

Tools to Improve Documentation of Smoking Status

Continuous Quality Improvement and Electronic Medical Records

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Background: Despite the deleterious effects of smoking on the nation's health and evidence that smoking cessation advice by family practice physicians is cost-effective, self-sustaining office systems to identify smokers in primary care clinics have been difficult to establish. We worked on a continuous quality improvement project group, aided by an electronic medical record, to design a system to document and periodically update smoking status in a consistent place in the medical record.

Intervention: Using the continuous quality improvement plan-do-study-act cycle, a 7-member group worked with nursing staff to define roles, routines, and responsibilities for medical assistants to screen for and document 1 of 4 categories of smoking status in the major problem list of the electronic medical record for at least 80% of patient appointments. Screening rate was tracked

monthly by means of the electronic medical record and feedback was given to staff.

Results: The screening rate rose from 18.4% to 80.3% within 2 weeks after the system was implemented and was maintained for 19 months. An additional benefit was an increased rate of smoking cessation counseling documented by providers, from a baseline rate of 17.1% to 48.3%.

Conclusions: A continuous quality improvement group process aided by an electronic medical record is useful to develop a self-sustaining office system to screen, document, and periodically update smoking status in a consistent place in the medical record. Although screening for and documenting smoking status are only the first step toward helping patients stop smoking, it is an important one.

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SMOKING CESSATION advice is one of the most cost-effective preventive strategies in primary care.¹⁻³ The potential impact of smoking cessation on a variety of health outcomes, such as coronary heart disease, pulmonary disease, low birth weight, and several forms of cancer, makes smoking intervention a high priority for all primary care physicians.^{4,5} The value of smoking cessation and cost-effectiveness of interventions has led the Agency for Health Care Policy and Research guideline to assert that "institutional changes in clinical practice are necessary to assure that all patients who smoke are identified."⁶

The exact mechanism for identifying smokers and instituting interventions in primary care clinics has been elusive. Data from a recent evaluation of the "Put Prevention Into Practice" program sponsored by the Public Health Service and the American Academy of Family Physicians have yielded disappointing results.⁷ McVea and coworkers⁷ found that physicians who had ordered the "Put Pre-

vention Into Practice" kit used these tools very little. The tools were not easily translated into action in many clinics, which underscores the need to tailor approaches to the systems and resources of individual practices. Rather than simple tools that can

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be standardized for all individual practices, Solberg et al⁸ observed that successful smoking intervention requires the establishment of office systems in ambulatory care clinics. A systems approach can facilitate the institutional changes needed to address the barriers of "time, attention, and lack of support" for preventive care.⁸

One approach to altering office systems is the process of continuous quality improvement (CQI).⁹ Continuous quality improvement methods have the potential to help primary care clinics develop the tools and skills to design their own prevention systems.¹⁰ Systems developed by the individual organization are more likely to fit the unique characteristics of each prac-

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METHODS

The Family Medicine Clinic, located in Eau Claire, Wis (population, 55 000), is affiliated with the University of Wisconsin–Madison Department of Family Practice and is the model ambulatory teaching clinic for 22 family practice residents. The residency is affiliated with 2 hospitals but is community based and is approximately equivalent to a practice with 4 full-time physicians with an average of 1600 patient appointments per month.

In July 1994, the clinic installed Practice Partner, an EMR software program produced by Physician Micro Systems (Seattle, Wash), which includes long-term and short-term problem lists, medication lists, prevention prompts, laboratory information, radiology information, electronic signatures similar to passwords, and search capabilities. Templates are used for health maintenance protocols, laboratory results, prescriptions, and some progress notes. Progress notes are entered by dictation and transcribed or by direct keyboard entry. Details of the software program are described elsewhere.¹⁴

As part of ongoing efforts to improve preventive care at the residency teaching clinic, a CQI project group was formed to improve documentation of patients' smoking status in the EMR. The 7-member cross-functional group was composed of the prevention coordinator, a medical faculty member (T.E.) who also served as group facilitator, a medical assistant (D.L.E.), 2 residents, an office nurse, and a residency education coordinator. The group used the plan-do-study-act cycle described by Brassard and Ritter¹⁵ to study the situation, gather and analyze data, and develop and implement an improvement plan. *The Team Handbook*¹⁶ is another valuable resource the group consulted for quality

improvement methods and problem-solving techniques. The results were studied to determine whether the mission had been accomplished, and if not, why. Further adjustments were then made when needed during the implementation phase.

MISSION

The mission of the group was to establish a self-sustaining office system to document and periodically update smoking status in a consistent place in the medical record: the major problem list. Our goal was to maintain a documentation rate of at least 80% of patients seen at our residency teaching clinic.

ANALYSIS OF THE SITUATION

Data from audits of smoking status in the paper charts before implementation of the EMR in July 1994 showed documentation of smoking status in 4 chart sections. Most documentation of smoking status was buried in chronological progress notes dictated by providers and not readily accessible for review at patient appointments. Baseline chart audit data before smoking status screening by medical assistants (MAs) was implemented showed a rate of smoking cessation counseling by providers of 17% documented in the progress notes.

Documentation of smoking status was the sole responsibility of the providers. The only training that providers received relevant to the documentation of smoking status was during their orientation to the EMR, where it was demonstrated how they could remove the reminder prompt for smoking counseling.

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tice personality.^{7,8} Another emerging tool that can be useful for changing physician behavior is the electronic medical record (EMR). Electronic medical records can integrate prevention systems into routine care, with features for tracking preventive care given and prompts to providers for needed preventive care. Automated tracking and prompting systems integrated into the EMR require less time and attention to maintain than paper records do.¹¹ Office systems for prevention designed for paper charts are labor intensive and often require duplicate documentation, which increases cost and inefficiency.¹² In addition to the ease of entering data, the EMR with a report function also requires less time than audits of paper charts to collect data for evaluation of internal CQI projects as well as data often required by accrediting agencies, third-party payers, and managed care organizations.

The purpose of this article is to describe the work of a CQI project group whose mission was to design an office system to increase the documentation of smoking status of patients seen at a residency teaching clinic. The system was aided by our clinic's EMR, which has (1) the capability of inserting information into several sections of the medical record with 1 manual entry, (2) the ability to prompt providers and staff for needed preventive care, and (3) tracking and report capabilities that facilitate measuring progress over time.

Smoking cessation was chosen as a model quality improvement project because it meets the criteria for selecting a clinical process to improve (ie, high risk, high volume), and a consensus exists for effective treatment that is available.⁹ A patient survey in 1994 showed that our young adult patients have a higher incidence of smoking than the national incidence: 51% compared with 25%.¹³ Despite evidence that brief intervention for smoking cessation by primary care physicians is cost-effective,¹⁻³ office systems to screen for lifestyle habits with adverse effects on health are not as well established in primary care offices as other preventive care services, such as immunizations or laboratory tests.⁴

RESULTS

The smoking status screening rate was less than 5% during the first 6 months of baseline data collection (**Figure**). During this time, the clinic was making the transition to the EMR, and both paper and EMR records were available at appointments. The upward trend in smoking status documentation in the first few months of 1995 resulted from 2 nurses transferring smoking status of patients seen that day from the paper charts into the EMR before the paper charts were archived. The highest screening rate achieved by the end of the baseline period was 18.4%.

IMPROVEMENT PLAN

A clinic policy was written with input from providers and nursing staff and was pilot tested by several MAs whose responsibility was to escort patients to examination rooms and obtain vital signs and other information before appointments. The policy defined clear roles and routines for screening for smoking status in every patient. The MA was assigned the role of documenting smoking status in the EMR during the process of preparing patients for appointments. The MAs offered smoking cessation information¹⁷ to patients who smoked and who consented to receive the information.

Smoking status was defined as *tobacco use* for current smokers, *ex-smoker* for those who had quit, *nonsmoker* for those who had never smoked, and *passive smoke exposure* for children younger than 14 years who lived with smokers. Since our goal was to document and periodically update smoking status for all patients, we decided to use nonsmoker as a pertinent negative and to document smoking status in the major problem list for all patients. Thus, patients who had no entry for smoking status in the major problem list were only those whose status was unknown and represented a screening failure or, in more positive terms, a "missed opportunity" to improve our screening rate. The Practice Partner EMR software does have a separate health maintenance section, where smoking status can be documented in a narrative form, but the group decided the major problem list was more highly visible and integrated smoking status better into the overall picture of the patient's health. The major problem list was also more likely to be viewed at routine appointments than the separate health maintenance section.

The EMR has prompts to remind providers of preventive care that is due for the individual patient on the patient chart summary screen. This screen also lists acute and major prob-

lems and allergies. The MAs were instructed to enter smoking status in the EMR in the progress note on the day of the appointment. When smoking status was recorded in the progress note, the EMR software was programmed to accomplish 3 tasks with 1 manual entry: (1) record smoking status on the major problem list, (2) document smoking counseling on the health maintenance screen with an X and date done, and (3) inactivate the reminder prompt for smoking counseling for 3 years. The group adapted the EMR, Practice Partner, and language of smoking counseling to meet our individual clinic system. Our operational definition of "smoking counseling" is for MAs to document smoking status and offer smoking cessation information. Since this is more screening and very limited counseling, future system revisions will need to separate "screening" and "counseling" as distinctly different activities, and the EMR software language can be changed to more accurately reflect our system. Providers document more extensive smoking cessation counseling in the narrative of the progress note.

DATA COLLECTION

The clinic's smoking status screening rate was operationalized as the percentage of patients visiting the clinic on the first 2 working days of the month who had their smoking status either already recorded in the EMR or entered into the EMR at that visit. An EMR report was run monthly, which showed the total number of patients who visited the clinic on the 2 days, along with the number who had their smoking status recorded. The percentage with smoking status recorded was calculated to determine each month's screening rate. Screening rates were calculated monthly during a 9-month baseline period and during a 19-month implementation period after initiation of the project in May 1995.

The initiation of the action plan was associated with prompt improvement. Within 2 weeks, 80.3% of patients seen had smoking status documented on the major problem list of the EMR. The prompt improvement was not only dramatic but sustained. Screening rates of approximately 80% were maintained throughout the 19-month implementation period. To date, more than 600 patients have accepted smoking cessation education packets offered by the MAs.

Time studies by 2 MAs to address the complaint that asking about smoking would add extra work and prolong the rooming-in process showed that the increased time needed to document smoking status and provide information to interested patients ranged from 5 to 30 seconds, with a median of 10 seconds.

Not all patients had smoking status documented at appointments. A 1-month analysis of appointments to determine why screening was not 100% showed that in 73% of cases, the failure was caused by MAs not asking about smoking status. The remaining 27% were from miscellaneous causes, ie, home visit, appointment with nurse or laboratory only, and so on.

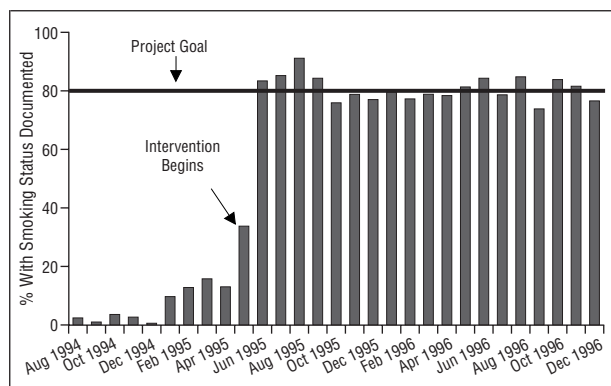
A random chart audit of 120 patients 8 months after initiation of the screening project showed that 48% of patients with tobacco use on the problem list had documented advice to quit by the provider. This compares with a baseline of 17% of patients who had documented ad-

vice to quit when tobacco use was not on the problem list but documented only in progress notes.

COMMENT

This project demonstrates for the first time that a multidisciplinary CQI project team using the EMR as a resource can systematically tailor an individual clinic's processes to establish a screening system by clinic staff to identify smokers, ex-smokers, passive smokers, and non-smokers, while generic office system kits have proved ineffective.⁷ Our system documents and periodically updates smoking status consistently in 1 highly visible and consistent place in the EMR, the major problem list. It also identifies no smoking as a pertinent negative, which indicates whether screening has occurred. In addition, the EMR provided a useful CQI tool for ongoing data tracking and measuring progress over time toward the 80% screening goal during the implementation phase of the CQI project. Use of nonphysicians to screen for, document, and update smoking status decreased the variability of documentation of screening reported when physicians are solely relied on to document smoking counseling.¹⁸

We were able to show that uniformly screening for and documenting smoking status in a consistent place in the EMR can help target smoking cessation counsel-



Patients seen who had smoking status documented in the electronic medical record as a percentage of all patients seen. The arrows show the project goal to maintain a screening rate of 80% and project start date of May 1, 1995.

ing to appropriate patients as well as increase the rate of intervention to smokers. This increase in smoking cessation counseling by providers is consistent with other systems to document smoking status as a vital sign, which also demonstrated increased intervention rates by providers.^{19,20}

A weakness in our system is the infrequent (every 3 years) updating of smoking status. Incorporating a question about smoking status into the vital sign routine as recommended by Fiore²¹ assures updating at every appointment. Our group elected to screen for smoking status by MAs every 3 years instead of making smoking status a vital sign. The group decided not to ask at every appointment for fear of alienating nonsmokers by repeatedly asking the same question. Nationally recognized guidelines advocate smoking status documentation at every visit as a vital sign but also acknowledge that repeated assessment may not be necessary for adults who have never smoked or not smoked for many years.²² Further research is needed to determine the potential negative attitude of confirmed nonsmokers to being asked about smoking at every appointment.

The MAs are responsible for the “ask” part of the ask-advise-assist-arrange model for smoking cessation counseling,¹⁴ which has been recommended to relieve the burden on physicians for sole responsibility for provision of preventive care.²² The physicians’ role is to review the problem list at every visit and act on the prompt for smoking status. Physicians may update the major problem list and follow up on a positive smoking screen as often as they choose. The system does not limit screening to every 3 years but ensures that it will occur at least that often. The frequency of updating smoking status may be reexamined by the team during the next reevaluation phase.

A possible limitation of this demonstration project is lack of a formal control group. However, the purpose of quality improvement is different from that of basic clinical research. In addition to lack of matched controls, the nature of the CQI process is that conditions of the intervention can be changed at any point to achieve some predetermined end goal. Changes in the system are measured over time and adjustments are made when the need for them is discovered.^{15,16} In view of this limitation, the magnitude of the change in screening rate from 18% to 80% of patients seen in such a short interval after imple-

mentation of the system lends credibility to the conclusion that the project, with clearly defined roles, routines, reminders, and increased nonphysician involvement, was responsible for the change. In addition, during the same time interval, data from the EMR reports showed that the smoking status screening rate was higher than rates for provision of other preventive care services with no enhanced role by nonphysician staff. The incidence was 1.4 times greater than documentation for Papanicolaou tests and the combined immunization for diphtheria, tetanus, pertussis, and *Haemophilus influenzae* type B, 1.6 times greater than cholesterol screening, and 7.1 times greater than screening for problems with alcohol and other drug abuse.

The project goal was to establish a system that could be “institutionalized” and be sustained without atrophy over time. We are encouraged that screening has been tracked monthly for 19 months with minimum continuing intervention. Ornstein et al¹¹ demonstrated an increase in documentation by providers of smoking cessation counseling to caregivers of young children from 8% to 21% during 17 months. This was accomplished after implementation of an EMR and physician education. They did not address the role of staff or the CQI group process in prevention screening.¹¹

Cultural and attitudinal barriers are the norm when CQI project teams recommend organizational changes. For CQI to succeed, teams must be trained to address resistance to organizational change to achieve lasting system improvement.^{15,16} Our clinic is no exception. One registered nurse believed asking smoking status was a “nursing assessment” and thought that this activity was outside the scope of practice of the MAs. Four of the 9 MAs were smokers themselves, and some were reticent to ask patients what they believed was an intrusive question. Comments from providers, who responded to a survey to find glitches in the screening system, were that preventive care is the physician’s job and having staff screen for smoking status fragments patient care. One provider commented that the CQI process stifles creativity. The group did address these barriers openly with both staff and providers. Most barriers declined with time and support from the medical faculty of the importance of the project. Such support from the team sponsor or management is critical to successful implementation of a CQI project.¹⁶ Although compliance by staff with the smoking status screening procedures is still not 100%, opposition has faded gradually and smoking status screening is an established part of the patient rooming-in routine.

In conclusion, an office system to screen for, document, and update smoking status in a consistent place in the medical record is possible to implement and sustain over time by means of a CQI group process, increased staff responsibility, and assistance from the EMR for prompting and evaluation. Consistent screening for, documenting, and updating smoking status are only the first step of a smoking cessation system in a primary care clinic. Although increased advice to quit smoking was documented by providers, the next phase is to further improve the assist-advise-arrange phases of smoking cessation counseling and determine changes necessary to increase our number of ex-smokers.

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Clinical Pearl

Theophylline for Atrioventricular Block after Myocardial Infarction

Theophylline (100 mg/min intravenously to a maximum of 250 mg) restored normal rhythm in patients with the onset of high-grade, second-degree block or third-degree block early after an acute inferior myocardial infarction. (*Ann Intern Med*. 1995;123:509-511.)