Original Research Articles

Periodic Health Evaluation of Adults: A Survey of Family Physicians

Roger Luckmann, MD, MPH, and Sharon K. Melville, MD, MPH
Worcester, Massachusetts

Background. The routine periodic health evaluation (PHE) is a popular format in primary care practice for the delivery of clinical preventive services to adults, but knowledge of the current pattern of use and of the content of the PHE is limited.

Methods. We surveyed a random sample of 567 family physicians (response rate, 60.1%) in New England regarding their approach to and attitudes about the PHE of adults.

Results. Family physicians reported spending a mean of 35.2% (11.6 hours per week) of their total ambulatory care time on adult PHEs, which were usually scheduled for 20 to 30 minutes each. All respondents recommended a PHE to men ≥50 years old and to women ≥40 years old, and more than 90% recommended a PHE to younger patients. Most physicians (80.7%) reported that the PHE is their primary mechanism for delivering preventive services, and 90.6% believed that the PHE should include a comprehensive physical examina-

tion. The mean number of physical examination items performed during the PHE was 11.6 to 13.9, depending on patient age and sex. As part of the PHE, most physicians (71.6% to 90.7%, depending on patient age and sex) ordered one or more screening laboratory tests not recommended by the US Preventive Services Task Force. Utilization of fewer laboratory tests was associated with residency training, employment in a health maintenance organization (HMO), and limited concern about malpractice suits.

Conclusions. Family physicians reported spending a substantial amount of time on the PHE of adults, performing extensive screening physical examinations and many screening laboratory tests of unknown effectiveness. Among family physicians, there is considerable unexplained variation in the form and content of the PHE.

Key words. Screening; physical examination; periodic health examination; ambulatory care; family practice; primary health care. (*J Fam Pract* 1995; 40:547-554)

In the United States, the routine periodic health evaluation of adults (PHE) was first popularized in the 1920s by the American Medical Association (AMA) and the Metropolitan Life Insurance Company. The content of the PHE received little serious attention until the 1970s, however, when Frame and Carlson[1-4] published their systematic reviews of the PHE, and the Canadian Task Force on the Periodic Health Examination promulgated guide-

lines for preventive care that specified in great detail recommendations for periodic screening, immunizations, and counseling.[5] In 1983, the AMA formally endorsed the emerging concept that periodic health evaluations should consist of a highly individualized package of preventive services of proven effectiveness rather than a standard, exhaustive set of examinations and laboratory tests applied indiscriminately.[6]

The US Preventive Services Task Force (USPSTF) published its first set of prevention guidelines in 1989.[7] The USPSTF recommends some form of PHE every 1 to 3 years for those aged 19 to 64 and annually for those aged 65 and older. For most healthy adults without specific risk factors, the USPSTF recommends a very limited screening physical examination, relatively few screening laboratory tests, and extensive risk-specific counseling.[7]

Surveys of physicians and patients show that the PHE is a very popular format for the delivery of preventive services. In 1985 in the United States, the general medical examination was the most common reason for a visit to family physicians (5.4% of all visits) and to internists (9.7% to 11.3% of all visits).[8] According to results from the Massachusetts 1990 Behavioral Risk Factor Surveillance Survey,[9] 42% to 86% of adults, depending on age and sex, reported having a routine checkup within the past year.

Despite the popularity of the PHE and recommendations for its continued use, knowledge of the current pattern of use and of the content of the PHE in primary care practice is limited. Many studies of the delivery of clinical preventive services have concentrated on specific screening procedures, counseling practices, or laboratory tests, and compared physician performance or recommendations with published guidelines.[10-17] However, most of these studies do not address the issue of *how* these services are packaged and delivered in the clinical setting. Information about primary care physicians' use of the PHE and about their attitudes and beliefs regarding the PHE is critical to determining the most effective and acceptable means of delivering recommended clinical preventive services.

Our study had two objectives: (1) to describe the variation among family physicians' reports of the frequency, content, duration, and organization of the PHE of adults, and (2) to describe family physicians' attitudes and beliefs about the PHE.

Methods

We developed and pretested a survey instrument that included 96 items addressing several topics related to the PHE of adults: recommended frequency, scheduled duration, content of the history and physical examination, associated screening laboratory tests, office systems supporting the PHE, physician attitudes and beliefs about the PHE, and physician demographic and practice characteristics. We specifically did not include questions about prevention counseling or about most commonly recommended cancer screening tests (eg, mammography) because performance of these items has been extensively studied by other investigators. A routine PHE was defined as a routine health evaluation of an adult patient aimed at early detection or prevention of disease, which may include any or all of the following: aspects of the medical history, partial or complete physical examination, one or more screening tests, and prevention counseling. The definition included the statement that for women, the PHE may be considered a routine periodic gynecologic examination.

In responding to questions about the physical examination and laboratory tests, subjects were instructed to report their usual practices for established, asymptomatic adult patients and to assume that none of the laboratory tests offered as choices had been performed within 5 years. We selected a random sample of 698 physicians from a database maintained by Folio Associates, Inc (Boston, Mass, 1993), which listed a total of 1345 self-identified family physicians practicing in Massachusetts, Rhode Island, and Connecticut.

The survey instrument and an addressed stamped return envelope were mailed to all physicians in the sample in June 1993. A reminder postcard was sent to all subjects 2 weeks following the initial mailing. Physicians not responding to the first mailing were mailed a second copy of the survey 4 weeks after the first mailing. Finally, 10 weeks after the initial mailing, subjects who failed to respond to these two mailings were sent a short form of the survey consisting of 24 items selected from the original instrument addressing the following topics: recommended frequency and scheduled duration of the adult PHE, associated screening laboratory tests for men only, selected questions on physician attitudes, and physician and practice characteristics.

Analysis of variance was used to compare mean laboratory test scores, and 95% confidence intervals (95% CI) for selected sample proportions were calculated. Linear regression modeling was performed using the SPSS-PC statistical package.[18]

Results

Of the 698 original physicians, 45 could not be located, and 86 were not actively practicing primary care medicine. Of the remaining 567 eligible physicians, 285 responded to the long form of the survey, and 56 returned only the short form. The overall response rate was 60.1% (341/567).

The majority of respondents were white (77.5%), male (93.1%), residency-trained (67.0%) and board-certified in family practice (76.8%). The most common forms of practice organization were solo practice (37.2%) and family medicine group practice (38.6%). Multispecialty group practices represented 10.6%, and 13.6% were in other forms of practice. The mean number of physicians in all types of group practices was 6.8 (range 2 to 60), with 66.1% of practices having 5 or fewer physicians. The mean age of respondents was 46.1 years (range 29 to 86).

Respondents reported spending a mean of 33.0 hours per week (95% CI, 31.7 to 34.3; range, 1 to 70) in the office practice of ambulatory care and a mean of 11.6

Table 1. Recommended Intervals Between Periodic Health Evaluations (PHEs) for Adults Reported by a Sample of Family Physicians, by Patient Age and Sex (n=300–330)

Patient Age, y	Percentage of Physicians Recommending PHEs at Intervals of		
	≤1 y	2–3 y	≥4 y
Women*			
19–39	61.4	32.1	6.5
40–49	74.2	23.9	1.8
50–64	78.5	20.0	1.5
≥65	93.3	5.8	0.9
Men*			
19–39	9.3	46.3	44.3
40–49	33.6	59.0	7.3
50–64	39.8	54.8	5.5
≥65	91.5	7.3	1.2

*Sample size varies because of missing data, and because respondents not recommending a PHE for a specific age and sex group are excluded from that group.

hours per week (95% CI, 10.6 to 12.6; range 0 to 55) on the PHE of adults. The average proportion of all ambulatory care hours devoted to adult PHEs was 35.2% (95% CI, 32.7 to 37.7).

PHE Interval

All respondents recommended PHEs for men aged 50 and older and for women aged 40 and older. Almost all (91.1%) recommended PHEs for men aged 19 to 39 years, and 97.3% recommended them for women in the same age group. For men aged 40 to 49 years, 99.1% of physicians surveyed recommended PHEs. The PHE was reported as the primary mechanism for the delivery of preventive services to adults in their practices by 80.7% (95% CI, 0.76 to 0.85) of respondents. One third (95% CI, 0.28 to 0.39) indicated that they provide most or all of their preventive care of adults during routine visits not specifically designated as a PHE.

Table 1 shows the intervals between PHEs recommended by respondents for men and women in four age categories. The majority of physicians recommend a 1-year interval for women of all ages. An interval of 2 to 3 years is recommended by most physicians for men younger than aged 65. Some respondents (13.7%) reported that many or most of their patients believe that periodic health evaluations should be scheduled more frequently than is currently recommended by these physicians, while 38.6% responded that only some of their patients have this belief.

PHE Scheduling

Almost one half of the physicians (47.3%; 95% CI, 0.42 to 0.53) reported that it is very important for women to have a separate appointment dedicated to the PHE, whereas 34.4% (95% CI, 0.30 to 0.40) strongly supported a separate appointment for men as well. Only 6.6% responded that a separate appointment for men is not at all important (for women, 4.8%).

The vast majority of physicians (91.6%) reported that they usually provide most or all preventive care for women at the time they come in for routine Papanicolaou (Pap) smear tests and breast examinations. For women who receive routine Pap smears from a gynecologist, the majority of physicians recommended a separate appointment with them for the provision of other routine preventive care. For women aged 40 and younger, the percentage of physicians making that recommendation was 59.0%; 89.9% made the same recommendation for women aged 65 and older.

There was modest variation in the time usually scheduled for the PHE. A majority of respondents reported appointments of 20 to 30 minutes for patients of all ages and either sex, except for older women; 15-minute visits for PHEs were reported by only 3.9% to 17.1% of respondents, depending on age and sex of the patient. However, substantial numbers of physicians (20.8% to 50.8%) scheduled 40 to 60 minutes for PHE appointments. The percentage of physicians recommending longer appointments increased with patient age.

Physical Examination

A great majority of respondents (90.6%) said they believe that the routine PHE should include a comprehensive physical examination, and 74.4% reported that they believe that many or most of their patients expect a complete "head-to-toe" physical examination during a PHE appointment. Of the 25 physical examination items included in the survey, 95% of respondents reported performing 9 items in all age groups: weight, blood pressure, lymph nodes, observation of the oral cavity, thyroid, auscultation of lungs and heart, palpation of the abdomen, and examination of the extremities. Table 2 shows the percentage of physicians who routinely performed the remaining 16 items.

There was little variation in the total number of physical examination items reportedly performed during the PHE. For women, the mean number of items ranged from 11.6 (standard deviation [SD], 2.0) in the youngest group to 13.1 (SD, 1.7) for those aged 65 and older (range, 5 to 17 for all age groups). For men, the mean was 12.4 (SD, 2.3) for the youngest group and 13.9 (SD, 1.9) for the oldest (range, 4 to 18 for all groups).

Table 2. Percentage of Family Physicians Reporting Frequent Performance of Selected Physical Examination Items During a Routine Periodic Health Evaluation, by Patient Age (n=285)

Examination Items*	Patient Age, y			
	19–39	40–49	50–64	≥65
Bimanual pelvic examination (female)	94.3	96.8	97.5	91.4
Breast (female)	92.9	99.6	99.3	98.6
Otoscopic	89.8	90.1	91.5	91.8
Genitals (male)	88.0	91.5	90.8	90.4
Inguinal canal (male)	84.5	87.6	85.1	83.6
Height	82.0	79.8	78.0	77.9
Neurologic	76.7	77.3	83.7	85.7
Opthalmoscopic	62.5	72.7	83.7	83.9
Skin examination				
Complete†	55.4	59.3	61.1	61.8
Partial	43.2	39.6	37.9	37.5
Visual acuity	35.0	30.5	31.6	33.2
Rectal (female)	25.4	76.2	91.9	92.1
Hearing	21.6	20.2	24.5	32.1
Rectal (male)	21.6	82.3	97.5	97.1
Oral cavity (palpation)	20.5	22.0	27.3	29.3
Tonometry	1.1	3.2	5.3	6.4

*Nine items reportedly performed by 95% or more of the respondents reported in all patient age groups were not included in this table. These items were weight, blood pressure, lymph nodes, observation of the oral cavity, thyroid, auscultation of lungs and heart, palpation of the abdomen, and examination of the extremities.
†Complete skin examination: ≥80% of skin surface examined.
NOTE: Table is based on responses to long form of survey only.

Laboratory Tests

Table 3 shows the percentage of physicians who reported frequently ordering each of eight screening laboratory tests as part of the PHE for asymptomatic patients who had not had the test within the last 5 years. Dipstick urinalysis and total cholesterol measurements are ordered by the majority of physicians for men and women of all ages. Most physicians (44% to 74%) reported ordering a complete blood count (CBC) or a hemoglobin or hematocrit (Hgb/Hct) test, depending on the age and sex of the patient. Most respondents considered measurement of glucose and a multichannel chemistry panel a routine part of the periodic examination for patients over the age of 40, and about one third of the respondents routinely ordered these tests for patients less than 40 years old.

The electrocardiogram (ECG) was commonly recommended for patients over the age of 40, and the chest radiograph was used as a screening test by a small minority of respondents. Approximately one half (48.8%) of physicians reported that they frequently order a prostate-specific antigen test (PSA) for men over the age of 50 years. With increasing patient age, there was a general corresponding increase in the percentage of physicians ordering each test. There were few substantial differences between men and women regarding recommended tests.

USPSTF Laboratory Guidelines

Of the laboratory tests we evaluated, the USPSTF currently recommends only the total cholesterol determination for all ages and a dipstick urinalysis for patients aged 65 and older. We performed several analyses to assess the utilization of the tests not recommended by the USPSTF: dipstick urinalysis for patients less than 65 years old, microscopic urinalysis, glucose, CBC or Hgb/Hct, multichannel chemistry panel, ECG, chest radiograph, and prostate-specific antigen.

The percentage of physicians fully adhering to the USPSTF guidelines for these tests for men (ie, ordering none of the nonrecommended tests routinely) was 28.4% (95% CI, 0.24 to 0.34) for the youngest patient group, 14.3% (95% CI, 0.11 to 0.19) for the middle, and 9.3% (95% CI, 0.10 to 0.18) for the oldest. For adherence to these guidelines for women, the corresponding results were 23.9% (95% CI, 0.19 to 0.30), 14.5% (95% CI, 0.11 to 0.19), and 18.4% (95% CI, 0.14 to 0.24). The mean number of nonrecommended tests for men frequently ordered by physicians who did not comply fully with the USPSTF guidelines (ie, ordered one or more nonrecommended tests) was 2.7 (95% CI, 2.5 to 2.9) in the youngest group, 4.1 (95% CI, 3.9 to 4.3) for those 40 to 64 years old, and 3.9 (95% CI, 3.7 to 4.1) in the oldest group. For women, the corresponding means were 2.7 (95% CI, 2.5 to 2.9), 3.6 (95% CI, 3.4 to 3.8), and 3.5 (95% CI, 3.3 to 3.7).

Predictors of Test Use

To investigate variation in the utilization of laboratory tests not recommended by the USPSTF, we calculated a laboratory test score for each respondent to the long form of the survey instrument. For each nonrecommended test reported to be frequently ordered for each age and sex group, the respondent received 1 point. The score could range from a minimum of 0 to a maximum of 43. Actual scores ranged from 0 to 42 with a median of 16, and a mean of 16.2 (SD, 10.6). The score was approximately normally distributed.

Table 4 shows the differences in the mean test score

Table 3. Percentage of Physicians Who Frequently Recommend Selected Laboratory Screening Tests As Part of the Periodic Health Evaluation of Adults, by Patient Sex and Age (n=285–330)

Laboratory Test	Male Patient* Age, y			Female Patient* Age, y		
	19–39	40–64	≥65	19–39	40–64	≥65
Total cholesterol	75.4	91.5	88.1	60.1	88.8	87.3
Urinalysis (dipstick)	63.6	73.1	78.9	65.2	73.0	77.2
CBC/Hgb/Hct	44.4	63.8	71.0	56.4	68.2	74.0
Glucose	31.3	49.4	60.6	29.2	46.4	59.9
Chemistry panel	20.1	53.5	63.9	28.6	50.7	61.0
Urinalysis (microscopy)	16.6	24.4	29.4	24.0	30.2	32.4
ECG	4.7	38.6	53.7	4.1	31.3	49.1
Chest radiograph	2.5	10.7	15.0	2.9	9.1	15.0

*Sample size varies because of missing data and because the short form of the survey did not include a question about laboratory tests for women.
CBC denotes complete blood count; Hgb, hemoglobin; Hct, hematocrit; ECG, electrocardiogram.

according to several physician and practice characteristics. Concern about malpractice suits was measured by the response to this question: "How often does concern about potential malpractice claims influence you to perform more laboratory and screening tests during a periodic health evaluation than you believe are necessary?"

Table 4. Mean Laboratory Test Scores, by Physician Characteristics

Characteristic	No.	Mean Test Score*	P Value†
Age, y			
<40	85	13.3	.0001
40–59	108	16.6	
≥60	31	22.5	
Practice Type			
Solo	79	18.8	.0008
Family medicine group	82	16.4	
Multispecialty group	12	15.5	
HMO	25	8.8	
Other	25	13.4	
Board-certified			
Yes	179	15.4	.04
No	44	19.1	
Residency-trained			
Yes	154	14.2	<.0001
No	67	20.5	
Level of concern about malpractice			
High	30	21.2	.0002
Medium	89	17.8	
Low	103	13.3	

*Score indicates utilization of laboratory tests not recommended by the US Preventive Services Task Force. One point is scored for each nonrecommended test frequently ordered by a respondent for each age and sex group. Possible scores range from 0 to 43.
†Analysis of variance was used to compare mean laboratory test scores.
NOTE: Total number of physicians in each category varies because of missing data and because the short form of the survey did not include questions about some of the laboratory tests in this analysis.
HMO denotes health maintenance organization.

The highest mean laboratory test scores (≥20) were found among the oldest physicians, nonresidency trained physicians, and respondents with high concern about malpractice claims. The lowest mean score (8.8) was among physicians who are salaried employees of an HMO.

We investigated the independent effects of the potential predictors of laboratory test score with linear regression modeling. The best-fitting model included four variables: residency training, concern about malpractice, employment in an HMO, and age. Employment in an HMO had the largest independent effect, lowering mean test scores by 5.7 points (P=.008). Residency training independently reduced mean test scores by 3.1 points, but statistical significance was borderline (P=.07). The effect of reduced concern about malpractice in the model was to lower the test score by 3.0 points (P=.008). Laboratory test scores declined in a linear fashion from the highest age group (≥50) to the lowest (<40), but statistical significance was borderline (P=.05). The linear regression model accounted for only 16% of the variance in test scores.

Discussion

We found that family physicians in New England almost unanimously recommend some form of PHE to their adult patients, except for men younger than aged 40 years, for whom about 10% of physicians would not suggest a PHE. In 1984, a survey of 120 randomly selected primary care physicians in New York City found that only 3% never recommended PHEs for their patients.[19] The proportion of physicians recommending PHEs increased as the age of the patients increased, ranging from 22% for

patients aged 20 to 29 to a high of 68% recommending PHEs for patients aged 50 to 59 years.[19] Sobal et al[20] found that 28% of primary care physicians in Maryland rated an annual PHE as very important, and 42% rated it as important. The USPSTF recommends a PHE every 1 to 3 years for men and women younger than 65 years and annually for those aged 65 years and older.[7] Although there was modest variation in the recommendation of a specific interval for the PHE (every year, compared with every 2 to 3 years), 90% or more of the respondents reported conforming to the USPSTF guidelines for all age and sex groups except for men aged 19 to 39 years, for whom 44.3% suggested an interval of 4 or more years between PHEs.

Most of respondents (80%) stated that the PHE is the primary mechanism for delivering preventive services in their practices. These findings are consistent with previously reported results. Stange et al[21] reported that in a national sample of family physicians in the United States, respondents were much more likely to provide comprehensive preventive care during a 30-minute visit for a periodic examination than during episodic visits for acute care. In a survey of Canadian physicians performed by Smith and Herbert,[22] respondents indicated that they provide most clinical preventive services during periodic examinations. Mandel et al[11] and Battista et al[23] have reported that much of the routine preventive care of adults is provided during PHEs. One third of respondents reported that they provide most or all preventive care during visits not specifically scheduled as a PHE. Some physicians may provide PHEs during routine follow-up visits, especially for younger patients who require very little screening and examination, and other physicians may spread the content of the PHE over several follow-up or acute care visits.

Family physicians in New England reported spending a substantial amount of their time available for outpatient clinical care performing adult PHEs, comprising approximately one third of all scheduled ambulatory care hours. Based on an estimate of 30 minutes per PHE, an assumed 5-day work week, and the reported mean of 33.0 hours per week spent in outpatient care, the average family physician may be performing about four adult PHEs per day. Although these estimates based on self-report seem credible, validation by means of reviewing actual physician office schedules and directly observing practices would be required to confirm the findings. Romm[24] has estimated that adult PHEs may account for 10% to 15% of a family physician's time in the office. Based on a survey of 40 primary care physicians, Osborn et al[25] estimated that about 23% of scheduled patient visits are dedicated primarily to the provision of preventive care.

There was modest variation in the time allotted each

PHE. The differences could be due to variation in several physician and practice factors: efficiency in use of allotted time, number of physical examination items included, time spent taking a history, and time spent counseling. Although it seems likely that physicians would be able to accurately report the amount of time scheduled for a PHE, it is possible that the actual amount of time spent with patients may not be the same as the scheduled amount of time. Carney et al[26] also found substantial variation in the amount of time spent with older female patients requesting a routine checkup from 59 primary care physicians in New England. The duration of the visits averaged 28.7 minutes, with a range of 5 to 60 minutes.

The typical PHE consists of several components: history, physical examination, prevention counseling, assessment of specific problems identified during the visit, and explaining and ordering screening tests. We studied only two of these components, the physical examination and the ordering of selected laboratory screening tests, specifically those not generally recommended by any national organization. These components may account for considerably less time in the average visit than the time spent in taking the medical history, performing counseling, and addressing specific patient concerns. We found nearly unanimous support for the inclusion of a core of about 10 physical examination items in the routine PHE. Although we found variability in the reported routine use of examination items beyond the core, a substantial majority reported that they usually complete 12 to 14 physical examination items in a PHE. The validity of our findings is limited by the usual problems with self-report, such as recall and a tendency to report the perceived correct response. We are unaware of any previous studies assessing the validity of physician self-report on the physical examination. In 1987, Romm[24] studied the PHE at a university family practice center and found that most patients received a comprehensive physical examination. Carney et al[26] found that auscultation of the heart and lungs was performed by 80% of the physicians in their study, fundoscopy and otoscopy were performed by about 55%, and deep tendon reflexes were tested by 30%.

For most of the physical examination items reportedly performed by respondents there exists little or no evidence of their effectiveness as a screening test for specific diseases,[27] and the USPSTF does not recommend routine use of most of the items.[7] The approach of family physicians to the screening physical examination may be determined by the following three beliefs: (1) many aspects of the examination are effective screening tests, despite the lack of evidence to support that contention; (2) patients expect a comprehensive physical examination; and (3) the physical examination plays a role in the patient-physician relationship. There is some evidence to

support the first two of these possible determinants. Most respondents indicated that they do believe that patients expect a comprehensive examination. Romm[28] reported that more than 90% of patients at a family medicine clinic queried just before a scheduled PHE wanted a typical physical examination that included heart, lungs, and abdomen. In a survey of family physicians in Ohio, Stange et al[17] found that a substantial majority of respondents explicitly disagreed with the USPSTF recommendations to forgo physical examination in four areas: oral cavity, rectal (for prostate cancer), testicular, and bimanual pelvic (for ovarian cancer).

We found considerable variation in the reported routine use of several common laboratory tests as part of the PHE for patients who had not had the test for 5 years or more. Of the tests we studied, only the total cholesterol and the dipstick urinalysis for patients aged 65 and older are recommended by the USPSTF for use in patients without specific risk factors.[7] Nevertheless, screening CBCs and chemistry tests are reported to be commonly ordered, even for young healthy patients. Screening ECGs are ordered by about one half of respondents for their older patients. Overall only 9.3% to 28.4% of respondents reported avoiding all the tests not recommended by USPSTF, depending on patient age and sex.

In a study of the content of the PHE for a 53-year-old woman conducted by Stange et al,[21] the percentage of a national sample of family physicians reporting usual performance of multichannel chemistry tests, urinalyses, CBCs, electrocardiograms, chest radiographs, and tonometry was similar to that of our study. In a study based on record review, Romm[24] found that 58% of patients undergoing a PHE in a family practice center had a routine blood count; 33%, a routine multichannel blood chemistry profile; and 48%, a routine urinalysis. Lefkowitz et al[15] found that 85% of 1017 men aged 60 years and older who were attending a Veterans Administration clinic had recently received a screening physical examination, CBC, multichannel chemistry panel and ECG, but a much smaller proportion had received recommended cancer screening tests or influenza vaccination. In a survey of resident and attending physicians in an academic general internal medicine practice, Woo et al[29] found that in 48 clinical scenarios, physicians recommended more frequent screening than is suggested by published guidelines. Romm et al[10] reported similar findings in a survey of internists in North Carolina.

The validity of self-report of performance of laboratory tests has been assessed in previous studies. These studies have shown that physicians generally overestimate their level of performance of tests such as Pap smears and mammograms,[10–16] but that self-report on blood and urine tests ordered during a PHE may be less subject to

bias, perhaps because ordering requires little effort on the part of the physician.[29]

Reasons for ordering screening tests whose efficacy is not supported by scientific evidence are probably similar to those for performing unsupported physical examination items. Many respondents in the study of Woo et al[29] indicated an awareness that they exceeded guidelines for test ordering and justified their practice by citing patient expectation for more frequent testing and possible inadequacies in guidelines. In the survey of family physicians by Stange et al,[17] 22% of respondents supported routine screening for anemia, and 26% supported periodic urine testing of asymptomatic persons. Financial incentives could also affect ordering laboratory tests, especially for physicians who have laboratory test equipment in the office.

The major limitations of this study are that the respondents may not be representative of the study population, and that performance of physical examination items and laboratory tests and the estimates of PHE scheduling are based on self-report. Because the database we used to draw the sample contained limited demographic information on physicians, we were unable to make any useful comparisons of respondents and nonrespondents. In a similar survey of family physicians in Ohio, however, Stange et al[17] found that a subsample of physicians with a response rate of 83% as a result of intensive follow-up did not differ substantially in demographics or response content from the majority of the sample, which had a response rate of 50%. It is possible that nonresponders to this survey could have a somewhat different response pattern compared with that of responders, but it is unlikely that the major findings of the surveys would be substantially affected by this potential bias.

The results of this and related studies are strongly supportive of three major conclusions. First, regular visits dedicated to PHE continue to be the mainstay of preventive care of adults in the primary care practices of family physicians, despite the call by some experts for physicians to use episodic visits opportunistically for preventive care.[7] Second, most family physicians spend a substantial amount of time on adult PHE visits. Finally, family physicians continue to perform comprehensive physical examinations and order extensive screening laboratory testing of unknown effectiveness as part of PHEs.

These latter two conclusions raise serious questions about the cost-effectiveness of the PHE as currently practiced. It appears that substantial amounts of physician time and health care dollars are being spent performing screening of uncertain usefulness while many patients are not receiving clinical preventive services that are of proven value. Based on the results of this survey and using conservative estimates for the time required to perform a

physical examination, it is possible that the average family physician could gain 2 or more additional hours of office time each week by eliminating unproven physical examination items from adult PHEs. This estimate assumes that a basic screening physical examination takes about 6 minutes of a typical 30-minute appointment, and that the average physician spends 11 hours per week on routine adult PHEs. Time gained from streamlining the physical examination could be used for focused prevention counseling during the PHE visit. The promotion of a new type of focused PHE such as that recommended by the USPSTF will require answers to several questions that should be addressed by future research in this area:

- What are patient and physician attitudes toward a PHE that is focused on prevention counseling and limited to screening examinations and tests of proven effectiveness?
- What are the diagnostic yield and costs of extensive screening physical examinations?
- What are the potential secondary benefits of the PHE aside from prevention screening and counseling (eg, impact on the patient-physician relationship and the opportunity for patients to report new symptoms)?

New administrative systems and changes in physician and patient attitudes and expectations will all likely be needed to support the adoption of a more uniform, focused, and efficient PHE than that currently in use.

Acknowledgments

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