Assessment and Counseling of Coronary Risk Factors by Family Practice Residents

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A study was undertaken to determine (1) the likelihood that patients seen for episodic health care in a family medical center have been assessed and counseled for coronary heart disease (CHD) risk factors, and (2) the likelihood that patients having an identified risk factor have been assessed and counseled regarding other CHD risk factors. One thousand five hundred twenty-eight medical records were randomly selected from all visits occurring over two periods in 1986 and 1987 to 122 residents in an eight-site family medicine residency network. Patients with cardiovascular disease and those younger than 20 or older than 65 years of age were excluded. Assessments were made of (1) smoking history, blood pressure, weight, physical activity, and dietary content during the previous 12 months; (2) family history of cardiovascular disease during the previous 12 months and in the initial patient history; (3) and blood cholesterol during the prior 5 years. Risk-factor counseling practices were examined for the previous 12 months. Blood pressure was assessed in 96% of patients, smoking in 40%, cholesterol in 26%, and family history in 52%. Ninety-six percent of hypertensive patients were counseled for hypertension, but only 45% of smokers and 20% of patients with hypercholesterolemia were counseled for those risk factors. Of patients having a given risk factor, assessment for any other risk factor occurred in fewer than 60% of cases. Patients having a documented positive family history were only slightly more likely than other patients to be assessed for additional risk factors. There is continued need for enhancing coronary risk-factor assessment and counseling by resident physicians. Particular attention should be given to risk-factor assessment and counseling among patients having identified CHD risk factors. *J Fam Pract 1991; 32:273–281.*

A substantial share of the recent decline in coronary disease has been attributed to changing health practices, including reduced smoking, improved diet, management of hypertension, and increased physical activity.[1,2] These changes are reflections of local and national efforts to modify patients' behavior and to change the practice habits of physicians by creating an awareness of coronary disease risk factors and the means available for their modification. The National High Blood Pressure Education Program of the National Heart, Lung and Blood Institute (NHLBI), for example, has had a significant effect on both early detection and management of elevated blood pressure.[3] More recently, in response to clinical demonstrations that reduction of elevated cholesterol may be associated with reduced coronary events, the NHLBI, with the support of a coalition of health organizations including the American Heart Association and the American Medical Association, launched the National Cholesterol Education Program (NCEP).[4–6] The aim of the NCEP is to enhance public and professional awareness of the role of cholesterol in the evolution of coronary heart disease and hence to improve the detection and management of hypercholesterolemia.[7]

The success of any national program designed to improve the detection, assessment, and management of coronary risk factors will be influenced by the practice habits of the physicians. Primary care physicians are the initial contact for most patients and are the most likely source for the patients' continuing care. As such, the primary care physician will play a key role in strategies for identifying, counseling, and managing risk factors for coronary heart disease (CHD).

A number of studies have made it clear that use of

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preventive measures by primary care physicians is suboptimal.[8–18] Many patients not having recommended preventive care have had a recent physician contact.[19] Furthermore, some of these studies may have overestimated the delivery of preventive health care by selecting only health maintenance visits for review. Many studies have focused on assessment and counseling practice for only one CHD risk factor. None of these studies has examined the assessment of other CHD risk factors among patients already at increased risk because of a previously identified risk factor.

Clinical skills developed during residency training are likely to be carried over into later practice. Physicians in residency training in primary care are therefore an especially important target for efforts to integrate preventive measures into practice. Evaluation of current resident practices is key to the development of curricula designed to improve practice patterns.

This article reports the assessment of and counseling for CHD risk factors of a random sample of patients encountered by residents in eight family practice training programs during two periods in the 1986–1987 residency training year. The specific aims were to determine (1) the likelihood that a patient who is seen for episodic health care in a family medicine center will have had specific CHD risk factors assessed within a defined period of time, (2) the frequency with which a patient identified as having a given CHD risk factor is assessed for the presence of other CHD risk factors, and (3) the frequency with which a patient with a known risk factor will be counseled for that risk factor and other risk factors. Because the most common kind of visit in ambulatory care is the episodic health care visit, patients selected were those seen for episodic health care. The study is part of a larger education and demonstration project, the Preventive Cardiology Education and Demonstration Project, designed to evaluate the effect of a cognitive educational intervention combined with individualized resident CHD risk assessment and counseling on resident physician CHD risk-factor assessment and counseling practices.

Methods

Design and Physician Subjects

This cross-sectional study examined family practice resident practice patterns based on medical record reviews. The practices of family practice residents located in eight residency sites in the University of Washington Affiliated Family Practice Residency Network were examined. The eight residency sites located in five cities and two states in the Pacific Northwest are characterized as follows: 1 university-hospital–based program, 1 military program, 1 in a health maintenance organization, 3 community-hospital–based programs located in urban cities with populations less than 200,000, and 2 community-hospital–based programs located in larger urban settings. Medical records at each site included a patient problem list and health maintenance record. The latter was not consistently found in patient records and was often not used to record health data. Forms were the same within sites, but differed between sites.

Residency curriculum at each site included at least 3 hours of curriculum in cardiovascular risk factors, assessment and management of hypercholesterolemia, smoking cessation, exercise prescription, and identification and treatment of hypertension. Additionally, the majority of residents had completed individual cardiovascular risk assessments including complete blood lipid analysis and had been provided personalized risk information at one time during their training, usually during the first year of training.

From July through September 1986, the practice of 120 residents was examined, including 41 third-year, 43 second-year, and 36 first-year residents. The practice of 122 residents from March through May 1987 was examined, including 44 third-year, 44 second-year, and 34 first-year residents. The mean age of the residents was 29.5 years; 62% were male. Residents were graduates of 31 American medical schools.

Selection of Patient Records

Key identifying information from physician-patient encounters occurring in all residency training sites is recorded in a centralized database. Data for each encounter includes date of visit, resident physician identifier, patient identifier, patient date of birth, and coded reason for visit based on the International Classification of Disease codes.

Medical records were randomly selected from the population of all patients at each site who had a visit (defined as the index visit) occurring during one of two 3-month periods, July through September 1986 or March through May 1987. The number of records sampled was based on the criterion, decided upon by the investigators and an advisory group, that a maximum of 10 records would be sampled for each resident in each of the two periods to provide a sufficient sample of resident behavior. Medical records were excluded from review if patient age was younger than 20 or older than 65 years at the time of the index visit and if the index visit was for general medical examination, obstetric care, initial clinic visit, or symptoms of potential cardiovascular disease. At

the time of medical record audit, the same exclusion criteria were applied. Charts indicating a history of cardiovascular disease or debilitating diseases in which CHD risk factor assessment would probably be inappropriate were also excluded. (In practice, there were no records that met the exclusion criterion for debilitating disease.) Visits for general medical examination, periodic health maintenance, and initial clinic visits occuring before the index visit, however, were included in the audit. The rationale for the exclusions was to focus on adults seen for episodic health care and to minimize bias attributable to assessment for diagnostic rather than primary preventive purposes in those patients presenting with symptoms of cardiovascular disease. Medical records of individuals aged over 65 years were excluded because the greatest benefit in risk reduction is attained by risk-factor identification and management in those younger than 65 years.

One thousand five hundred twenty-eight medical records were reviewed, 717 from July through September 1986, and 811 from March through May 1987, in which an aggregate of 6885 patient encounters were documented. Forty percent of index visits were to third-year, 36% to second-year, and 24% to first-year residents.

At each residency site a l-month window was chosen for sampling. The number of records reviewed per resident in each period was 7.3 for third-year, 6.4 for second-year, and 5.1 for first-year residents. This review represented approximately a 25% sample for third-year residents, a 35% sample for second-year residents, and a 50% sample for first-year residents of eligible patient visits.

Medical Record Review

The patients' records were reviewed by standardized medical record audit conducted on site by trained, experienced medical record auditors. General information collected included date of birth, sex, number of visits in prior 12 months, and number of general medical examination visits in the prior 12 months. The medical records were audited for assessment of and counseling for smoking history, blood pressure, weight, physical activity, and dietary content at the index visit and for visits occurring during the previous 12 months. Because usual ambulatory care practice at the residency sites was to assess family history at least on one occassion, the assessment of family history of cardiovascular disease was examined at the index visit, during the prior 12 months, and in the initial patient history. At the time of the study there was no consensus regarding the frequency with which blood cholesterol measurements should be obtained. The investigators agreed on a frequency of every 5 years as reasonable. Consequently, assessment of blood cholesterol was examined at the index visit, at visits occurring within the prior 12 months, and in laboratory reports dated within the prior 5 years. Audit for documentation of counseling of family history and blood cholesterol was limited to the prior 12 months.

The criteria established to define assessment and counseling for each risk factor are described in Table 1. Certain information was not accepted as an indication of risk-factor assessment or counseling. For blood pressure, a simple list of medications without comment regarding dosage or compliance was not accepted as indication of counseling. For smoking, information recorded by the patient in patient questionnaires was not accepted. For diet assessment, "eating well" was not accepted as evidence of assessment of dietary intake with respect to CHD risk. Recommendations for specific dietary changes unrelated to dietary fat content, such as directions to reduce caloric intake, increase calcium intake, or seek diet consultation for weight loss, did not count as dietary counseling. For physical activity, notes pertaining to physical activity level in the context of an acute injury, eg, range of motion or work release, were not accepted as an indication of physical activity assessment with respect to cardiovascular health.

Risk-factor counseling and assessment of other risk factors were examined in patients identified as having a given risk factor on the basis of medical record review. Risk-factor positivity was defined for five risk factors as follows: the patient was positive for smoking if the review indicated the patient was smoking at any time in the previous 12 months; hypertension was present if the record indicated a diagnosis of hypertension or elevated blood pressure; the patient was classified as having elevated blood cholesterol if a recorded cholesterol measurement was greater than or equal to 5.69 mmol/L (220 mg/dL); obesity was judged to be present if the record indicated a physician diagnosis of obesity or being overweight, or if a recorded body weight for a man was more than 250 lb (115 kg) and for a woman was more than 200 lb (92 kg); and family history was positive if there was any indication of cardiovascular disease in a first- or second-degree relation. The definition of hypercholesterolemia was based upon the National Institutes of Health Consensus Conference recommendations published in 1985.[4]

Quality Control

Three trained auditors reviewed the medical records. Each auditor reviewed approximately 20 records over each 6-hour period of time. At each audit session, ap-

Table 1. Audit Criteria for Assessment and Counseling of Risk Factors

Risk Factor	Assessment	Counseling
Cholesterol	Progress note indicating cholesterol level or order for laboratory test (during 12-mo audit); laboratory data on laboratory slip (anytime during prior 5 years)	Record of any dietary advice or plans to reduce cholesterol with diet or drugs in the prior 12 mo
Blood pressure	Record of blood pressure by staff or physician in clinic notes or flow sheets in the prior 12 mo	Any reference regarding control of blood pressure by any means. Indication of concern about or satisfaction with blood pressure level in the prior 12 mo
Smoking	Any indication of smoking status by physician or clinic staff in the prior 12 mo	Any record of advice to quit or decrease smoking, referral to a cessation program, any effort at patient education, prescription for nicotine gum in the prior 12 mo
Weight	Any record of weight, any notation regarding weight (eg, obese) in the prior 12 mo	Any indication of advice to reduce weight in the prior 12 mo
Diet	Any notation or reference to dietary content in the prior 12 mo	Any nutritional advice, patient education materials, referral to a dietician in prior 12 mo
Physical activity	Any comment regarding physical activity in the prior 12 mo	Any notation regarding exercise, referral to aerobics or other physical activity program, or distribution of patient education materials in prior 12 mo
Family history	Any notation of family CVD history, family tree, or evidence of physician attempt to elicit such, including patient self-report on standard form, in the prior 12 mo or in the initial patient history	Any evidence of physician teaching regarding risk when family history was positive in the prior 12 mo

CVD—cardiovascular disease.

proximately 10% of records were audited by two auditors who were blind to the review of one another. A high degree of interobserver agreement was found for the medical record audit. Data were coded by two experienced coders and entered by trained data-entry personnel.

Analysis

The frequency with which each CHD risk factor was assessed and counseled was calculated using a standard statistical package. Differences in practice by year of residency training were not examined.

Results

One thousand five hundred twenty-eight medical records were reviewed. The mean patient age was 36 years, the median age was 34 years, and 72% were female. Race could not be consistently identified from medical records. The mean number of visits in 12 months was 4.5 with a range of 1 to 34 visits. Most records did not include a general medical examination in the previous 12 months.

Table 2. Assessment of Coronary Heart Disease Risk Factors (N = 1528 medical records)

Risk Factor	Assessment Period	Risk Factor Assessed No. (%)	Risk Factor Positive* No. (%)
Blood pressure	Past 12 mo	1467 (96)	210 (14)
Weight	Past 12 mo	1451 (95)	403 (28)
Family history	At any time	795 (52)	390 (49)
Smoking status	Past 12 mo	611 (40)	346 (57)
Blood cholesterol	Past 5 y	397 (26)	205 (52)
Physical activity	Past 12 mo	382 (25)	
Dietary content	Past 12 mo	382 (25)	

**Risk factor positive is defined in the text for each risk factor with the exceptions of physical activity and dietary content.*

Table 3. Percentage of Patients Assessed for other Coronary Heart Disease Risk Factors as Determined by Medical Records Indicating the Presence of a Given Risk Factor

Positive Risk Factor	Percentage of Medical Records Showing Assessment						
	Cholesterol	Smoking	BP	Weight	Physical Activity	Family History	Dietary Content
Blood cholesterol ≥5.69 mmol/L (n = 205)	—	49	99	99	40	49	47
Smoked within past 12 mo (n = 346)	32	—	99	97	26	54	30
Diagnosed hypertension (n = 210)	55	51	—	100	50	55	54
Diagnosed obese or overweight (n = 403)	36	43	99	—	40	53	42

BP—blood pressure.
To convert cholesterol values in milligrams per milliliter to millimols per liter, multiply by 0.02586.

the mean number of visits for general medical examination was 0.37 within the previous 12 months (range 0 to 2).

Table 2 shows the number of cases in which each risk factor was assessed and the number positive for each risk factor. The data indicate that patients were routinely assessed for blood pressure and weight, but that only about one half were assessed for family history of cardiovascular disease or smoking status, and only one in four was assessed for physical activity or diet. Only 26% of the patients had been assessed for elevated cholesterol at any time within the 5-year period that preceded the chart audit. Of patients assessed, 52% (205) had a blood cholesterol level greater than or equal to 5.69 mmol/L (220 mg/dL), 57% (346) smoked, 14% (210) carried a diagnosis of hypertension, and 28% (403) were obese or overweight.

The finding of a given positive coronary risk factor provides rationale for further inquiry into the patient's cardiovascular risk status, including assessment for other related risk factors. Table 3 shows the percentage of patients having at least one risk factor who were assessed for other risk factors. About one half of all patients whose blood cholesterol levels were greater than or equal to 5.69 mmol/L (220 mg/dL) were assessed for smoking, physical activity, and family history or dietary content; yet nearly all were assessed for blood pressure and body weight. Of smokers, only one third were assessed for blood cholesterol and one half for a family history of cardiovascular disease. Only one half of known hypertensive patients had documentation of smoking status, cholesterol, family history, physical activity, and dietary fat content.

Table 4 shows the number of patients counseled for known CHD risk factors. Essentially all patients found to be hypertensive were counseled for blood pressure, but fewer than 50% of smokers were counseled for smoking, and only 20% of patients with elevated cholesterol readings received counseling in the past year. A positive family history of cardiovascular disease in a first- or second-degree relation was documented in 390 records, but only 2% (8) of these records showed evidence of counseling regarding that individual's CHD risk.

Certain coronary disease syndromes are heritable, notably those associated with disorders of cholesterol metabolism. There is also evidence of familial aggregation, whether genetic or environmental, in relation to hypertension and smoking. Consequently, assessment of CHD risk factors in individuals with a positive family history of cardiovascular disease is clinically important. Table 5 shows the frequency with which the 390 individuals with a documented family history of heart disease and 1135 with a negative or not documented family history were assessed for other CHD risk factors. Those with a documented positive family history of cardiovascular disease were more likely to have been assessed for elevated cholesterol, smoking, low physical activity, and

Table 4. Counseling of Coronary Heart Disease Risk Factors

Positive Risk Factor	Counseled for Risk Factor No. (%)
Blood cholesterol ≥5.69 mmol/L (n = 205)	41 (20)
Smoked within past 12 mo (n = 346)	156 (45)
Diagnosed hypertension (n = 210)	202 (96)
Diagnosed obese or overweight (n = 403)	185 (46)
Family history (n = 390)	8 (2)

Table 5. Percentage of Patients Assessed for Coronary Heart Disease Risk Factors as Indicated in Medical Records Noting the Presence of a Positive Family History of Cardiovascular Disease in First- or Second-Degree Relative and in Those Where Family History Was Negative or Not Documented

	Percent of Medical Records Showing Assessment of					
Family History	Cholesterol	Smoking	BP	Weight	Physical Activity	Dietary Content
Positive (n = 390)	30	47	96	94	32	30
Negative or not documented (n = 1135)	25	38	96	95	23	23

BP—blood pressure.

dietary fat content, though the differences are not substantial.

Discussion

This study focused on the assessment of and counseling for CHD risk factors in 1528 adults between the ages of 20 and 65 years who were asymptomtic for coronary heart disease, who did not have a debilitating disease in which assessment of CHD risk factors would be inappropriate, and who were not seen at the index visit for general medical examination, obstetric care, initial clinic visit, or potential cardiovascular disease. Visits for general medical examination, periodic health examination, and initial clinic visit that occurred before the index visit were included. The results reflect the likelihood that a patient who is seen for episodic health care in a family medicine center will have had CHD risk factors assessed and will be counseled within a defined period.

The results of this study indicate that (1) patients cared for by family practice residents in training and seen for episodic health care are unlikely to have had CHD risk factors assessed at that visit or in a specified time before that visit, (2) patients having a given positive risk factor are unlikely to have been assessed for other CHD risk factors, and (3) patients having a known risk factor are often not counseled for that risk factor.

Four factors may limit the internal validity of the study: (1) bias resulting from incomplete documentation in the medical record of actual practice, (2) underestimation of documented practice (incomplete ascertainment), (3) misclassification of patients as to risk-factor positivity, and (4) the use of broad criteria to define assessment and counseling maneuvers.

Actual practice is less likely to be documented when the data pertain to patient history or counseling rather than physical examination and laboratory information, when the provider perceives the information is not important to continuing health care, when the data are unrelated to the chief complaint or reason for visit, and when the result of inquiry, examination, or testing demonstrates the absence of a finding rather than the presence of a finding.[20–23] In this study, documentation bias may have resulted in underrecording of smoking assessment and counseling during episodic health care visits, but probably did not influence recording of blood cholesterol testing. Because the majority of visits reviewed were for acute or established problems, residents may have been unlikely to document assessment and counseling of risk factors unrelated to the reason for visit even if these practices actually occurred. Additionally, a tendency to record smoking assessment more often when the assessment is positive than when it is negative may have resulted in the higher prevalence of smoking among those assessed than is found regionally.

Interobserver reliability on a 10% sample of records at each audit by two blinded auditors was high, suggesting at least similar levels of ascertainment by the two auditors. Nevertheless, information routinely documented in the same location in medical records may be more easily ascertained by all observers than information documented according to the individual preferences of the physician. For example, blood pressure and weight are always recorded by the nurse just before the written progress note, blood cholesterol values are documented on laboratory slips in the laboratory section of the chart, and intention to obtain a blood cholesterol measurement is fairly consistently documented in the plan section of the progress note. Assessment of family medical history may be underascertained in that a more extensive review of the record was required to determine whether assessment occurred. Fortunately, in all but one clinic at the time of their first visit to the clinic, most patients complete an adult health history questionnaire, which includes a family medical history section.

Rates of assessment of other risk factors among individuals with one positive risk factor and counseling for that risk factor may be influenced by misclassification of patients with respect to risk-factor positivity. For example, a patient may have smoked at the beginning of a 12-month period but quit shortly thereafter and did not smoke for the ensuing 11 months. If the physician re-

Table 6. Assessment of Cardiovascular Risk Factors in Primary Care: Medical Record Audit Studies

Risk Factor	PCED*	Morris and Morris, 1988[10]	Nichols, 1987[11]	Otradovec et al, 1985[13]	Sloane et al, 1985[14]	Romm et al, 1984[17]	Mandel et al, 1982[16]
Cholesterol	.26	.06	.33	.09		.13	.05
Family history	.52			.16			
Smoking	.40			.24	.33	.22	.63
Physical activity	.25			.08			
Diet	.25			.24			
Blood pressure	.96			.99	.99	.81	.88
Weight	.95			.98			.90

*PCED—*Preventive Cardiology Education and Demonstration Project, the present study.*

corded this patient's smoking behavior at the beginning of the 12 months, the patient would be counted as a smoker for the entire 12 months. Counseling regarding smoking probably should continue, however, at least for the first 6 months following smoking cessation, and so even in this patient documentation of smoking counseling should occur. A similar argument would apply in the case of counseling of other risk factors.

The use of broad criteria for assessment and counseling may have resulted in overestimation of these practice variables. Such overestimation may have offset any underestimation resulting from the use of the medical record as a measure of actual practice.

The use of a 12-month, rather than 24-month, window for record review for the majority of risk factors may have resulted in the observed low rates of assessment for smoking, physical activity, and dietary content assessment. Interestingly, however, blood pressure and weight, which are routinely recorded by nurses, were recorded at least once in all cases in the 12-month window. Because most patients whose care was examined visited frequently, there were numerous opportunities for risk-factor review. Regarding counseling of individuals having a risk factor, it is not unreasonable to expect counseling at least annually, particularly when the average number of visits providing opportunities for counseling was great.

The findings are most generalizable to the practices of other family practice residents in training. It is not clear to what extent studies of resident practice can be generalized to the practices of community physicians because factors influencing resident practice are different from those affecting community physician practice.[24]

The findings of this study with respect to CHD risk-factor assessment are similar to those of other studies of family practice resident outpatient practice shown in Table 6. The study most comparable to this study in terms of physician-subjects, setting, and patient characteristics is that of Otradovec et al,[13] conducted in 1981 in a university-based family medicine clinic. One hundred forty-three randomly selected records of nonobstetric patients aged 10 to 50 years were reviewed. As in the present study, the majority (70%) of patients were female, patient-completed health history questionnaire data were not included in the review, and visits for cardiovascular disease related problems were excluded, although patients with a past history of cardiovascular disease were not excluded. That study differed from this study in that index visits for general medical examination were not excluded, though this kind of visit was rare.

Romm et al[17] reviewed the records of 176 patients who presented for a general medical examination in a family practice outpatient clinic in a 10-week period in the winter of 1982 to 1983. The visits of these patients during the year prior to the visit for the general medical examination were reviewed for information relating to cardiovascular risk-factor assessment. Consequently, general medical examination visits in which attention to disease prevention is more likely are overrepresented. Sloane et al[14] reviewed 216 records of patients older than 65 years in seven practices in North Carolina, looking for assessment of blood pressure within the prior 2 years and smoking within the prior 3 years as part of a study of multiple risk-factor assessment by family physicians in the elderly.

Two fairly recent studies have focused specifically on assessment of cholesterol status in outpatients. Morris and Morris[10] reviewed the records of 270 adult patients aged 20 to 70 years seen by family practice residents in a university-based program in Texas in the fall of 1985. The majority of patients were Mexican-American and of lower socioeconomic status. Of 133 eligible patients, only 6% had their cholesterol measured over a 4-month period. In a larger study of cholesterol screening practice, Nichols[11] reviewed 1062 records of patients aged 30 to 39 years who had been seen within the prior year at a

university-based family medicine clinic in 1985-1986. Only 33% of patients had a cholesterol determination documented in their charts over the prior 3 years. Recently, Ornstein et al[25] reported that cholesterol assessment was included in only 20% of records reviewed in a large university-based family medicine program.

Differences in the criteria applied for inclusion of medical records in the review process may account for some of the differences in findings between studies. For example, in this study, index visits for health maintenance were excluded although information from health maintenance visits occurring before the index visit qualified for review. In contrast, Otradovec et al[13] included health maintenance visits as index visits. Because general medical examination and health maintenance visits account for a very low percentage of all visits, however, this difference in methodology probably accounts for only a small proportion of the difference in findings. In general, comparison of these studies with the results of the present study suggests that between 1980 and 1987 there may have been an increase in the frequency with which patients seen by family practice residents are assessed for CHD risk factors.

What factors account for the generally low rates of assessment and counseling of CHD risk factors? Three sets of factors seem to influence physician practice in preventive health care: predisposing, enabling, and reinforcing factors.[26] Predisposing factors include knowledge, attitudes, beliefs, perceived self-efficacy,[27] and demographic factors.[28] Enabling factors determining practice include the existence of a clear official policy, time, reimbursement, availability of staff, practice setting, and patient visit frequency and demand.[29] Reinforcing factors include feedback from colleagues and patients.[26,30,31]

Other data not reported here on the same population of residents indicate adequate knowledge and positive attitudes toward risk-factor assessment and counseling. Furthermore, the recent classes of medical students, from which the population of residents comes, have positive attitudes toward CHD prevention.[32] Residency curricula at each site included several hours of didactics on CHD epidemiology and risk factors. The majority of residents had received personal CHD risk assessment and counseling. Clearly stated official policies existed at the time of the study for assessment of blood pressure, smoking, and blood cholesterol.

The reasons for the high rates of assessment and counseling of blood pressure may include the delegation of responsibility for assessment from the physician to the nurse, the existence of recognized official policies for management of high blood pressure, probable high levels of perceived self-efficacy among resident physicians in the management of hypertension, and attention to blood pressure by attending physicians. In contrast, the low rates of assessment and counseling of smoking and blood cholesterol may result from lack of time or delegation of activities to other health care personnel, the lack of a recognized official policy for the management of smoking and hypercholesterolemia, low levels of perceived self-efficacy among physicians,[27,32] and lack of positive feedback from colleagues and patients regarding these practices.

Clearly, there is a need for effective interventions aimed at enhancing CHD risk-factor assessment and counseling practices. Interventions generally effective in modifying behaviors or practices include certain key elements: utilization of a combination of approaches, targeting specific behaviors, individualization of education and feedback, peer comparison, and involvement of respected colleagues.[33] Specific interventions aimed at modifying preventive practices of physicians have included dissemination of educational materials,[34] lectures,[35] feedback of performance,[36,37] providing cues,[38,39] and providing reminders for test ordering.[37] Lectures alone, including the kind of didactic information provided to the resident physicians in this study, are often not effective in promoting lasting changes in practice.

These and other interventions may prove effective in favorably modifying CHD risk-factor assessment and counseling practices. In particular, the relatively low frequency with which cholesterol was assessed in patients in this study, 26%, and the even lower frequency with which those patients with hypercholesterolemia were counseled by residents in family practice training programs, 20%, clearly identify these programs as priority targets for the National Cholesterol Education Program.

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