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The Role of Family History in Personal Prevention Practices among US Women Physicians

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Key Words

Family history · Cancer prevention practices · Women physicians

Abstract

Objective: To document the role of physicians' family history of cancer in terms of personal use of cancer preventive services and in recommending that patients receive such services. ***Methods:*** We examined the Women Physicians' Health Study, a questionnaire-based study of a representative sample of 4,501 female physicians in the United States. ***Results:*** Among the physicians surveyed, 38.9% (95% confidence interval 37.1–40.7) reported a family history of cancer. A physician's self-reported family history of a specific cancer was positively associated with the physician having had a more recent screening exam for that cancer. Family history of any cancer was positively associated with older age, white race, recent sigmoidoscopy, recent mammogram, digital rectal exam, a blood stool test, history of cigarette smoking and history of recent alcohol use. Physicians' family histories did not significantly influence the reported frequency of recommendations of screening services for their patients. ***Conclusions:*** The observed association between a positive physician family history and personal cancer prevention practices suggests that physicians are receptive to the concept of a positive family history of cancer as a risk factor for cancer. This could present an educational opportunity for physicians to emphasize the importance of cancer family history in patients, particularly with respect to underutilized services such as screening for colorectal cancer.

Introduction

Family history of certain cancers, such as cancer of the breast, colon or ovaries, plays an important role in identifying persons at increased risk [1–5]. Clinical information about a family history of cancer might allow for targeted strategies such as heightened surveillance, additional screening or earlier screening. Persons with a family history of cancer may be more likely to adopt healthier behaviors when given targeted clinical interventions or health education. In addition, assessment of family history is often the first step in determining whether a patient is a candidate for genetic testing, such as the recently developed tests for inherited risk of breast and colorectal can-

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cer. Little is known about whether physicians' family histories of certain cancers affect what they do for themselves or their patients. Such information would help to estimate providers' understanding of family history as a cancer risk factor and their receptiveness to educational efforts to increase awareness of medical genetics. To determine the role of family history in physicians' cancer prevention habits and in patient counseling and screening for cancer, we examined the Women Physicians' Health Study (WPHS), a questionnaire-based study of a representative sample of 4,501 female physicians in the US.

Methods

The design of WPHS and the fundamental characteristics of the WPHS population have been described elsewhere [6–8]. We surveyed a stratified random sample of US women MDs. The sampling frame is based on the American Medical Association's Physician Masterfile, a database intended to record all MDs who reside in the United States and its possessions. Using a sampling scheme stratified by decade of graduation from medical school, we randomly selected 2,500 women from each of the graduating classes of the last four decades (1950 through 1989) for a total of 10,000 women. We oversampled older women, a population that otherwise would have been sparsely represented by proportional allocation because of the recent increase in number of women physicians. We included active, part-time, professionally inactive and retired physicians, aged 30–70, who were not in residency training programs in September 1993 when the sampling frame was constructed. In that month, we sent out the first of four mailings; each mailing contained a cover letter and a self-administered four-page questionnaire. We accepted responses until October 1994 (final n = 4,501).

Of the 10,000 potential respondents, an estimated 23% were ineligible because they were men, were deceased, were currently living outside of the US, were interns or residents, or because we had incorrect addresses. Our response rate was 59% of eligible physicians. We compared respondents and nonrespondents in three ways: a phone survey (comparing a phone-surveyed random sample of 200 nonrespondents with all the written survey respondents), the American Medical Association's Physician Masterfile (contrasting all respondents with all nonrespondents) and an examination of survey mailing waves (all respondents, from wave 1 through 4) to contrast respondents' and nonrespondents' outcomes for a large number of key variables. We found that nonrespondents were less likely than respondents to be board certified. However, respondents and nonrespondents did not differ consistently or substantively on other tested measures, including age, ethnicity, marital status, number of children, alcohol consumption, fat intake, amount of exercise, smoking status, hours worked per week, frequency of being a primary care practitioner, personal income and percentage actively practicing medicine.

On the basis of our findings, we weighted the data by decade of graduation from medical school (to adjust for our stratified sampling scheme) and by decade-specific response rate and board certification status (to adjust for our identified response bias). Using these weights allowed us to generalize to the entire population of female physicians in the US who graduated from medical school between 1950 and 1989.

We asked physicians to state whether they had a personal history of various conditions, including cancer. We also asked if they had first-degree relatives (mother, father, sibling, child) or a spouse who had had any of the conditions examined in the personal history. We combined all responses of cancer among first-degree relatives as family history of cancer. We inquired nine categories of cancers: colon (personal and family history of rectal cancer was not asked), breast, lung, skin, ovarian, uterine, cervical, prostate and other. We also examined four cancers individually: colon, breast, lung and skin. We examined a physician's family history of each of the four cancers and cancer at any site in relation to personal cancer-related screening and preventive practices and to counseling and implementation of these practices for her patients. To isolate the effect of family history of cancer, we present results after we excluded all persons with a personal history of cancer. For selected cancers with large enough numbers (skin cancer and all cancers), we also examined the effect of a spousal history of cancer.

Questions about personal and clinical screening and counseling practices were based on national evidence-based recommendations at the time of the survey [9]. Personal questions were asked about the following habits and preventive practices: dietary fat intake, smoking status, alcohol use in the past month, use of sunscreen when outdoors for ≥ 1 h and the last time the physician had a clinical breast exam (CBE), a mammogram, a Pap smear, a blood stool test, a digital rectal exam (DRE), a proctoscopy or sigmoidoscopy and a skin exam for cancer by a clinician. Response options were <1 year, >1–2 years, 2–3 years, >3–5 years, >5 years, never done and don't know. For the clinical screening questions, we asked physicians how often they discussed or screened their patients for colorectal cancer (if patient is >50 years old), skin cancer and sunscreen use and (for female patients) CBE and mammograms (if >50–<75 years old). Response options included every visit, every year or less, every 1–2 years, every 2–3 years, >3–5 years, only at initial visit, only if clinically indicated and never. Those physicians who counseled every visit or every year or less were considered frequent counselors.

We examined physician family, personal, and spousal history of cancer according to various personal and professional characteristics including age, ethnicity, marital status, religion, number of children, personal health status, work stress level, home stress level, self-perception of being fat, personal screening, specialty and patient counseling frequency. Respondents who identified their specialty as family medicine, general practice, general internal medicine or public health/general preventive medicine were considered primary care specialists. Obstetrician-gynecologists were analyzed separately. Pediatricians, pathologists, radiologists and anyone who spent <5 h per week in clinical practice were excluded from analyses of counseling practices because of their minimal clinical contact with the patients for whom cancer screening behaviors are recommended.

We used SUDAAN [10] to perform χ^2 tests to determine whether family history and counseling were related to certain personal and professional characteristics. All analyses were weighted to generalize to the entire population of female physicians, and standard error and significance testing were performed with SUDAAN, which incorporates the sample design. We used the most conservative adjustment for multiple tests, Bonferroni's correction, to determine the threshold for significance: a p value of 0.003 (table 1) or 0.0022 (table 2) [11].

Table 1. Physician characteristics associated with physician family history of cancer in a first-degree relative by cancer site, US WPHS, 1994

Physician characteristics	n	Colon, %	Breast, %	Lung, %	Skin, %	Any site, %
Total[1]	4,102	5.3	7.3	4.1	13.1	38.9
Age, years						
30–39	1,097	4.3	5.3	3.7	12.7	35.2
40–49	1,293	4.9	8.3	4.0	15.4	42.5
50–59	929	7.6	9.6	4.8	9.8	39.7
60–70	783	11.8	11.4	7.3	8.6	45.3
p value		0.0001	0.0001	0.0170	0.0001	0.0004
Ethnicity						
White	2,952	5.8	7.9	4.7	17.0	43.8
Black	126	6.1	7.4	3.1	0.1	35.1
Hispanic	164	3.2	7.1	0.6	4.9	30.3
Asian/Pacific Islander	672	3.8	3.8	3.0	0.9	20.7
Other	123	2.8	8.9	4.1	0.0	19.0
p value		0.0868	0.0033	<0.0001	<0.0001	<0.0001
Specialty						
Primary care	1,207	5.0	6.9	5.0	14.3	38.5
Ob-Gyn	280	6.2	8.8	3.4	13.7	44.4
Other	2,565	5.4	7.3	3.7	12.4	38.6
p value		0.7987	0.6961	0.3295	0.4392	0.3316
Sunscreen use						
Always/almost always	1,896	5.1	7.4	4.4	16.2	42.2
Other	1,905	5.8	7.4	3.8	11.1	38.1
p value		0.4106	1.0000	0.4958	0.0003	0.0352
Clinical skin exam						
≤2 years	1,032	6.2	7.7	4.5	16.4	43.6
>2 years	347	5.6	7.0	5.8	18.7	41.5
Never	2,318	5.1	7.1	4.0	11.7	38.2
Don't know	80	5.7	17.6	4.8	12.7	45.1
p value		0.5546	0.8765	0.5802	0.0023	0.0544
Digital rectal exam						
≤2 years	1,549	6.4	7.4	5.0	15.1	42.6
>2 years	1,474	6.2	8.5	3.3	14.7	42.3
Never	731	3.1	5.6	4.1	9.0	31.2
Don't know	110	1.1	9.5	7.4	8.8	38.4
p value		0.0021	0.1009	0.1627	0.0006	<0.0001
Blood stool test						
≤1 year	981	8.0	9.0	5.4	16.0	45.5
>1 year	1,133	6.4	8.7	4.8	14.4	44.7
Never	1,526	3.6	6.2	3.5	12.0	34.6
Don't know	196	6.5	8.0	4.7	13.3	42.4
p value		0.0003	0.0338	0.1480	0.0696	<0.0001
Proctoscopy or sigmoidoscopy						
≤5 years	658	13.3	11.5	4.6	15.4	50.2
>5 years	319	4.5	6.9	2.7	18.1	42.8
Never	2,757	4.4	7.1	4.4	12.7	38.4
Don't know	33	2.3	12.4	1.4	10.6	29.5
p value		<0.0001	0.0530	0.2040	0.0976	0.0001

Table 1 (continued)

Physician characteristics	n	Colon, %	Breast, %	Lung, %	Skin, %	Any site, %
Papanicolaou test						
≤3 years	3,058	5.4	7.0	4.2	14.4	40.7
>3–5 years	341	4.1	7.8	3.8	5.5	28.1
Never	50	9.4	4.0	1.4	6.0	24.8
Don't know	20	8.9	6.5	0.0	0.0	20.8
p value		0.4390	0.6272	0.0904	<0.0001	0.0002
Clinical breast exam						
≤2 years	3,302	5.7	7.7	4.2	14.0	41.0
>2 years	519	3.6	7.4	5.0	11.2	36.0
Never	87	4.2	0.4	1.7	4.1	20.9
Don't know	25	0.0	0.0	3.7	1.9	15.0
p value		0.0827	<0.0001	0.1301	0.0012	0.0015
Mammogram						
≤2 years	2,482	6.7	11.0	4.9	15.0	45.5
>2 years	523	3.6	7.1	4.0	13.5	39.1
Never	917	4.3	2.5	3.4	11.3	32.2
Don't know	8	0.0	6.7	0.0	0.0	6.7
p value		0.0038	<0.0001	0.2506	0.0494	<0.0001
Smoking status						
Never	2,964	5.1	7.3	3.9	12.8	37.8
Former	793	6.3	7.3	5.8	14.7	45.4
Current	166	6.8	10.4	4.6	16.4	48.4
p value		0.4797	0.6267	0.2609	0.4423	0.0026
Personal health status						
Excellent/very good	3,046	5.6	7.1	4.1	13.8	41.4
Good	746	4.7	8.1	3.9	11.7	40.0
Fair/poor	189	6.0	11.0	7.1	11.3	43.4
p value		0.6134	0.4451	0.5652	0.4096	0.7799
Home stress						
Severe	190	2.3	6.8	4.3	13.1	40.1
Moderate	1,492	4.9	7.2	4.3	15.2	40.6
Light	2,245	6.4	7.6	3.9	12.0	38.8
p value		0.0017	0.8792	0.8449	0.0855	0.6449
Alcohol use in the past month						
Ever	2,706	6.1	7.5	4.2	15.5	42.5
Never	1,156	3.6	7.8	4.2	8.0	33.1
p value		0.0026	0.7756	0.9666	<0.0001	<0.0001

Percentages are weighted. p values reflect Pearson's χ^2 comparing characteristics in physicians with a family history of the particular cancer with those without. Calculation of χ^2 excludes 'don't knows' and 'missing'. Using Bonferroni's correction, a p value was considered significant if <0.003.

[1] Total excludes those with a personal history of cancer (n = 399). In the case of the Pap test, total also excluded those with a history of hysterectomy (total n = 3,469). Stratified n may not add up to 4,102 because of missing data: ethnicity, 65; specialty, 50; sunscreen use, 301; skin exam, 325; digital recctal exam, 238, blood stool test, 266, proctoscopy, 335; pap test, 157 (total is 3,469); clinical breast exam, 169; smoking, 172; personal health status, 179; home stress, 75; alcohol use, 240.

Table 2. Physician characteristics associated with frequent (at least once a year) patient counseling or screening practices, US WPHS, 1994

Physician characteristics		n[1]	Colorectal cancer (if >50 years)		Skin cancer/ sunscreen use		Clinical breast exam		Mammogram (if >50–≤75 years	
			%	p value	%	p value	%	p value	%	p value
Total		2,155	32.5	–	25.3	–	53.1	–	45.8	–
Family history										
Colon cancer[2]	Y	148	35.6		23.0		60.8		53.3	
	N	2,007	32.3		25.4		52.6		45.3	
				0.5072		0.5649		0.1174		0.1393
Family history										
Breast cancer[2]	Y	185	30.5		20.5		51.0		45.4	
	N	1,970	32.6		25.7		53.3		45.8	
				0.6132		0.1562		0.6247		0.9363
Family history										
Lung cancer[2]	Y	94	35.7		26.7		51.5		49.8	
	N	2,061	32.3		25.2		53.2		45.6	
				0.6123		0.7848		0.7971		0.5143
Family history										
Skin cancer[2]	Y	266	29.3		22.5		50.8		45.5	
	N	1,889	32.9		25.7		53.4		45.8	
				0.2898		0.3024		0.4979		0.9260
Family history										
Any cancer[2]	Y	907	32.5		24.2		54.0		47.3	
	N	1,248	32.4		26.1		52.4		44.7	
				0.9676		0.3796		0.5499		0.3063
Spousal history										
Any cancer[2]	Y	73	51.1		28.2		49.3		43.3	
	N	2,082	32.0		25.2		53.2		45.8	
				0.0275		0.6934		0.6260		0.7437
Age (years)										
30–39		696	33.7		25.3		52.2		46.6	
40–49		708	31.6		26.7		52.9		44.7	
50–59		436	31.2		28.4		57.0		45.4	
60–70		315	28.3		26.3		53.2		44.8	
				0.5339		0.3558		0.5493		0.9234
Ethnicity										
White		1,627	32.0		25.1		51.5		46.1	
Black		65	43.1		19.7		61.7		49.2	
Hispanic		80	33.2		34.3		60.8		44.7	
Asian/Pacific Islander		306	32.1		27.1		60.1		43.7	
Other		52	32.7		22.8		46.6		41.8	
				0.6356		0.4709		0.0642		0.9233
Specialty										
Primary care		603	52.6		40.0		83.2		69.9	
Ob-Gyn		231	63.5		15.8		95.1		88.3	
Other		1,321	15.6		19.5		28.6		24.2	
				<0.0001		<0.0001		<0.0001		<0.0001

Percentages are weighted. p values reflect Pearson's χ^2 comparing characteristics among frequent counselors vs. less frequent counselors. Using Bonferroni's correction, a p value was considered significant if ≤0.0025.

[1] n represents the smallest number of obervations for the five coutcomes; n varies because of different item response rates.

[2] Excludes physicians with a personal history of the particular cancer.

Results

Previously published studies have reported the basic demographic and professional characteristics of women physicians from this study [7, 8]. Among the women physicians who reported a personal history of cancer (n = 399) 1.8% had a history of colorectal cancer, 29.5% of breast cancer, 39.7% of skin cancer and 33.9% had a history of other cancers (not shown). In the remaining data, we exclude these women so that effects due to a family histo-

ry of cancer can be observed without possible confounding from a personal history of cancer.

The percentage of respondents reporting at least one first-degree family member having had any type of cancer was 38.9% [95% confidence interval (CI) 37.1–40.1] (table 1). Of the respondents, 10.6% reported a family history of more than one cancer. The prevalence of a family history of specific cancers was as follows: colon cancer, 5.3% (95% CI 4.5–6.1); breast cancer, 7.3% (95% CI 6.3–8.3); lung cancer, 4.1% (95% CI 3.3–4.9); skin cancer, 13.1% (95% CI 11.7–14.5), and all other cancers, 19.2% (95% CI 17.6–20.8; not included in table). Approximately 2.7% (95% CI 2.1–3.3) of the women physicians reported that their current spouse had a history of cancer.

Characteristics associated with a physician's family history of cancer varied by type of cancer (table 1). For all cancers combined, the prevalence of a self-reported history of any cancer among family members was similar in whites and blacks, but the prevalence was significantly higher in whites than in all other ethnicities ($p < 0.005$ for all pair-wise comparisons). Family history was significantly and positively associated with increasing age (test for linear trend, $p = 0.0008$).

Family history of cancer was also associated with respondents ever having a DRE, a blood stool test, recent sigmoidoscopy, a recent Pap smear, a CBE, a recent mammogram, a history of smoking and of recent alcohol use. In almost all cases the association of a physician's family history of a particular cancer with a recent related screening test held even when we stratified results by age (<50 and ≥ 50 years). An exception was mammography screening. For women physicians <50 years old, mammography use within the preceding 2 years was significantly greater for those with a family history of breast cancer than for those without (74 and 43%, respectively; $p < 0.0001$). Among physicians ≥ 50 years old, screening prevalence within the past 2 years was 80% regardless of family history (data not shown).

Physicians were more likely to report patient counseling or screening ≤ 1 year for breast cancer by CBE (53.1%, 95% CI 50.6–55.6) and mammogram (45.8%, 95% CI 43–48) than for colorectal cancer (32.5%, 95% CI 30.1–34.9) and skin cancer (25.3%, 95% CI 23.1–26.4) (table 2). Frequent counseling or screening for cancer-related services was not significantly associated with family history of breast, cervical, colorectal or skin cancer. Specialty was the characteristic most consistently and strongly associated with counseling or screening frequency. Obstetrician-gynecologists reported the most frequent counseling or screening for breast and colorectal cancer. Other specialists reported low rates of frequent counseling or screening. When we further stratified specialty by family history to see whether family history modified a physician's counseling or screening practices, we did not see any effect (data not shown). Counseling frequency was associated with the physician's recent use of certain preventive services. A physician who had a recent blood stool test was more likely to counsel frequently on colorectal cancer and mammogram. This finding was not significant when stratified by specialty (data not shown). Physicians who used sunscreen always or almost always or who had recently received a clinical skin exam counseled on skin cancer/sunscreen use more frequently, even when stratified by specialty (data not shown).

Discussion

To our knowledge, this is the first study to investigate the role of family history in a physician's own preventive care practices. As expected, family history of a particular cancer is associated with a physician's personal use of related early detection activity. What is particularly interesting is how family history plays a role in personally having cancer screening where recommendations have not been widely used or are controversial. Thus a family history of breast cancer predicted the use of mammography before age 50 but not after age 50. Most older physicians in our study, independent of family history, had had a mammogram. Colorectal cancer screening, by contrast, is underutilized [12–14], despite a consensus favoring its use in persons aged 50 and older [15]. Our study shows that utilization of colorectal cancer screening is also low in our sample of physicians. However, family history is associated with more recent screening in physicians over and under 50. Although no evidence-based guidelines exist for routine screening for skin cancer, the *Guide to Clinical Preventive Services* [16] does suggest that those at high risk who see a physician for other reasons have their skin examined. In this study, physicians with a family history of skin cancer were more likely to have ever had a clinical skin exam. We found that family history was a significant correlate of personal screening behaviors when the general prevalence of screening was low.

Those with a family history of certain types of cancer were more likely to be screened for other cancers. For example, a physician with a family history of colon cancer was more likely to get a mammogram as well as colorectal cancer screening. Across-site relationships were most notable for a family history of skin cancer and the following

screening modalities: CBE, DRE and Pap smear. Family history of any cancer was also significantly associated with increased recent use of CBE, mammogram, Pap smear, DRE, blood stool test and sigmoidoscopy. Frequent use of sunscreen was significantly associated with a family history of skin cancer. Increased personal screening among physicians with a family history of cancer may reflect a greater awareness of cancer prevention generally.

The finding that, in general, family history of cancer was associated with increasing age is expected because cancer risk increases with age. Thus older physicians tend to have older first-degree relatives, who are at greater risk of cancer. However, a physician's history of smoking was significantly associated with family history of all cancers rather than any of the specific cancers we examined. Physicians who reported drinking alcohol in the past month also were more likely to have a family history of colon or skin cancer and of all cancers combined. These two observations may reflect shared environmental exposures rather than a genetic component of the family history. The observation that having less stress at home was associated with family history of colon cancer is of unclear significance. Although we considered multiple testing when setting a significance threshold, it is still possible that some of these associations were due to chance, given the number of significance tests performed.

If a family history of cancer increases awareness of cancer prevention measures, we might expect that the positive family history group in our study would be more likely to counsel their patients about cancer screening, particularly for underutilized screening measures such as those for colorectal cancer. However, our data provide no evidence for such an effect. From other WPHS reports, Frank et al. [17] have shown some examples of a modest positive correlation with a physician's family history and a related clinical practice in blood pressure counseling or screening, smoking cessation and hormone replacement therapy counseling.

Our data do not address whether and how survey respondents routinely use a patient's family history of cancer as a factor in their recommendations about cancer. However, the association of a positive family history with personal cancer prevention practices suggests that physicians are receptive to the concept of a positive family history of cancer as a risk factor for cancer. This may present an educational opportunity for physicians, particularly with respect to underutilized cancer prevention services such as screening for colorectal cancer. For example, family history may help to tailor colorectal cancer prevention activities (e.g., the recommendation by some experts that colorectal cancer screening should be initiated at age 40 for persons with an affected first-degree relative) [15]. However, an emphasis on family history as a risk factor could detract from efforts to ensure that all persons begin colorectal cancer screening by age 50. Physicians with a family history of cancer might be more receptive to education about family history as a cancer risk factor, but they also might be more likely to interpret a negative family history as ruling out risk. Our data thus support the need for research on effective ways to educate physicians about the use of family history in clinical practice.

References

1 Burt R: Familial risk and colon cancer. Int J Cancer 1996;69:44–46.
2 Pharoah PDP, Day NE, Duffy S, Easton DF, Ponder BAJ: Family history and the risk of breast cancer: A systematic review and meta-analysis. Int J Cancer 1997;71:800–809.
3 Stratton JF, Pharoah PDP, Smith SK, Easton DF, Ponder BAJ: A systematic review and meta-analysis of family history and the risk of ovarian cancer. Br J Obstet Gynaecol 1998; 105:493–499.
4 Steinberg GD, Carter BS, Beaty TH, Childs B, Walsh PC: Family history and the risk of prostate cancer. Prostate 1990;17:337–347.
5 Holman CD, Armstrong BK: Pigmentary traits, ethnic origin, benign nevi, and family history as risk factors for cutaneous malignant melanoma. J Natl Cancer Inst 1984;72:257–266.
6 Frank E: The Women Physicians' Health Study: Background, objectives, and methods. J Am Med Womens Assoc 1995;50:64–66.
7 Frank E, Brogan DJ, Mokdad AH, Simoes EJ, Kahn HS, Greenberg RS: Health-related behaviors of women physicians vs. other women in the United States. Arch Intern Med 1998; 158:342–348.
8 Frank E, Rothenberg R, Brown WV, Maibach H: Basic demographic and professional characteristics of US women physicians. West J Med 1997;166:179–184.
9 United States Preventive Services Task Force: The Guide to Clinical Preventive Services, Baltimore, Williams & Wilkins, 1989.
10 SUDAAN: Professional Software for Survey Data Analysis: User Documentation for Release 7.01. Research Triangle Park, Research Triangle Institute, 1996.
11 Cook RJ, Dunnett CW: Multiple comparisons; in Armitage P, Colton T (eds): Encyclopedia of Biostatistics. New York, Wiley, 1998, pp 2736–2746.
12 Anderson L, May D: Has the use of cervical, breast, and colorectal cancer screening increased in the United States? Am J Public Health 1999;85:840–842.
13 Centers for Disease Control and Prevention: Self-reported use of mammography among women aged ≥40 years – United States, 1989 and 1995. Mor Mortal Wkly Rep CDC Surveill Summ 1999;46:937–941.
14 Centers for Disease Control and Prevention: Screening for Colorectal Cancer – United States, 1997. Mor Mortal Wkly Rep CDC Surveill Summ 1999;48:116–121.
15 Winawer S, Fletcher R, Miller L, et al: Colorectal cancer screening: Clinical guidelines and rationale. Gastroenterology 1997;112:594–642.
16 United States Preventive Services Task Force: The Guide to Clinical Preventive Services, ed 2. Alexandria, International Medical Publishing, 1995.
17 Frank E, Rothenberg R, Lewis C, Beldoff B: Correlates of physicians' prevention-related practices: Findings from the women physicians' health study. Arch Fam Med 2000;9:359–367.