

Public Expectations and Attitudes for Annual Physical Examinations and Testing

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Background: Recent guidelines for adult prevention do not recommend a comprehensive annual physical examination, but current public expectations in light of this change are unknown.

Objective: To determine public belief in the need for and content of an annual physical examination and to examine the effect of financial charges on these beliefs.

Design: Telephone survey.

Setting: Three U.S. cities.

Participants: Adult English-speaking respondents.

Measurements: Percentage of respondents answering that an annual physical examination is necessary and percentage desiring individual components of the history, physical examination, and laboratory testing, with and without knowledge of charges.

Results: Of 1203 respondents, 66% (67% in Denver, Colorado; 71% in Boston, Massachusetts; and 58% in San Diego, California) believed that in addition to regular care, an annual physical examination is necessary. Among the 600 respondents presented

with charge information, interest decreased from 63% to 33% if payment were required. For history, greater than 90% believed that diet, exercise, and tobacco and alcohol use should be discussed, while 60% believed that seatbelt use and sexual history should be discussed. For the physical examination, greater than 90% felt that blood pressure should be measured and that the heart and lungs, abdomen, reflexes, and prostate should be examined. However, fewer than 80% thought that hearing and vision should be tested. Many tests, including the Papanicolaou smear (75%), mammography (71%), cholesterol measurement (65%), prostate-specific antigen test (65%), urinalysis (40%), blood glucose measurement (41%), fecal occult blood testing (39%), and chest radiography (36%), were desired. Interest in these tests decreased substantially when the charges were known.

Conclusion: Public desire for a comprehensive annual physical examination is high across the United States and is sensitive to charges.

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The model of the comprehensive annual physical examination advocated by the American Medical Association in the 1920s (1) was the standard of care until the 1970s, when principles of evidence were first applied to the components of the periodic health evaluation (2–5). In recent years, several expert panels have examined the content of and appropriate mechanisms for providing preventive services to asymptomatic adults. In 1979, the Canadian Task Force on the Periodic Health Examination first suggested that the few preventive health care interventions that are well supported by data could be done during visits for short-term and long-term care and did not require scheduled annual physical examinations (6). Since then, the American College of Physicians, the American Medical Association, the U.S. Preventive Services Task Force (USPSTF), and the U.S. Public Health Service have all agreed that routine annual checkups for healthy adults should be abandoned in favor of a more selective approach to preventing and detecting health problems (7–12).

Little is known about public acceptance of this

change in emphasis. A 1984 study (13) showed that patients in a university-based family practice expected a comprehensive annual physical examination with a battery of routine tests. A more recent survey (14) showed that British general practice patients favored “general health screening”; however, that study did not evaluate expectations for specific tests. Patient satisfaction with medical care has been linked to expectation for services (15, 16). If the public is unaware that an annual physical examination and accompanying laboratory and miscellaneous testing are no longer considered valuable, the physicians who follow contemporary recommendations risk having dissatisfied patients. Public knowledge and acceptance of these changes in recommendations regarding an annual physical examination are unknown.

We designed and implemented a survey instrument to ascertain the public’s perception of the need for and content of an annual physical examination. Because medical services usually involve a charge or cost to the recipient, we also ascertained the effect of an imposed dollar cost on public desire for an annual examination.

METHODS

We performed a two-phase study. In phase I, we evaluated public expectations and attitudes of Denver, Colorado, residents about an annual physical examination and preventive health care. In phase II, we assessed public attitudes about an annual physical examination in two other metropolitan areas (Boston, Massachusetts, and San Diego, California) and ascertained the effect of a financial barrier on desire for annual evaluation.

Phase I

For phase I, we developed a telephone questionnaire that was administered to Denver-area adults. The questionnaire assessed demographic information (sex, age, ethnicity/race, annual income, education level), usual source of medical care (health maintenance organization [HMO], private-sector clinic, hospital-based clinic, community clinic, or none), frequency of visits to a physician in the past year, the presence of any of five chronic medical conditions (hypertension, heart disease, lung disease, diabetes mellitus, or cancer), and smoking status. These factors were selected to determine whether demographic variables, system of medical care, pattern of physician use, and the presence of one or more chronic diseases are variables that could affect respondents' attitudes about an annual examination. We asked respondents to agree or disagree with the following statement: "In addition to seeing my regular doctor when I am sick or for chronic medical problems, I need an annual physical exam." We then asked which items, from a fixed list of history, physical examination, or blood or other tests, should be included in an annual physical examination. The instrument was developed after we reviewed similar published instruments (17). It was reviewed by several physicians knowledgeable in general internal medicine and preventive health care and by an expert with substantial training and experience in survey design and administration; the survey was also pretested on a sample of 20 persons. On the basis of this process, the survey was modified slightly. A professional telephone surveyor administered the survey to Denver-area adults 18 years of age or older, who were selected by random-digit dialing in fall 1997. We estimated that a sample size of 600 respondents would detect 20% differences among respondents and provide sufficient

Context

Recent preventive health guidelines recommend against comprehensive annual examination of healthy adults. Yet, many Americans are accustomed to receiving such examinations.

Contribution

This population-based survey of adults in three U.S. cities suggests that many people expect annual physical examinations that include many tests (for example, complete blood counts) that prevention guidelines do not recommend.

Conversely, adults do not feel strongly about receiving tests and counseling that have proven benefit.

Desires for tests decrease as out-of-pocket costs increase.

Implications

Public education about preventive health interventions is needed.

—The Editors

power to detect differences when the data were analyzed according to age, sex, or usual source of medical care.

Phase II

Phase II was conducted in a new sample, primarily to ascertain whether the relatively high public expectation for annual physical examination found in Denver would be replicated in two other diverse metropolitan areas located in different regions of the country. As we had done for phase I, we determined demographic characteristics, source of medical care, frequency of physician visits, presence of five chronic medical conditions, smoking status, and response to the following statement: "In addition to seeing my regular doctor when I am sick or for chronic medical problems, I need an annual physical exam." The remainder of the questionnaire was modified for phase II.

For some persons, obtaining an annual physical examination involves payment of a fee. To ascertain the potential effect of a financial barrier, respondents affirming the need for an annual physical examination were next asked whether they would still want a physical examination if they had to pay a \$150 charge. Subsequently, respondents were asked if they felt they needed eight selected tests (urinalysis; stool tests for blood; chest radiography; mammography and Papanicolaou [Pap]

smear [for women only]; and tests for prostate-specific antigen [PSA] [for men only], cholesterol, and blood glucose levels) every 1 to 3 years. Those who affirmed the need for any of these tests were immediately asked whether they would still want the test if payment of a specified amount were required (\$10 for urinalysis, \$20 for cholesterol test, \$20 for blood glucose test, \$20 for fecal occult blood testing, \$50 for PSA test, \$125 for chest radiography, \$150 for Pap smear, and \$160 for mammography). We determined the charges after surveying several Denver-area hospitals, clinics, and commercial laboratories and determining, on the basis of these sources, mean dollar amounts for all care-related charges, such as facility and laboratory fees and physician charges. The same professional telephone surveyor used in phase I administered the phase II questionnaire in spring 1998 to Boston, San Diego, and Denver residents at least 18 years of age. We selected the respondents by random-digit dialing. For both study phases, 75% of telephone calls were made after 6:00 p.m. The telephone surveyor spoke only English; thus, potential non-English-speaking respondents were excluded.

Statistical Analysis

We performed statistical comparisons of categorical responses between groups by using the chi-square test for unpaired categorical data and the McNemar chi-square test for paired categorical data (that is, for the effect of charge on test expectations). We compared between-group data for continuous variables using the Student *t*-test. We used multivariable logistic regression analysis to measure independent associations between expectations for annual physical examination and respondent age, sex, ethnicity/race, education level, annual income level, smoking status, HMO enrollment, regularity of physician visits, frequency of physician visits, and city. We combined phase I and II data for multivariable analysis. We treated age (<65 vs. ≥65 years), ethnicity/race (white vs. nonwhite), education level (≤high school vs. >high school), annual income level (<\$30 000 vs. ≥\$30 000), and frequency of physician visits in past year (0 vs. >0) as dichotomous variables. We did this mainly to provide more stable parameter estimates in the logistic regression model, given the limited sample size, and to yield measures of association that are easily interpreted. Medicare eligibility at 65

years of age was another reason to categorize patients according to age as a dichotomous variable, because propensity to seek care and to expect an annual examination could vary by insurance coverage. Variables were included in the model if the bivariate association with expectations for annual physical examination had a *P* value less than 0.20. Because only age did not fulfill this criterion, all variables were included in the final model.

All analyses were conducted by using SAS software, version 8.0 (SAS Institute, Inc., Cary, North Carolina). Finally, because reporting odds ratios for common outcomes (>10%) can overestimate the magnitude of the association, we converted odds ratios to relative risk (RR) ratios; this was done according to the Flanders and Rhodes method, by using marginal standardization (18). Results are reported as adjusted RRs with 95% CIs, which were computed by using bootstrap resampling.

Role of the Funding Source

The funding source from divisional funds had no role in the collection, analysis, and interpretation of the data or in the decision to submit the paper for publication.

RESULTS

In phase I, 603 of 689 persons answering the telephone (89%) agreed to participate and completed the telephone survey. In phase II, 600 of 660 persons (90%) answering the telephone agreed to participate and completed the survey. **Table 1** shows the demographic characteristics and health status variables of the respondents. Most respondents were white women with at least some college education, and 78% were younger than 65 years of age.

In phase I, 69% of respondents residing in the Denver metropolitan area had an expectation for an annual physical examination. The Denver respondents expected most components of a comprehensive health evaluation to be performed. When asked, "During an annual physical my doctor should ask me about . . .," greater than 90% responded "yes" for alcohol and tobacco use (94% for each), exercise (93%), and diet (92%). More than 80% wanted their physicians to discuss mental health (88%) and drug (marijuana and cocaine) use (86%). In comparison, fewer respondents wished to discuss their job (66%), sexual history (62%), or seatbelt use (60%).

Table 1. Characteristics of Respondents

Characteristic	Phase I, Denver	Phase II			
		Total	Denver	Boston	San Diego
Total participants, <i>n</i>	603	600	205	186	209
Women, %	61	59	66	55	55
Mean age, <i>y</i>	49	48	50	42	50
White, %	77	80	84	75	81
Education > high school, %	70	77	71	82	78
Annual income ≥ \$30 000, %	72	68	68	68	69
Health maintenance organization care, %	44	52	51	49	57
Physician visits in the past year, %					
0	18				
1–2	40				
3–5	22				
≥6	19				
Chronic medical conditions, %					
Hypertension	22	14	17	10	17
Heart disease	7	7	10	5	6
Lung disease	7	4	4	5	4
Diabetes mellitus	6	4	4	4	5
Cancer	6	4	3	4	5
Smoker, %	20	17	17	19	14

Elderly respondents were significantly less likely ($P < 0.05$) than younger respondents to expect questioning about all behavioral and psychosocial issues, except for seatbelt use. In bivariate analysis, women were more likely than men to expect discussion of sexual history (71% vs. 48%; $P = 0.001$) and seatbelt use (65% vs. 52%; $P = 0.003$) and were less willing to discuss alcohol use (92% vs. 97%; $P = 0.02$). White respondents differed from nonwhite respondents only in having a higher expectation to discuss diet (93% vs. 81%; $P < 0.001$) and job issues (68% vs. 60%; $P < 0.02$). Those who used HMOs differed from non-HMO users only in having a lower expectation to be asked about illicit drug use (82% vs. 88%; $P < 0.02$).

The Denver-area public wanted a “head-to-toe” examination. More than 90% of respondents desired blood pressure measurement (99%), heart and lung examinations (99%), reflex testing (95%), an abdominal examination (93%), and prostate examination (91% of men). However, of these tests and procedures, the USPSTF currently recommends only blood pressure measurement for average-risk adults (11). In contrast, only 89% of women expected a breast examination, and 78% expected a Pap smear. Elderly respondents were less likely than younger respondents to want a heart and lung examination (96% vs. 99%; $P = 0.005$), reflex testing (90% vs. 97%; $P = 0.001$), abdominal examination (85% vs. 95%; $P = 0.001$), hearing test (73% vs.

82%; $P = 0.027$), and vision test (67% vs. 78%; $P = 0.008$). Women differed from men only in having lower expectations for hearing testing (77% vs. 85%; $P = 0.02$). Nonwhite respondents were more likely than white respondents to desire vision testing (86% vs. 72%; $P = 0.001$). Users and nonusers of HMOs did not differ for any of the physical examination components.

The Denver-area public also desired extensive blood tests, including many tests not currently recommended for screening in asymptomatic adults. Cholesterol testing—the only blood test currently recommended for routine screening by the USPSTF—was desired by 92% of all Denver-area respondents. However, more than 80% of male respondents desired a PSA test (90%), and more than 80% of respondents desired tests for glucose level (89%), renal and liver function (86%), thyroid level (81%), and hemoglobin level (90%) as part of an annual evaluation. Expectations for blood tests did not differ according to age. Women were less likely than men (82% vs. 90%; $P = 0.007$) and white respondents were less likely than nonwhite respondents (84% vs. 92%; $P < 0.01$) to want renal and liver function testing. Persons enrolled in HMOs were significantly less likely than non-HMO-enrolled persons to desire every blood test, except renal and liver function.

Desire for routine testing other than blood tests varied. Tests currently recommended by the USPSTF and other groups—including mammography for women

Table 2. Public Expectation for Annual Physical Examination

Test	Total (n = 600)	Denver (n = 205)	Boston (n = 186)	San Diego (n = 209)
	←———— % —————→			
Annual physical examination		62	71	58 63
Urinalysis		50	54	44 49
Cholesterol screening		63	69	63 65
Blood glucose testing		43	48	32 41
Prostate-specific antigen test*		67	60	69 66
Fecal occult blood testing		44	35	33 38
Chest radiography		32	38	38 36
Mammography†		71	66	77 71
Papanicolaou smear†		75	79	71 75

* For men only.

† For women only.

(68%) and colon cancer screening by fecal occult blood testing (58%) or by sigmoidoscopy (30%)—were desired less often than urinalysis (78%) or blood tests. Electrocardiography and chest radiography were desired by 43% of respondents, and exercise treadmill testing was desired by 28%.

Phase II demonstrated that the high public-perceived need for an annual physical examination demonstrated in the Denver metropolitan area during phase I was similarly high for Boston and San Diego (Table 2). A comparison of the demographic profiles of respondents in phases I and II (Table 1) is similar, except for increased HMO enrollment in phase II ($P < 0.05$). Overall, public desire for some tests and procedures (cholesterol, urinalysis, blood glucose, PSA, fecal occult blood) but not all tests and procedures (chest radiography, mammography, Pap smear) was modestly lower in phase II than in phase I.

To better delineate the factors associated with public expectations for annual physical examination, we conducted a multivariable analysis using results from phases I and II (Table 3). Factors independently associated with desire for annual physical examination included having at least one of the specified chronic medical conditions, having more than a high school education, and having at least one physician visit in the past year. Factors independently associated with lack of desire for annual physical examination included white ethnicity/race, male sex, and no regular physician. The RR was 1.22 (95% CI, 1.06 to 1.45) for Denver respondents expecting a physical examination com-

pared with San Diego respondents and 0.92 (CI, 0.81 to 1.03) for Denver respondents compared with Boston respondents.

The addition of information on charges significantly reduced the public desire for an annual physical examination and for specific tests. The Figure shows the change in desire for specific tests with charges known. Overall, the percentage of respondents wanting an annual physical examination decreased from 63% to 33% if they had to pay \$150, a relative decrease of 48%. The percentages still wanting an annual physical examination with required payment were 35% for Denver respondents, 35% for Boston respondents, and 30% for San Diego respondents. Desire for Pap smear among women decreased from 75% to 38%, while interest in mammography decreased from 71% to 38%. The percentage of men wanting PSA testing decreased from 66% to 43%. Interest in chest radiography, which was desired least at baseline, had the largest decrease, from 36% to 13%. Decreased desire for laboratory tests appeared generally related to charge for the test. The least expensive tests—urinalysis, blood glucose test, fecal occult blood test, and cholesterol test—had the smallest decrease in interest when respondents were presented with charge information.

DISCUSSION

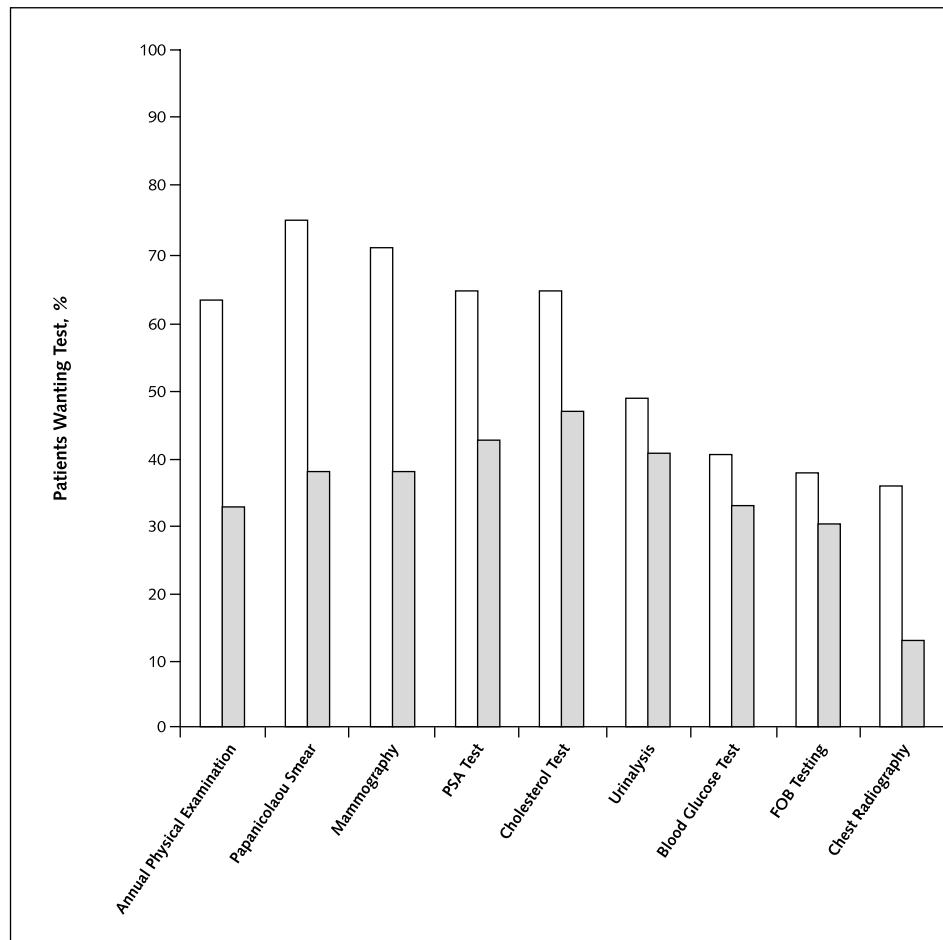
Our results demonstrate that in addition to short-term and long-term medical care, most adults residing in three

Table 3. Multivariable Logistic Regression Analysis of Physical Examination Expectations*

Variable	Adjusted Relative Risk (95% CI)	P_0 (95% CI)
Age \geq 65 years	1.01 (0.87–1.18)	0.57 (0.41–0.81)
White ethnicity	0.83 (0.72–0.96)	0.71 (0.56–0.87)
Male sex	0.89 (0.80–1.00)	0.65 (0.51–0.83)
Chronic medical condition	1.28 (1.09–1.50)	0.46 (0.32–0.65)
Current tobacco smoker	1.00 (0.87–1.15)	0.58 (0.44–0.76)
Annual income \geq \$30 000	1.12 (0.97–1.30)	0.52 (0.37–0.73)
Education > high school	1.18 (1.00–1.39)	0.50 (0.34–0.72)
Health maintenance organization care	0.99 (0.88–1.10)	0.58 (0.42–0.80)
No regular physician	0.75 (0.59–0.96)	0.78 (0.70–0.87)
At least 1 physician visit in the past year	1.53 (1.24–1.89)	0.38 (0.25–0.58)

* The probabilities of desire for annual physical examination for different sets of values of variables and relative risks (RRs) were calculated according to the method of Flanders and Rhodes (18). Relative risk was calculated as follows: $RR = P_1/P_0$, where P_0 is the probability of desire for annual physical examination for the reference group and P_1 is the probability for the comparison group. For example, for age, the reference group (persons < 65 y) has a probability of 0.57. For respondents \geq 65 y, $P_1 = 0.58$, leading to the reported RR of 1.01.

Figure. Desire for tests decreases when respondents are informed of typical charges.



White bars indicate patients without knowledge of test charges; shaded bars indicate patients with knowledge of test charges. Charges were as follows: physical examination—\$150, Papanicolaou smear—\$150, mammography—\$160, prostate-specific antigen (PSA) test—\$50, cholesterol test—\$20, urinalysis—\$10, blood glucose test—\$20, fecal occult blood (FOB) test—\$20, and chest radiography—\$125.

geographically separated metropolitan areas had a relatively high desire for an annual physical examination. In Denver-area residents, this expectation encompassed a comprehensive physical examination, including an extensive history, physical examination, and routine tests. Since 1979, most major medical organizations have changed the recommendation for a scheduled complete annual physical examination to recommend selective preventive services in the context of visits for other reasons. Although a comprehensive physical examination in asymptomatic adults has little screening value (19), 66% of the more than 1200 adults we surveyed in 1997 and 1998 believed that an annual physical examination was necessary. Persons who were higher consumers of medical care and who thus may have had less

need for a scheduled annual physical examination (such as persons with chronic medical conditions, those who reported having a regular physician, and those who had at least one physician visit in the previous year) were more likely to believe that they needed an annual physical examination.

An important finding is that the high expectations for specific components of an annual physical examination do not match the current recommendations. The only blood test currently recommended by the USPSTF for screening in asymptomatic adults, cholesterol, was expected only slightly more often than tests for PSA, glucose, or hemoglobin levels or for renal, liver, or thyroid function. Four tests or procedures with proven screening benefit—mam-

mography, Pap smear, fecal occult blood testing, and sigmoidoscopy—were expected less often than any of the nonrecommended blood tests. Collectively, these results demonstrate the need for public education on medical practices of proven and unproven benefit.

Compared with respondents not enrolled in an HMO, patients enrolled in HMOs were as likely to believe that they needed an annual physical examination, had the same expectations for history and physical examination, but were less likely to expect most laboratory tests. Whether this is because of successful education by the HMO or self-selection of HMO care (enrollment by patients who expect fewer laboratory tests) is unknown.

The sources of high public expectations for a comprehensive annual physical examination are unknown. Our study shows that between different age levels, sexes, ethnicities/races, and education and income groups, more than 60% of the surveyed public believed an annual physical examination was necessary. Insurance plans may contribute to the public expectation for an annual physical examination. Some insurance plans prominently display preventive health services as part of their benefits packages, and such promotion may imply to consumers that these services are necessary. For example, in 1997 the standard Blue Cross and Blue Shield package for federal employees included annual cancer screening and comprehensive laboratory panels every 3 years for enrollees 20 to 64 years of age and annual blood tests beginning at 65 years of age (20). Another potential explanation for the high public desire for an annual examination is that patients want their care from someone they already know, and one way to get to know your physician is to see him or her before being preoccupied with ill health. The role of the media in promoting high expectation for annual testing is less clear, since several recent articles in the popular press suggest that a comprehensive annual physical examination is not necessary (21–25). However, other widely read popular press articles have extolled the value of comprehensive periodic testing in relatively healthy persons (26). Physicians may directly or unwittingly encourage the continued practice for annual examinations. For example, use of the term *annual checkup* in encounter sheets and in conversation may encourage these examinations. In this regard, as recently as 1993, family practitioners in New England reported spending 35% of their office time on annual physical examinations of adults (27).

This was estimated to add as many as 11 million potentially unnecessary visits annually to the national health care system (28). Studies to evaluate physicians' current attitudes about comprehensive, periodic evaluations would thus be of great interest. Another important area for future investigation is why the public has relatively low expectations for the few services of proven benefit.

Although our analysis does not address the genesis of high public expectation for an annual examination, our results do demonstrate a significant effect of a financial barrier on public desires for an annual examination and selected testing. Romm (17) previously reported that provision of cost data could decrease patient desire for some but not all laboratory studies. Our survey showed decreased desire by the public for a comprehensive physical examination and for all tests when presented with charges, with the largest decrease in desire for the most expensive tests. This suggests that the use of graduated copayments could decrease demand for nonrecommended tests. Future sensitivity analyses could reveal a threshold charge that affects public desire for an annual examination. In addition to charges, informational items, such as cost-effectiveness data and operating characteristics of tests, if widely known, could influence public desire for annual examinations and testing.

Our study has limitations. Our data were obtained from residents of three U.S. metropolitan areas and may not be representative of smaller urban or rural areas. Moreover, our telephone survey method underrepresented some populations, such as non-English-speaking persons and persons without telephones. Our two surveys in Denver-area residents revealed some modest discrepancies. In phase II, respondents expressed a lower expectation for all the tests than in phase I. However, the two questionnaires differed. For example, the inclusion of charge data in phase II may have led to more conservative responses. In addition, the number of Denver-area respondents was much smaller in phase II and may not have been adequately powered relative to phase I. However, it is noteworthy that even with the lower public desire for selected tests in phase II, the perceived need was still substantial. In addition, the charge data used in phase II were derived from the Denver area and may not accurately reflect charges in other parts of the country. Some of the laboratory tests and charges for Pap smears are often included in a laboratory panel or as part of a comprehensive physical examina-

tion. Of note, our survey deals with self-reported expectations and may not reflect actual behavior. Moreover, our survey instrument has not been validated for accuracy, precision, or reproducibility. Finally, although the public expectation we observed for an annual physical examination may be considered unrealistic in terms of current recommendations, such visits probably have value in developing patient–physician relationships and other aspects of medical care, such as discussion of psychosocial issues. Thus, they may be of value in periodic health assessments.

In conclusion, the public has a high expectation for a comprehensive annual physical examination and extensive routine testing. The public apparently needs education about the value of periodic health examinations and current recommendations for specific preventive health services. Further studies delineating the factors underlying public desire for annual examinations and optimal ways of educating the public to change their expectations from tests and procedures of unproven value to those of proven benefit are needed.

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The Appendix, current author addresses, and author contributions are available at www.annals.org.

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