Specialty Differences in Cardiovascular Disease Prevention Practices

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Objectives. The aim of this study was to examine physician specialty differences in cardiovascular disease prevention practices.

Background. Despite the importance of cardiovascular disease prevention, little is known about current national practices, particularly physician specialty differences.

Methods. Using a national survey of office visits, we evaluated differences in the propensity of physicians of different specialties to provide prevention services. We analyzed 30,929 adult visits selected by stratified random sampling in the 1995 National Ambulatory Medical Care Survey. Standard and ordinal multiple logistic regression models were employed to estimate the independent effects of physician and patient characteristics.

Results. A variety of cardiovascular disease prevention services were provided during an estimated 547 million adult office visits to US physicians in 1995, including blood pressure measurement (50% of visits), cholesterol testing (5%) and counseling for exercise (12%), weight (6%), cholesterol (4%) and smoking (3%).

Cardiovascular disease (CVD) is the leading cause of mortality in the United States, accounting for 41% of all deaths (1,2). The established role of modifiable physiologic and life-style factors in the etiology of CVD makes prevention a vital clinical approach (3–5). A variety of physician activities including screening, counseling and pharmacotherapy focus on the risk-factors of smoking, hyperlipidemia, hypertension, obesity and sedentary life-style. These tasks may be directed at patients with or without known CVD. Clinical trials and cohort studies have suggested the efficacy of these interventions (5–9) and clinical guidelines have been promulgated to direct physician practices (10–13).

Despite substantial efforts investigating and promoting CVD prevention, existing evidence suggests that CVD prevention services may not be adequately provided (14–16). These assessments, however, are limited and little is known about specialty differences in these practices. Many previous investigations measure physician attitudes rather than practices (14,17,18), and most studies that assess practices rely on data from the 1970s (19–21). Past investigations do suggest that general internists and cardiologists are more likely than other primary care physicians and specialists to order cholesterol tests (22), report smoking and exercise counseling (17), gather information on cardiac risk factors (18), counsel patients on CVD risk factors (21) and provide counseling generally (14,19,20). More direct and current information exists about specialty differences in the acute care of CVD. Cardiologists, followed by general internists, are more adherent to acute management guidelines when compared to other primary care physicians and specialists (23–25).

To characterize recent CVD prevention practices, we have employed a representative sample of US office visits. These visit-based data allow specific assessment of whether particular physicians are more likely to provide services than others, controlling for patient characteristics.

Conclusions. Cardiologists have the greatest propensity to provide cardiovascular disease prevention services, while primary care physicians vary substantially in their practices. These findings suggest a need to address variations in cardiovascular disease prevention.

In addition, medication management was reflected by the report of antihypertensives in 12% of visits and lipid-lowering medications in 2%. Across these eight services, propensity to provide services varied consistently with specialty. Controlling for patient and visit characteristics and compared to general internists, the likelihood of providing services was higher for cardiologists (adjusted odds ratio 1.65, 95% confidence interval 1.44 to 1.89) but lower for obstetrician/gynecologists (0.75, 0.68 to 0.82), family physicians (0.69, 0.64 to 0.74), general practitioners (0.58, 0.53 to 0.63), other medical specialists (0.65, 0.59 to 0.72) and surgeons (0.06, 0.05 to 0.06).

Data source. Data for this study come from the 1995 National Ambulatory Medical Care Survey (NAMCS) conducted by the National Center for Health Statistics (26,27). This ongoing, annual survey of US physicians selects medical practice physicians and specialists (23–25).

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Abbreviations and Acronyms

CI = confidence interval
CVD = cardiovascular disease
NAMCS = National Ambulatory Medical Care Survey
OB/GYN = obstetrician/gynecologist
OR = odds ratio

The National Ambulatory Medical Care Survey is a large, representative, national sample with a degree of detail not available from insurance claims or other sources. The recording of information is not tied to reimbursement, unlike insurance claims where prevention services may not be recorded. The cross-sectional nature of the NAMCS data, however, does not allow specific patients to be followed longitudinally. Because the unit of analysis is the patient visit, rather than the patient, it is not possible to account for the frequency with which patients visit their physicians. Patients visiting physicians less often may be more likely to receive some services at any given visit.

We used data from NAMCS to study the use of CVD prevention services, including blood pressure measurement, cholesterol testing and counseling related to exercise, cholesterol reduction, weight reduction and smoking. In addition, physicians' role in managing antihypertensive and lipid-lowering medications was assessed by examining whether patients were reported to be taking these medications.

The presence of atherosclerotic CVD, hypertension, hyperlipidemia, obesity, diabetes and smoking was coded if any of the following were recorded on visit records: a specific NAMCS patient problem code, a specific NAMCS "reason for visit" code (28) or an appropriate ICD-9 diagnostic code (29). American Medical Association physician specialty designations were employed. General internists were defined as those internists who did not identify a medical subspecialty.

Statistical analysis. Evaluation of CVD prevention focused on assessing the propensity of different physician specialties to provide services, controlling for patient characteristics. We estimated the national volume of cardiovascular prevention activities by US office-based physicians using the
Results

One or more of the eight selected CVD prevention services were reported in 56% of the estimated 547 million adult visits to US office-based physicians in 1995. Blood pressure measurement was reported in 50.2% of visits and cholesterol testing was ordered in 4.6%. Physicians also provided counseling for CVD risk factors, including exercise counseling (11.5% of all visits), weight reduction advice (5.8%), cholesterol counseling (4.3%) and smoking cessation advice (3.0%). Patients were reported to be taking lipid-lowering medications in 1.9% of all visits, while antihypertensive medications were reported in 11.6%.

Share of prevention services. Among the eight CVD prevention services studied, general internists provided between 25% (exercise counseling) and 44% (cholesterol testing) of all services. Family physicians (17% to 24% share across the eight services), general practitioners (10% to 14%) and obstetrician/gynecologists (OB/GYNs) (1% to 14%) each provided a smaller share of services. Together these four specialties provided 66% to 73% of services, while they saw 55% of all office visits in 1995. Cardiologists provided a small share of all CVD prevention services (4% to 18%), although they saw fewer patients (3% of all office visits). Other medical specialists, surgeons and other specialists provided relatively few services. Primary care physicians provided the majority of services to patients with known CVD (56% to 63%). Cardiologists provided a modest share of services to these patients (20% to 33%).

Specialty differences in preventive services provided at visits. Physician specialties differed in the likelihood that CVD prevention services were provided during office visits. On an unadjusted basis, cardiologists were most likely to provide these services (Tables 1 and 2). For each of the eight services examined, cardiologists had the highest rates. The report of lipid-lowering medications by cardiologists showed the greatest difference from other physicians (13% for cardiology visits versus 1% for all other visits, p < 0.001). The smallest difference was for smoking cessation (cardiologists 4.9% vs. 2.9% for other physicians, p < 0.001). General internists were consistently the next most likely to provide each of the eight services, followed by other primary care physicians and then other medical specialists.

A series of eight multiple logistic regression models was employed to estimate the propensity of different physicians to provide individual services, controlling for potentially confounding patient clinical and demographic characteristics. In these models, cardiologists continued to have the greatest likelihood of providing preventive services, although adjustment for patient characteristics reduced the magnitude of differences between cardiologists and other physicians (Tables 1 and 2). General internists tended to be next most likely to provide CVD prevention services. For most services, other medical specialists, family physicians and general practitioners had an intermediate propensity to provide services. While OB/GYNs were very likely to measure blood pressure and

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<th>Table 1. Provision of Cardiovascular Disease Prevention Counseling Services to US Adults, 1995; National Ambulatory Medical Care Survey</th>
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<tr>
<td><strong>Exercise Counseling</strong></td>
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<td><strong>Percentage of Visits with Counseling</strong></td>
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<td><strong>Adjusted Odds Ratio (95% CI)</strong>*</td>
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<td>Internal medicine</td>
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<td>Surgery</td>
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<td>Other specialists</td>
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<td><strong>Total</strong></td>
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*Odds ratio of likelihood of prevention services during a visit relative to visits to general internists, adjusted for patient age, sex, race, payment source, geographic region, cardiovascular disease, smoking, hypertension, diabetes, obesity, general medical examination, first visit to physician and cardiac reason for visit. 95% CI = 95% confidence interval.
counsel about exercise and weight, they were less likely to provide other services. Surgeons had a much lower likelihood of providing CVD services.

**Subgroup analyses.** These same findings pertained to services provided to subgroups of patients with particular risk factors for CVD: the patients most likely to benefit from particular services (Table 3). Prevention services tended to be most likely for cardiologists followed by general internists and family physicians, then other physicians. Compared to the results for all visits, many differences between general internists and family physicians were relatively small.

Analysis of new patient visits and general medical examination visits also demonstrated the same pattern of specialty differences in prevention services. In five of the eight services, cardiologists were the specialty most likely to provide CVD prevention services, generally followed by general internists then other primary care physicians. For example, blood pressure measurement in these visits was most likely in visits to cardiologists (94%) compared to general internists (89%), other medical specialties (89%), OB/GYNs (85%), family physicians (84%) and surgeons (11%, chi-square p < 0.001).

**Aggregate patterns by physician specialty.** The results presented in Tables 1 to 3 suggest a consistent effect of specialty across CVD prevention services. To summarize the aggregate effect of specialty, we developed an ordinal logistic regression model predicting the number of different prevention services provided at any given visit. Compared to general internists, the adjusted odds of providing CVD prevention services was highest for cardiologists (adjusted OR 1.65, 95% confidence interval (CI) 1.44 to 1.89). The overall likelihood of services was substantially less for OB/GYNs (0.75, 95% CI 0.68 to 0.82), family physicians (0.69, 95% CI 0.64 to 0.74), general practitioners (0.58, 95% CI 0.53 to 0.63), other medical specialties (0.65, 95% CI 0.59 to 0.72) and surgeons (0.058, 95% CI 0.053 to 0.063).

Several other variables were consistent predictors of the provision of CVD prevention services. Within our ordinal logistic regression model, the adjusted odds of prevention services were 2.50 times higher (95% CI 2.30 to 2.72) when CVD was present. Each CVD risk factor was a strong independent predictor of prevention services, especially hyperlipidemia (OR 10.2, 95% CI 8.8 to 11.8) and hypertension (OR 2.51, 95% CI 2.36 to 2.67). Patients less than 45 years old were less likely to receive services (OR 0.88, 95% CI 0.83 to 0.93) compared to older patients. Privately insured patients were more likely than patients with other coverage to receive prevention services (OR 1.15, 95% CI 1.10 to 1.20). Patients residing in the Northeast region of the country were more likely to receive services (OR 1.08, 95% CI 1.02 to 1.14) than in other geographic areas. Nonwhites were slightly more likely to receive services (OR 1.08, 95% CI 1.02 to 1.14) compared to whites. Patients were more likely to receive services if the visit was a general medical exam (OR 2.19, 95% CI 2.02 to 2.37) or if the primary reason for the visit was a cardiac disease or symptom (OR 2.02, 95% CI 1.82–2.25). Patients new to a physician’s practice were slightly less likely to receive services.
Gender did not have a significant effect on overall CVD prevention services.

**Discussion**

Physicians in the United States provide a large volume of CVD prevention services, including screening, counseling and medication management. While primary care physicians provide a large share of all services, during any given visit cardiologists had the greatest propensity to provide CVD prevention services, even after accounting for patient characteristics. Among primary care physicians, general internists were most likely to provide prevention services.

Consistent with their focused training and scope of practice, cardiologists are more aggressive in providing prevention services. Like previous researchers (17,20,25), we noted that cardiologists were more likely to provide risk factor counseling, diagnostic screening tests and CVD medications. Our findings are consistent with analogous studies indicating that cardiologists have better outcomes and greater adherence to guidelines in the inpatient management of acute cardiovascular conditions (23–25). Our findings also are consistent with studies suggesting that general internists are more likely to provide counseling (18,20–22) and cholesterol testing (19) than other primary care physicians.

The prominent role of CVD prevention services in office-based practice emphasizes the need for medical education that prepares physicians adequately to perform these tasks (32). Because primary care physicians provide the vast majority of services, it would be difficult to overemphasize the provision of appropriate CVD prevention in primary care training programs. Young physicians, however, report receiving too little training in office practice and being insufficiently prepared for providing preventive care (33).

Among primary care physicians, family physicians, OB/GYNs and general practitioners had a lower propensity to provide services than general internists. While other studies suggest that even internists underutilize CVD prevention (14,15), we were not able to gauge the appropriateness of the practices observed in this study. However, the magnitude of both the health care costs and the potential benefits associated with CVD prevention suggests a need to address the observed variations. More aggressive implementation of practice guidelines, enhanced outpatient training and continuing medical education may provide mechanisms for responding to the lack of uniformity in prevention practice. In addition, adequate payment for prevention services and improved office support for physicians may be needed to ensure consistency and optimal timing of prevention services.

The need for training in CVD prevention may extend beyond primary care physicians. While other physicians provided only a small portion of all prevention services, they may be a hidden source of primary care (34). Given their large share of all visits, even modest increases in prevention services provided during nonprimary care, noncardiology visits would substantially increase the overall volume of several services.
Study limitations. Several limitations of the NAMCS data must be acknowledged. For the physician-reported practices that we examined, it was not possible to determine their clinical appropriateness. Physician reporting of services may not be complete. In addition, we were unable to exclude the possibility of selection bias among those physicians choosing to participate in the survey. Using a cross-sectional sample, we have evaluated screening and counseling services on the basis of specific visits rather than for patients over time. Specifically, we were unable to account for the possibility that patients seen by physicians less frequently might receive more services at any given visit. This potential source of bias could contribute to the greater likelihood of cardiologists providing services at specific visits. Even so, our analysis of medications would not be affected by this issue, and many other services, particularly smoking cessation counseling and blood pressure measurement, might be appropriate at every visit. Finally, our analysis of new patient visits and general medical exam visits suggests consistent specialty differences. This subgroup of visits is less likely to be affected by bias related to visit frequency.

Conclusions. Despite these limitations, NAMCS provides a unique, detailed snapshot of national CVD prevention practices that raises several concerns. Although prevention represents an effective clinical approach to CVD, great variations exist in the propensity of US physicians to provide these services. Efforts should be made to address these variations.

Randall S. Stafford, MD, PhD, conceived of the study, performed the literature review, performed computer programming for the statistical analyses and prepared most of the manuscript. David Blumenthal, MD, MPP, contributed ideas to research design, provided data for the analysis, contributed to discussion of policy implications in the manuscript and performed extensive editing on multiple revisions of the manuscript.

References