 0.0004$ for comparison between baseline and intervention period quit rate.

** $P = 0.001$ for comparison between baseline and intervention period quit rate.

*** $P = 0.02$ for comparison between baseline and intervention period quit rate.

sician should be primarily responsible for smoking cessation counseling. Despite this belief, the guideline was well accepted by clinic staff. Indeed, the majority of intake clinicians indicated that they intended to change specific smoking cessation practices for the long term as a result of the intervention, with the exception of discussing pharmacotherapy and arranging follow-up for smoking cessation (Table 7).

DISCUSSION

Despite their potential for improving clinical practice, AHRQ-sponsored guidelines have been used by only a minority of hospitals and physicians [*21*]. Although the recommendations of the AHRQ Smoking Cessation Clinical Practice Guideline are based on strong scientific evidence, the effectiveness of a smoking cessation program also depends on the proper delivery of cessation services by trained personnel to appropriately selected patients under certain conditions. Providing evidence that specific guidelines are effective when implemented in real-world practice settings remains a key challenge in changing the way that clinicians and health care organizations approach smoking cessation.

This pilot trial demonstrates that implementation of a guideline-based, multimodality intervention that includes routine identification of smokers and brief counseling by intake clinicians, free NRT, and proactive telephone counseling was associated with increased quit attempts and 2-month cessation rates. The 10% absolute difference in 6-month quit rates (intervention vs. baseline period) at the test site is similar to that observed in clinical trials of NRT [*22*] and demonstrates the feasibility of selecting patients who are appropriate for additional intervention (telephone counseling and pharmacotherapy) in a busy primary care practice. Although this difference was not statistically significant (because of lack of power), the magnitude of this effect is comparable to that seen with relatively intense psychosocial counseling or pharmacologic interventions [*1*], we also observed, however, a 5% increase in the 6-month quit rate at control sites and note that these sites also showed significant gains in the performance of guideline-recommended counseling during the intervention period versus baseline. There were no significant changes in the statewide prevalence of cigarette smoking in adults during the study period (*1999–2000*) [*23*].

It is unclear precisely what aspect of the intervention was most strongly associated with short-term smoking cessation in the current study; however, the cornerstone of this program is the accurate identification and brief counseling of smokers by intake clinicians during routine visits. At the pilot test site, a significantly greater proportion of patients received recommended counseling activities at the time of their visit during the intervention compared to that observed during the baseline phase. Despite initial concerns about the time required to offer brief counseling, clinic staff found that the guideline recommendations could be readily incorporated into the assessment of vital signs and other intake responsibilities within 2–3 min. Moreover, the availability of targeted smoking cessation resources enabled nurses and medical assistants to take a more active role in preventive care, as they had effective therapy to offer screen-detected smokers (prior to the physician encounter). These find-

TABLE 6

Regression Models for Prediction of Abstinence from Smoking at 6-Month Follow-up Interview[a]

Model parameter	Test site (n = 247)	Control sites (n = 339)
Intervention period	1.9 (0.9–4.0)	2.0 (0.7–5.4)
Age (years)	0.99 (0.96–1.02)	0.98 (0.96–1.01)
Gender (male)	0.8 (0.4–1.7)	1.4 (0.6–3.3)
Years of education		
Less than 12	0.2 (0.02–1.2)	2.8 (0.8–9.6)
More than 12	0.7 (0.3–1.6)	2.9 (1.1–7.3)*
Cigarettes per day		
Less than 10	2.5 (0.6–11)	14 (1.7–118)**
10–20	2.6 (0.7–9.4)	3.1 (0.4–25)
Alcohol use	1.0 (0.4–2.2)	0.6 (0.2–1.4)
Self-rated health		
Good	0.8 (0.4–1.8)	0.7 (0.3–1.8)
Fair–poor	0.8 (0.3–2.6)	0.4 (0.1–1.7)
Other smoker in household	0.6 (0.3–1.3)	1.2 (0.5–2.9)
Advice to quit in past year	1.1 (0.5–2.3)	1.0 (0.4–2.3)

Note. Odds ratios and 95% confidence intervals are shown for each variable.

[a] Based on analysis of 586 patients with complete follow-up data. The data for education and average daily cigarette consumption showed highly skewed distributions and were categorized as follows: (a) education, less than 12th grade, 12th grade, and greater than 12th grade (with 12th grade as the reference category); (b) average daily cigarette consumption, less than 10, 10–20, and >20 cigarettes per day (cpd) (with >20 cpd as the reference category). Self-rated health was assessed using a 5-point scale (EVGFP), and ratings were collapsed into three categories: excellent–very good, good, and fair–poor categories (with excellent–very good as the reference category). Alcohol use was defined as positive if the patient consumed at least 1 drink per week over the prior 3 months. Of note, race was not included in the model as there were less than 10 non-Whites in the analysis sample.

* $P = 0.03$.

** $P = 0.02$.

ing argue for expanding the role of nurses and allied health professionals in counseling patients about smoking cessation [*24*,*25*].

The additional resources which comprised the study intervention (NRT plus behavioral counseling) have been demonstrated to increase the use of smoking cessation services in a managed care population [*26*]. Proactive telephone counseling of properly selected smokers was demonstrated to be feasible in the current study: 85% of patients completed at least one session, and 75% completed both sessions. As the length of time required for telephone counseling and scheduling appointments was substantial (30–45 min over two sessions), we believe that smoking cessation counseling is best handled by an experienced nurse, health educator, or psychologist with dedicated blocks of time for patient education. In some cases, cessation counseling could be administered in tandem with patient education for other chronic conditions (such as diabetes or hypertension).

The increase in guideline-recommended activities that we observed at control sites was unexpected. These gains were smaller in magnitude than those observed at the test site and did not include certain key activities such as helping the patient set a quit date. Although the control sites did not receive any specific training or resources to implement the guideline intervention, increases in counseling at these sites as the study progressed may reflect greater awareness of new health plan smoking cessation initiatives, increased promotion of national quality of care indicators that include smoking (e.g., HEDIS), increased media coverage of tobacco control issues, and increased awareness of clinic staff that their performance was being measured.

Significant differences in cessation rates between the intervention and baseline cohorts were limited to moderate smokers (10–20 cpd). Although this subgroup analysis had limited power to detect differences in cessation rates within other subgroups (because of small sample size), that the intervention had negligible effect on the long-term quit rates of heavy smokers suggests room for improvement in the design of future guideline-based interventions. First, the study intervention did not significantly increase the proportion of smokers for whom a follow-up visit was arranged (to discuss smoking cessation), which remained low throughout the study. Although follow-up telephone counseling was being provided to smokers who had set a quit date as part of the research protocol, a greater emphasis on the importance of follow-up care and the offering of additional training in relapse prevention may have improved long-term quit rates. Second, telephone counseling involved only two contacts around the time of the scheduled quit date. In practice, several patients had reconsidered their plans to quit smoking after their initial clinic visit and not all completed both telephone counseling sessions. It is likely that more intensive counseling over several weeks may have boosted long-term cessation rates, particularly in heavy smokers. Third, more patients may have been successful in quitting if offered alternative counseling options other than proactive telephone counseling (e.g., face-to-face counseling or group therapy) or a choice of pharmacotherapy (e.g., other forms of NRT, bupro-

TABLE 7

Survey at Pilot Test Site at the End of the Intervention

Recommended action	Postintervention
Ask about smoking status	6/6 (100%)
Ask about willingness to make quit attempt	4/6 (67%)
Advise to stop smoking	5/6 (83%)
Provide materials on smoking cessation	5/6 (83%)
Help patient set quit date	3/6 (50%)
Discuss pharmacotherapy	1/6 (17%)
Arrange follow-up for smoking cessation	0/6 (0%)

Note. Intake clinicians were asked: "As a result of this intervention, what cessation practices (if any) do you intend to change for the long-term?"

prion SR). It is important to note, however, that a significant increase in the intensity of an intervention may decrease staff adherence or patient willingness to participate; this, in turn, may undercut the expected benefit of a stronger treatment. Finally, algorithms based on the stages of change model have been criticized for not measuring discrete states of change and for defining the stages based on arbitrary time periods [*27*]. Whether algorithms based on newer stage models can improve the targeting of smokers who are likely to benefit from additional intervention warrants further research.

Another limitation of this study is that cessation rates were based on self-report alone, as the logistics of conducting a regional, community-based intervention made biochemical verification of smoking status impractical during this pilot study. False reports of abstinence are estimated to occur in 5–10% of subjects in low-intensity intervention studies such as this one and may be differentially higher in patients who receive intervention versus usual care [*18*]. In the hypothetical situation where the rates of overreporting of abstinence are assumed to be 10 and 5% at the test site during the intervention and baseline periods, respectively, the 6-month quit rates would be 18.9 vs. 10.5%; this represents a clinically important difference in cessation rates (albeit not statistically significant), even after correction for overreporting.

Other limitations of this study deserve comment. First, 8–14% of study participants were lost to follow-up for a variety of reasons (e.g., inability to reach subjects despite multiple attempts, disconnected telephone without forwarding address, withdrawal from study, etc.); however, the rate of attrition did not differ significantly between test and control sites. Second, the study participants were predominantly nonurban Caucasians, which is representative of the population of south central Wisconsin. We expect that the study intervention would be effective in non-White populations; indeed, a brief intervention using a vital signs stamp to document smoking status has been implemented successfully in African-American clinic patients [*28*]. Finally, the study clinics had identified smoking cessation as a priority for practice improvement, and a significant fraction of patients at study clinics reported having been asked about smoking during routine encounters. Baseline cessation practices of study sites, however, were representative of family practice clinics in the region: the proportion of study patients who reported having been advised to quit smoking in the past year was similar to that reported in a recent study of primary care practices in the Upper Midwest [*29*]. Nonetheless, it is unknown whether study results can be generalized to primary care clinics that are less interested in smoking cessation and/or that are less prepared to make changes in the delivery of cessation services.

Treating tobacco dependence as a chronic condition using evidence-based guidelines and disease management principles [*30*] has great potential to reduce the health burden of tobacco-related illnesses and is cost-effective relative to other well-accepted preventive care interventions [*31*]. Moreover, the delivery of smoking cessation services is within reach of many health care organizations that already offer comprehensive nurse-administered counseling in other preventive care activities such as diabetes education and lipid management [*32–34*]. Effective reduction of tobacco use requires redesigning health care systems to increase the identification of smokers, to improve the delivery of smoking cessation advice in a time-efficient manner, and to provide effective pharmacotherapy to properly selected smokers. This process also depends on the active involvement of clinicians who can support the patient in his/her attempt to quit smoking within the context of an ongoing primary care relationship [*35*]. Future research should aim to validate the results of this pilot trial in other primary care settings and in other populations.

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