Smoking Status as a Vital Sign

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OBJECTIVE: We conducted this study to determine if a smoking status stamp would prompt physicians to increase the number of times they ask, advise, assist, and arrange follow-up for African-American patients about smoking-related issues.

DESIGN: An intervention study with a posttest assessment (after the physician visit) conducted over four 1-month blocks. The control period was the first 2 weeks of each month, while the following 2 weeks served as the intervention period.

SETTING: An adult walk-in clinic in a large inner-city hospital.

PARTICIPANTS: We consecutively enrolled into the study 2,595 African-American patients (1,229 intervention and 1,366 control subjects) seen by a housestaff physician.

INTERVENTIONS: A smoking status stamp placed on clinic charts during the intervention period.

MAIN RESULTS: Forty-five housestaff rotated through the clinic in 1-month blocks. In univariate analyses, patients were significantly more likely to be asked by their physicians if they smoke cigarettes during the intervention compared with the control period, 78.4% versus 45.6% (odds ratio [OR] 4.28; 95% confidence interval [CI] 3.58, 5.10). Patients were also more likely to be told by their physician to quit, 39.9% versus 26.9% (OR 1.81; 95% CI 1.36, 2.40), and have follow-up arranged, 12.3% versus 6.2% (OR 2.16; 95% CI 1.30, 3.38).

CONCLUSIONS: The stamp had a significant effect on increasing rates of asking about cigarette smoking, telling patients to quit, and arranging follow-up for smoking cessation. However, the stamp did not improve the low rate at which physicians offered patients specific advice on how to quit or in setting a quit date.

KEY WORDS: smoking status; vital signs; physician counseling inner city; African Americans.

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Findings from numerous studies have shown that advice to quit cigarette smoking by a physician increases patient cessation rates.¹⁻⁵ Despite this evidence, physicians often fail to ask about smoking status or advise smokers to quit.^{6,7} Studies suggest that fewer than half of current smokers report ever having received a physician's advice to quit smoking.^{6,8,9}

According to estimates from the National Health Interview Survey, a large majority of U.S. smokers visit physicians at least once per year.¹⁰ These visits afford physicians frequent opportunity to intervene with their patients who smoke. Efforts are needed to take full advantage of this contact and to influence physicians to motivate smokers to quit. There is also evidence that physicians asking, advising, and assisting about smoking may move smokers

further along the stages of change.¹¹⁻¹³ A more advanced stage has been shown to predict abstinence.¹⁴

In 1991, Fiore proposed a fundamental change in the way that physicians could assess, document, and intervene with patients who smoke.¹⁵ Advocating a systemwide change, he suggested that smoking status be added as a new fifth vital sign, alongside blood pressure, pulse, temperature, and respiratory rate. Fiore and colleagues later reported that physician-patient discussions increased more than 20% among smokers who were seen by their health care provider at an appointment-based, continuity clinic.¹⁶ In a similar study, Robinson and colleagues included smoking status as a vital sign on patient charts in an ambulatory family practice center.¹⁷ They also reported a significant increase of smoking-related discussions between patients and their physicians. In both studies, physicians did not solicit smoking status information; it was done by medical assistants in one study and registered nurses in the other.

To date, researchers have not assessed the effectiveness of including smoking as a vital sign at a nonappointment walk-in clinic or in a setting serving a minority population. It has also not been assessed when physicians obtain smoking status. We conducted this study to assess whether or not a smoking status stamp would change physician counseling patterns about smoking-related issues for African-American patients at an inner-city walk-in clinic setting.

METHODS

Setting and Study Population

The study site was a busy walk-in clinic that provides approximately 30,000 annual patient visits a year to an adult, inner-city, predominantly African-American population. Patients presented to the clinic with a range of

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nonsurgical medical illnesses, including respiratory infections, medication refills, management of chronic diseases, and minor medical complaints.

Patients were recruited between the hours of 8:00 am and 4:30 pm on weekdays between March 6, 1995, and June 23, 1995. The clinic was staffed by internal medicine housestaff from two medical schools and mid-level health care practitioners. All patients were approached after being seen by the discharge nurse. Only those patients seen by physicians were approached and asked if they were willing to answer a 33-item questionnaire that was administered by a research assistant. Exclusion criteria included the inability to answer the survey due to an emergent medical illness, active psychiatric illness, having already completed one of our surveys for this study on a previous visit, or an inability to understand the survey.

The Emory University School of Medicine Human Investigations Committee approved the study protocol. After the nature of the study had been fully explained, all participants gave verbal informed consent. Patients were told that their participation was voluntary. Because of the possibility of low literacy among our patients,¹⁸ research assistants read all items of the survey instrument.

Study Design

The study used a posttest-only assessment, with the clinic alternating every 2 weeks between treatment and control. The control period was the first 2 weeks of each month, with the following 2 weeks serving as the intervention period.

All patients aged 18 years and older who presented to the walk-in clinic during the first 2 weeks of each month served as controls. During the following 2 weeks (intervention period), a research assistant imprinted a smoking status stamp (Fig. 1) on all clinic encounter charts prior to physicians' seeing each patient. Those patients who were surveyed during the 2-week period when the stamp was placed on clinic charts served as the intervention group.

During the 4-month study period, 45 internal medicine housestaff rotated through the walk-in clinic. The housestaff were a mix of first-year and second-year residents from two medical schools assigned to a 1-month rotation in the clinic. Housestaff physicians were told once about the presence of the stamp on the morning of the

first day that the stamp appeared on the clinic encounter sheets. At that time, they were further instructed to circle the appropriate smoking status category (i.e., current, former, or never). This instruction was given at the end of the last day of the control period, or on the morning of the first day of the intervention period. The content of the instruction was brief (i.e., less than 1 minute), simply stating, "A smoking status stamp will appear on the patient's chart. Circle the appropriate category and intervene with your patients accordingly." Prior to the intervention, no systematic chart identification of a patient's smoking status was done in the clinic setting. Other reminders, interventions, or educational programs were not carried out during the course of the study. Moreover, physicians were not specifically instructed to assist patients in setting a quit date.

Physicians in the clinic were not informed of the ongoing survey, which was discreetly administered in the nursing discharge area. No other attempt was made to blind physicians to the study design. Nursing and support staff were given a 10-minute in-service session to inform them of our presence, but they were not explicitly told of the study's intent.

Outcome Measures

Six questions were modeled after the National Cancer Institute's four A's: ask, advise, assist, and arrange follow-up model.¹⁹ Two questions specifically related to whether or not the physician asked about the patient's smoking status. Patients who were identified as current smokers were asked four questions related to the remaining three A's. The six questions were as follows:

Ask. (1) During your exam today, did your doctor ask you if you smoke cigarettes?, and (2) During your exam today, did your doctor ask if you use snuff, chew, pipes or cigars?

Advise. (3) During your exam today, did your doctor tell you to quit smoking?

Assist. (4) During your exam today, did your doctor ask you to set a quit date?, and (5) During your exam today, did your doctor give you specific advice on how to quit smoking? and,

Arrange. (6) During your exam today, did your doctor offer you a follow-up appointment about smoking or refer you to a stop-smoking program?

Survey Instrument

Age, gender, and ethnicity were determined during the interview by patient self-report. In addition, self-reported history of diabetes and hypertension was also obtained from each patient. Insurance status was obtained from hospital administrative records. The presence or absence of a regular source of care was determined by

FIGURE 1. Smoking status stamp placed on clinic encounter charts.

asking patients, "Do you have a regular source of care, the same doctor that you see for problems?" To assess whether the smoking status stamp was circled during the intervention period, we directly abstracted this information from each patient's clinic encounter chart.

To control for the potential confounding effects of smoking-related illnesses, the purpose of each patient's visit was abstracted from the medical record. The purpose of the visit was then reviewed and coded as smoking-related or not smoking-related according to predetermined categories. Categories of smoking-related illnesses were established by two of the authors (JSA and REK). A high degree of concordance between raters was found ($\kappa = 0.92$; 95% confidence interval [CI] 0.84, 0.99). Smoking-related categories included cardiac problems (angina, chest pain, etc.), hypertension, respiratory problems (cough, sputum production, etc.), neurologic problems (stroke, slurred speech, etc.), diabetes, gastrointestinal problems (ulcer, gastritis, etc.), otolaryngeal problems (dysphagia, pharyngitis, etc.), and weight loss. These categories were chosen to be exhaustive and inclusive. Some, such as cardiac problems, are directly related, and others, such as gastrointestinal ones, are indirectly related.

All patients were placed into one of three categories according to their smoking status (i.e., current, former, or never). Current smokers were defined as those who had smoked at least 100 cigarettes in their lifetime and had smoked a cigarette in the past 30 days. Those individuals who had smoked at least 100 cigarettes in their lifetime, but had not smoked a cigarette in the past 30 days were defined as former smokers. Never smokers were defined as persons who had smoked fewer than 100 cigarettes in their lifetime. No attempt was made by the researchers to biochemically verify the self-reported smoking status of participants. Other questions about smoking, quit attempts, and quitting were obtained from previously published National Institutes of Health-funded studies, the Centers for Disease Control and Prevention, and national surveys.²⁰⁻²⁴

Survey items also assessed the patient's readiness to quit, based on the five stages in the smoking cessation process identified by Prochaska and DiClemente.²⁵ This model characterizes smoking cessation as a process involving movement through a series of five mutually exclusive stages: precontemplation, contemplation, preparation, action, and maintenance.²⁵⁻²⁷ We classified precontemplators as those smokers who were not thinking about quitting in the next 6 months. Smokers who were thinking about quitting within the next 6 months were classified as contemplators. Preparers were defined as those smokers who were thinking about quitting in the next 30 days and had made at least one serious quit attempt lasting at least 24 hours in the past year. We labeled those who had been abstinent for 6 months or less as persons in the action period. Those who had quit for more than 6 months were classified in the maintenance phase.

The effect of physician counseling on rates of smoking cessation was not possible to determine given lack of time and resources. However, to evaluate short-term impact, we did assess stage of change at the exit interview. It is possible that physician counseling, prompted by the inclusion of smoking status as a vital sign, shifted some patients from the precontemplation stage to the contemplation stage or from the contemplation stage to the preparation stage. Therefore, we compared stage of change between the intervention and control groups. Because the action and maintenance stages require abstinence, these two stages were not relevant to this analysis.

Analyses

Data were double-entered using Epi Info version 5.01b (USD), Inc., Stone Mountain, Ga, 1990), and statistical analyses were performed using SAS software (SAS User's Guide: Statistics, 6th ed., SAS Institute Inc., Cary, NC, 1990). Patients served as the unit of analysis.

Univariate comparisons between control and intervention conditions were made using independent *t* tests for continuous measures and χ^2 analyses for categorical variables. Two-sided *p* values less than .05 were considered to provide statistical evidence of differences in the two groups.

Logistic regression analyses were conducted to identify those variables that independently predicted six binary outcomes while statistically controlling for potential confounds. The six binary outcomes were as follows: whether or not the physician (1) *asked* about the patient's smoking status (yes/no), (2) *asked* about the use of other forms of tobacco (yes/no), (3) *advised* the patient to quit smoking (yes/no), (4) *assisted* the patient to set a quit date (yes/no), (5) *assisted* the patient on how to quit (yes/no), or (6) *arranged* for follow-up for smoking cessation (yes/no). Variables included in each model were the primary independent variable (presence or absence of a smoking status stamp), age, gender, number of cigarettes smoked per day, the purpose of the clinic visit (smoking-related vs not smoking-related), whether the patient had a regular source of care (yes/no), and the number of years that the patient had smoked cigarettes. Variables were eliminated from the model if they did not significantly ($p < .05$) contribute to the prediction of physician counseling patterns (i.e., ask, advise, assist, and arrange). Contingency tables and logistic models were also used to assess posttest differences in stages of change in the two groups.

Sample size estimations were based on the outcome of physicians advising smokers to quit. Lower estimates, relative to two previous studies, were used because the current study was conducted in a non-continuity-care setting, yielding estimates of an ask rate of 35% during the control period and 50% during the intervention period. Using a two-sided hypothesis test of differences in proportions with .05 level of significance, we projected

480 smokers would be needed to detect differences of this size with a power of 0.90.

RESULTS

Participants

We approached a total of 2,928 patients immediately after the discharge nurse saw them. Approximately 4% ($n = 117$) of the total patients approached by the research assistant refused to participate. A total of 2,811 patients completed the survey. Of those who were surveyed, 2,604 (92.6%) considered their ethnic background to be African American, the remaining 7.4% ($n = 207$) of the sample were not included in the analyses. Nine cases were removed because of data inconsistencies, leaving 2,595 African-American patients.

Intervention patients ($n = 1,229$) and control patients ($n = 1,366$) did not differ significantly on age, gender, insurance status, or purpose of visit. In addition, we examined characteristics of smokers ($n = 883$) by study group (Table 1). No evidence of differences was found between the control and intervention groups on age, number of cigarettes smoked per day, the number of times a patient tried to quit smoking, the percentage presenting with a smoking-related illness, the percentage who were insured, and the percentage who had a regular source of care.

Univariate Analyses

Compared with the nonstamp period (Table 2), physicians with stamped encounter sheets were more likely to ask their patients if they smoke cigarettes, 78.4% versus 45.6%, and to ask if they use other forms of tobacco, such as snuff, chew, pipes, or cigars, 18.5% versus 12.8%. Physicians were also more likely to tell their patients to quit smoking, 39.9% versus 26.9%. Further, physicians were more likely to arrange a follow-up appointment about smoking or refer their patients to a stop-smoking program if the smoking status stamp was present, 12.3%

versus 6.2%. However, physicians were equally unlikely to assist patients in setting a quit date in both groups, and differences in counseling patients on how to quit smoking during the intervention and control periods were negligible.

Multivariate Analyses

Table 2 displays the odds ratios (ORs) and corresponding 95% CIs for the multivariate results when the smoking status stamp was present compared with the control period. While controlling for the influence of other variables, the presence of the stamp was associated with an increased likelihood of physicians asking about the patient's smoking status. The presence of the stamp was also significantly associated with an increased likelihood of physicians advising their patients to quit smoking. In addition, the presence of the stamp was associated with an increased likelihood of physicians arranging a follow-up appointment or referral. Consistent with the univariate analyses, the presence of the stamp was not associated with an increased likelihood of physicians assisting patients in setting a quit date, or counseling patients on how to quit smoking during the intervention period. Furthermore, the controlling variables substantially diminished the effect of the presence of the stamp on physicians asking about the use of other forms of tobacco.

Stage of Change

As shown in Table 3, the percentage of individuals who reported themselves to be in the contemplation and preparation stages was higher in the intervention group than the control group ($p = .023$). Multivariate analyses, adjusting for demographic and smoking characteristics, again provided some evidence of a shift in the stage distribution for the intervention relative to the control group (OR 1.45; 95% CI 1.03, 2.06) and for being in the contemplation versus precontemplation stage (OR 1.37; 95% CI 0.98, 1.92).

Table 1. Sample Description of Smokers Only

Characteristics*	Control Group ($n = 466$)	Intervention Group ($n = 417$)
Age (mean $\pm$ SD), years	43.2 $\pm$ 12.5	44.1 $\pm$ 13.2
Male, %	53	47
Number of cigarettes smoked per day, mean $\pm$ SD	11.6 $\pm$ 8.5	12.0 $\pm$ 9.1
Mean number of years smoking $\pm$ SD	20.4 $\pm$ 12.8	19.8 $\pm$ 12.9
In past year, number of $\geq$ 24-hour quit attempts [†] (mean $\pm$ SD)	2.7 $\pm$ 8.7	3.0 $\pm$ 10.0
Presenting with smoking-related illness [†] , %	53	52
Wanting to quit smoking, %	82	85
Previous use of gum/patch to quit, %	6	7
Insured, %	43	45
Regular source of care, %	24	21

*No evidence of differences between groups found at the .05 level for the listed characteristics.

[†]Does not account for all individuals because of missing values.

Table 2. Presence of Smoking Status Stamp And Physician Counseling Patterns

Physician Counseling	Intervention, %	Control, %	Univariate Analyses		Multivariate Analyses*	
			Odds Ratio	95% CI	Odds Ratio	95% CI
Did the physician . . .	(n = 1,229)	(n = 1,366)				
Ask if you smoke?	78.4	45.6	4.28	3.58, 5.10	3.97	2.87, 5.49
Ask if you use other forms of tobacco?	18.5	12.8	1.72	1.34, 2.20	1.40	0.91, 2.18
For smokers, did the physician . . . [†]	(n = 417)	(n = 466)				
Advise you to quit?	39.9	26.9	1.81	1.36, 2.40	1.75	1.29, 2.35
Assist you to set a quit date?	< 1	< 1	0.84	0.19, 3.76	0.74	0.16, 3.34
Assist you on how to quit?	4.8	2.8	1.76	0.86, 3.58	1.60	0.78, 3.31
Arrange a follow-up appointment or referral?	12.3	6.2	2.16	1.30, 3.38	1.97	1.20, 3.24

*For each logistic model, we controlled for age, number of cigarettes smoked per day, the purpose of the clinic visit, whether the patient had a regular source of care, and the number of years that the patient smoked cigarettes.

[†]For smokers n = 880; 3 participants dropped out because of missing values.

DISCUSSION

The findings from the present study extend the body of knowledge concerning physician-counseling behaviors about smoking-related issues in a minority population. Our analysis of a smoking status stamp in a walk-in clinic of a large inner-city hospital that cares for a predominantly African-American population showed that the inclusion of smoking as a vital sign significantly increased the rates that physicians ask about tobacco use, advise patients to quit smoking, and arrange follow-up for smoking cessation. This is consistent with results from two smaller studies conducted in different clinical settings with a different patient population.^{15,17} Moreover, unlike the two previously mentioned studies, we instructed physicians, not support staff, to circle the appropriate smoking status category. Yet, we still found a 32% increase in physician-patient discussions about smoking.

No other interventions such as daily physician reminders, educational sessions, educational materials, or assistance of other staff were utilized; therefore, the observed results of this intervention can be considered potentially cost-effective. As the leading cause of death, as a new Health Plan Employer Data and Information Set (HEDIS)

measure, and as a recommended intervention by many organizations, it is reasonable for physicians to invest time in identifying and intervening with their patients who smoke.²⁸ However, there is controversy in the field of emergency medicine as to whether preventive measures, and specifically smoking cessation, should be addressed in nonappointment settings. One must note that more than 75% of patients in this study did not have a regular source of care. If we are to significantly impact on smoking rates in inner-city populations, we must be flexible and take advantage of potential missed opportunities.

One may be discouraged, however, by both the low rate at which physicians assisted patients in helping to set a quit date and by the lack of assistance provided on how to quit smoking. It must be kept in mind that our only intervention was the stamp placed on the clinic sheet, and a one-time mention in the middle of the monthly rotation. Other studies have shown that more rigorous physician education can improve physician performance in these areas.^{29,30} Physicians were told that a stamp would be placed on all charts, and that they were to circle the appropriate answer and discuss the response with their patient. Housestaff received no other instructions or reminders, and were not told to assist smokers specifically in setting a quit date or to counsel them to quit. Even without a specialized stage-specific training program for housestaff to promote smoking cessation, we still found evidence of movement along the stages of change in the intervention group compared with the control group. Similar results have been reported in studies that have used stage-specific brief-advice programs to individualize treatment plans. For these studies, extensive training was provided to support staff and physicians to deliver brief messages and handouts to their patients who smoke based on the stages-of-change model.³¹⁻³³ The low

Table 3. Stage of Change at Exit Interview for Smokers Only

Stage of Change*	Intervention (n = 417), %	Control (n = 466), %
Precontemplation	24	32
Contemplation	40	37
Preparation	36	31

*The distribution in the intervention group is shifted toward a higher level of stage of change in comparison with that in the control group (Mantel-Haenszel χ^2 statistic = 5.13, p = .023).

rate of referral and of arranging follow-up visits is not surprising. However, it may even be lower in this population, reflecting a lack of choices for an economically deprived population.

Cigarette smoking remains the leading cause of preventable death, leading to one of five deaths in the United States. Unscheduled appointments (in emergency departments, urgent care centers, etc.) may represent a missed opportunity for a variety of interventions. These might include counseling for smoking cessation, alcohol and substance abuse, domestic violence, and injury prevention. This and a number of other striking statistics suggest considerable public health benefit of implementing the smoking status stamp as the "fifth vital sign" throughout the health care system, including inpatient charts, non-appointment charts, and all appointment visits (not only primary care visits, but also visits to physicians in all subspecialties).

There are limitations to our findings. First, we relied on patient recall, subjecting our findings to recall bias. To reduce the potential bias, we asked patients immediately after they spoke with the discharge nurse, reducing the amount of recall time to within 15 minutes after having seen the physician. We found 89.5% agreement between patient self-report and chart audit of the physician's circled response to the smoking status categories. Previous studies have found that patient recall is systematically biased toward overreporting of physician query of smoking status and among smokers, of physician advice to quit.³⁴

A second limitation was that our outcome variables were proximal measures. We did not measure actual smoking cessation, but rather measured changes in the rate physicians addressed smoking-related issues with their patients and advancement in readiness to quit. This was our intent, since randomized studies funded by the National Institutes of Health in the 1980s,^{35,36} and those conducted abroad,^{11,37} have already shown that brief physician interventions result in increased abstinence rates. We also assessed the distribution along the stages-of-change continuum, acknowledging that there may have been differences between the two groups before the interview. This is unlikely, as baseline smoking-related variables were no different.

A third limitation was that we did not collect physician characteristics. Without this information, we are unable to distinguish between those who were more likely to counsel smokers and those who were less likely to intervene with their patients who smoke. For example, Cummings and colleagues found that patients who were seen by a physician who was a cigarette smoker were significantly less likely to report stop-smoking advice than patients seen by a nonsmoking physician.⁹

The smoking status stamp had a clinically important effect on increasing ask and advise rates by physicians. Had further interventions been implemented, physician counseling rates and rates of arranging follow-up most likely would have been considerably improved as well. In

addition, it appears the presence of the stamp may have moved smokers further along the stages of change, a measure for readiness to quit. This low-cost, simple administrative intervention can easily be implemented across health care settings.

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