

Physician Over-Recommendation of Mammography for Terminally Ill Women

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BACKGROUND: There has been recent, sometimes intense, debate about when to begin screening and how often to screen women for breast cancer with mammography. However, there should be no controversy regarding screening women who are unlikely to benefit from the procedure, such as those with a serious, life-limiting illness who would not live long enough to benefit from the potential detection and treatment of breast cancer. Identifying characteristics of physicians who recommend mammography for terminally ill women can help guide efforts to minimize patient risks and make better use of health care resources. **METHODS:** The authors used data from a nationally representative survey of primary care physicians (PCPs) (N = 1196; response rate, 67.5%) conducted in 2006 and 2007 to examine PCPs' breast cancer screening recommendations for hypothetical patients ages 50 years, 65 years, and 80 years who were healthy, had a moderate comorbidity, or had a terminal comorbidity. **RESULTS:** Many PCPs (47.7%) reported that they would recommend mammography to a woman aged 50 years, 65 years, or 80 years with terminal lung cancer, indicating over-recommendation. Physician characteristics associated with over-recommending mammography included obstetrician/gynecologist (odds ratio [OR], 1.69) or internal medicine (OR, 0.45) specialty, being a woman (OR, 1.40), being a racial/ethnic minority (OR, 1.72), and working in a smaller practice (OR, 1.41). **CONCLUSIONS:** The current results indicated that physician over-recommendation of screening mammography among terminally ill women is common. Certain physician and practice characteristics, including specialty, were associated with over-recommending mammography. The authors concluded that an informed and shared mammography decision-making process for terminally ill women may eliminate unnecessary patient risks and health care expenditures. *Cancer* 2012;118:27-37. © 2011 American Cancer Society.

KEYWORDS: breast cancer, mammography, primary care, practice guidelines, screening.

Breast cancer remains the most common cancer among women, and greater than 190,000 new cases are diagnosed each year in the United States.^{1,2} When caught early, the disease has an excellent 5-year survival rate (up to 98.1%) in contrast to the 5-year survival rate for patients with advanced disease (27.1%).³ Routine mammography generally is regarded as the most effective early detection strategy for breast cancer. However, the survival benefit from screening is not typically observed until approximately 6 to 7 years after the procedure.⁴ Many older or terminally ill women with a limited life expectancy may not live long enough to experience the benefits of having breast cancer diagnosed and treated.

Moreover, mammography presents the potential for harm. Screening mammograms are physically uncomfortable, expose women to low levels of radiation, require time and financial resources,^{5,6} and may confer additional risks from false-positive tests. False-positive results often lead to physical pain and anxiety for women who must undergo additional diagnostic testing, such as biopsies; they also require additional time and monetary resources.⁶ In a 10-year retrospective study, Elmore and colleagues⁶ observed that 23.8% of women experienced at least 1 false-positive test result. Women aged ≥ 80 years have an 11% risk of false-positive test results as well as physical discomfort and decreased psychological well being and overall survival from screening mammography and subsequent follow-up tests.⁷

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Table 1. Screening Mammography Guidelines of the US Preventive Services Task Force, the American Cancer Society, and the American College of Obstetricians and Gynecologists

Age Group	USPSTF (2002 and 2009)	ACS (2003 and 2010)	ACOG (2003)
50-74	2009: 1-2 y screening mammography (B) 2002: Biennial screening mammography (B)	2010: Annual mammography 2003: Annual mammography	Annual screening mammography
≥75	2009: Insufficient evidence (I) 2002: Findings generalizable to women aged ≥70 years if their life expectancy is not compromised by comorbid disease; the exact age at which potential benefits of mammography justify the possible harms is a subjective choice	2010: Consistent with 2003 ACS guidelines 2003: In older women, screening decisions should be individualized by considering potential benefits and risks of mammography in the context of current health status and estimated life expectancy; so long as a woman's health is reasonably good and she would be a candidate for treatment, she should continue to be screened with mammography	No specific recommendations or upper-age cut-off

Abbreviations: ACOG, American College of Obstetricians and Gynecologists; ACS, American Cancer Society; USPSTF, US Preventive Services Task Force.

Numerous factors have been associated with having a mammogram. The strongest predictor of mammography receipt is a recommendation from a physician.^{8,9} Women are less likely to receive mammography as they age¹⁰; however, compromised health status has not been associated with a similar decline in screening.¹⁰⁻¹² Many older women in poor health continue to receive a physician recommendation for mammography. For example, 30.7% of physicians reported that they would recommend mammography to a frail woman aged 90 years.¹³

There has been recent, sometimes intense, controversy¹⁴ surrounding when to begin screening and how often to screen women for breast cancer with mammography. However, there should be no controversy regarding screening women who are unlikely to benefit from these tests, such as those with a serious, life-limiting illness. Screening guidelines put forth by different organizations (eg, the US Preventive Services Task Force [USPSTF], the American Cancer Society [ACS], and the American College of Obstetricians and Gynecologists [ACOG]) provide guidance to physicians regarding the appropriate application of breast cancer screening in clinical practice. These organizations vary in their recommendations, especially with regard to patient age and health status (Table 1). The absence of older women in screening clinical trials¹⁵ likely contributes to the absence of more clear-cut stopping rules in breast cancer screening guidelines.

Currently, little is known about the prevalence of over-recommending breast cancer screening among women of advanced age, with poor health status, or with limited life expectancy or the circumstances under which primary care physicians (PCPs) might stop recommending screening for such patients. In addition, little is known about characteristics of PCPs who may be over-

recommending mammography. In this study, we used data from a large, nationally representative survey that included a set of hypothetical clinical vignettes to consider the breast cancer screening recommendations of PCPs for women of various age and health status combinations.

MATERIALS AND METHODS

Survey Procedures

The National Survey of Primary Care Physicians' Recommendations and Practices for Breast, Cervical, Colorectal, and Lung Cancer Screening (http://healthservices.cancer.gov/surveys/screening_rp/ accessed on April 19, 2011) was sponsored by the National Cancer Institute in collaboration with the Centers for Disease Control and Prevention and the Agency for Healthcare Research and Quality to assess PCPs' current knowledge, attitudes, recommendations, and practices for 4 types of cancer screening: breast, cervical, colorectal, and lung. A nationally representative sample of PCPs was drawn from the American Medical Association Physician Masterfile, stratified by physician specialty (general practitioners [GPs], family medicine practitioners [FPs], general internists, and obstetricians/gynecologists [OB/GYNs]).

Survey-eligible PCPs were aged <76 years with an active medical license who were engaged in patient care as their main professional activity. Physicians who were retired; in residency training; or involved in full-time teaching, research, or administration were excluded. These eligibility criteria focused the survey on physicians who were in active clinical practice. Half of the sample was assigned randomly to receive a questionnaire that covered breast and cervical cancer screening, and the other half received a questionnaire that focused on colorectal and lung cancer screening. In total, 2475 physicians were

identified for the breast/cervical cancer screening questionnaire. Eligibility was confirmed by telephone screening calls ($N = 435$ excluded). In September 2006, the remaining 1948 eligible physicians were surveyed by mail. Nonresponders were sent a second mailing. Telephone follow-up continued through March 2007. A \$50 honorarium was provided to encourage participation. Further details on survey procedures are reported elsewhere.¹⁶

Measures

Survey questions assessed PCP demographic and primary care practice characteristics as well as their breast cancer screening knowledge, attitudes, recommendations, and practices (<http://healthservices.cancer.gov/tools/instruments.html> accessed on April 19, 2011). A prior study from the larger dataset focused on breast cancer screening beliefs and practices in general.¹⁷

Outcome

Breast cancer screening recommendations were assessed with a series of vignettes that varied according to the hypothetical patient's age and health status. Three ages (50 years, 65 years, and 80 years) were combined with 3 health status conditions (healthy, moderate comorbidity, terminal comorbidity) to form the 9 vignettes. Moderate comorbidity was defined as a woman with "ischemic cardiomyopathy who experiences dyspnea with ordinary activity (New York Heart Association [NYHA] Class II) treated with appropriate medication," which was identical to the classification in a previous study.¹⁸ This type of comorbidity, using NYHA Class II or III, is associated with a 15% 1-year mortality rate and a 40% 4-year mortality rate.¹⁹ Terminal comorbidity was defined as "unresectable nonsmall cell lung cancer." Patients with this cancer survive on average 9 to 10 months.²⁰ The 2-year to 3-year survival rate associated with stage III or IV nonsmall cell lung cancer, as a proxy for unresectable nonsmall cell lung cancer, is very low: 14.1% for adults ages 50 to 59 years, 12.6% for adults ages 60 to 69 years, and 7.7% for adults aged ≥ 75 years (calculated by A. Mariotto using Surveillance, Epidemiology, and End Results [SEER] data, 1975-2007²¹). Physicians reported the type(s) of breast cancer screening they would hypothetically recommend for each of the 9 categories of women (clinical breast examination [CBE] alone, mammography alone, CBE plus mammography, other, or no screening).

Physician characteristics included age, sex, race/ethnicity, medical specialty, medical school affiliation, international medical degree, and board certification.

Because of the relatively small number of GPs ($n = 50$) as well as similarities in screening behaviors between GPs and FPs identified here and in other studies of cancer screening,²² we combined GPs and FPs in our analyses, and coded specialty as GP/FP, internist, or OB/GYN.

Practice characteristics included geographic location (urban, large rural city, small rural town), primary care practice arrangement (physician-owned, large medical group, health maintenance organization, university, hospital/clinic, or other), size of practice (1 physician, 2-5 physicians, 6-15, physicians, or ≥ 16 physicians), practice type (single-specialty group, multispecialty group, or other), percentage of patients uninsured ($< 5\%$, 6%-25%, or $\geq 26\%$), and percentage of Medicaid patients ($< 5\%$, 6%-25%, 26%-50%, or $\geq 51\%$).

Breast cancer screening guideline endorsement was assessed by asking how influential (very influential, somewhat influential, not influential, or not applicable or not familiar with) respondents considered the 3 main guidelines (USPSTF, ACS, and ACOG) (see Table 1). Because the American College of Physicians and the American Academy of Family Physicians endorse the USPSTF screening guidelines, they were not examined separately.

Analyses

Data were analyzed using SUDAAN (version 10.0.1; RTI International, Research Triangle Park, NC) to incorporate sampling weights and the stratified survey design. Initial descriptive analyses were conducted for the full sample on all variables. The percentages of PCPs recommending mammography alone or in combination with CBE for each vignette stratified by medical specialty were examined graphically.

For this study, over-recommendation of screening mammography was defined as a PCP who recommended mammography alone or in combination with CBE for a woman aged 50 years, 65 years, or 80 years with the terminal comorbidity, nonsmall cell lung cancer. A correlation matrix was used to examine potential multicollinearity among predictor variables. Univariate logistic regression analyses examined the relation of individual predictors and over-recommending screening. All variables significant at $P < .10$ in univariate analyses were included in a final multivariate logistic regression analysis.

Table 2. Characteristics of US Primary Care Physicians and Their Practice Settings: 2006-2007

Characteristic	Unweighted No.	Weighted %
Physician characteristics		
Medical specialty		
Family medicine/general practice	502	45.2
Internist	376	36.9
Obstetrics/gynecology	334	17.9
Sex		
Men	821	66.7
Women	391	33.3
Age, y		
<40	244	19.6
40-49	365	32
50-59	383	31.7
≥60	220	16.7
Race/ethnicity		
White, non-Hispanic	836	67.8
Black, non-Hispanic	65	5
Hispanic	74	5.9
Asian	182	16.8
Other ^a	55	4.5
Board certified		
Yes	974	81.5
No	238	18.5
International medical graduate		
No	928	74.9
Yes	284	25.1
Medical school affiliation		
No	771	64.5
Yes	419	33.7
Missing	22	1.8
Guidelines from USPSTF		
Very influential	480	42.4
Somewhat influential	497	39.8
Not influential	83	6.1
Not applicable or not familiar	142	10.9
Missing	10	0.7
Guidelines from ACS		
Very influential	677	55.9
Somewhat influential	469	38.8
Not influential	36	2.9
Not applicable or not familiar	23	1.9
Missing	7	0.5
Guidelines from ACOG		
Very influential	619	46.9
Somewhat influential	446	38.9
Not influential	61	5.9
Not applicable or not familiar	72	7.1
Missing	14	1.2
Practice characteristics		
Primary practice arrangement		
Full/part owner of practice	647	51.8
Employee, physician-owned practice	108	9.2
Employee, large medical group, HMO, or health care system	205	18.1
Employee, university hospital/clinic	85	6.7
Employee, other hospital/clinic	142	12.1
Other/missing	25	2.2
Geographic location		
Urban ^b	1012	82.9
Large rural city ^c	109	8.8

(Continued)

Table 2. (Continued)

Characteristic	Unweighted No.	Weighted %
Small rural town ^d	91	8.3
No. of physicians in practice		
1	320	26.2
2-5	499	41.2
6-15	239	19.8
≥16	146	12
Missing	8	0.8
Practice type		
Single specialty	875	70.8
Multispecialty	302	26.1
Other/missing	35	3.1
Percentage of uninsured patients		
0-5	754	62.2
6-25	318	26.2
≥26	77	6.3
Do not know/missing	63	5.4
Percentage of Medicaid patients		
0-5	480	40.2
6-25	390	32.3
26-50	179	14.6
≥51	91	6.9
Do not know/missing	72	6.2

Abbreviations: ACOG, American College of Obstetricians and Gynecologists; ACS, American Cancer Society; HMO, health maintenance organization; USPSTF, US Preventive Services Task Force.

^aIncludes American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, multiple races, other race, and unknown.

^bRural Urban Commuting Area 2 (RUCA2) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, and 7.1.

^cRUCA2 codes 4.0, 4.2, 5.0, 5.2, and 6.0.

^dRUCA2 codes 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 9.0, 9.1, 10.0, 10.2, 10.4, 10.5, and 10.6.

RESULTS

In total, 1212 PCPs responded to the survey (absolute response rate, 67.5%). Sixteen PCPs had missing outcome data, resulting in a final analytic sample of 1196. Physician and practice characteristics of the study cohort are listed in Table 2. The cohort included FP/GPs (45.2%), internists (36.9%), and OB/GYNs (17.9%). Almost two-thirds of the sample was male (66.7%), non-Hispanic white (67.8%), had no medical school affiliation (64.5%), and worked in a small (67.4%), physician-owned (61%), single-specialty (70.8%) practice. Most PCPs spent ≥90% of their time in patient care (74.5%), worked in an urban setting (82.9%), and reported that <25% of their patients were uninsured (88.4%) or on Medicaid (72.5%). A slightly higher percentage of PCPs reported that the ACS guidelines were “very influential” (55.9%) compared with the ACOG (46.9%) and USPSTF (42.4%) guidelines.

Patterns of Screening Mammography Recommendations by Medical Specialty

Figure 1 presents the percentages of PCPs who hypothetically would recommend mammography alone or in combination with CBE for each vignette stratified by medical specialty. Almost all PCPs, regardless of medical specialty, would recommend mammography to healthy women or to

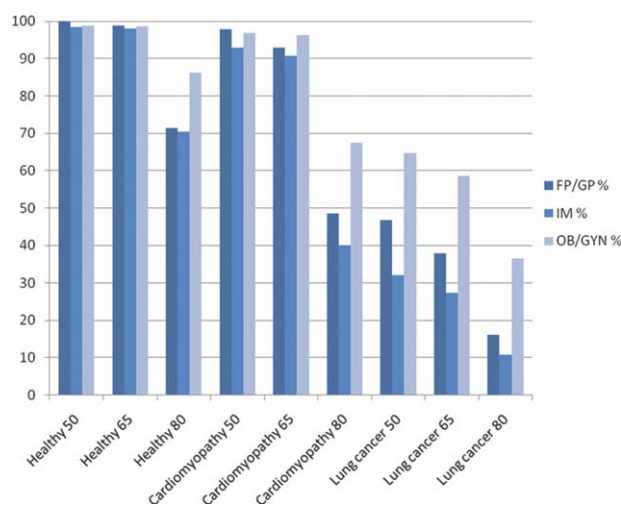


Figure 1. This chart illustrates the percentage of primary care providers who recommended either a mammogram alone or a mammogram and a clinical breast examination stratified by medical specialty. FP/GP indicates family medicine practitioners/general practitioner; IM, internist; OB/GYN, obstetrician/gynecologist.

Table 3. Physician and Practice Characteristics of Primary Care Physicians Over-Recommend Screening Versus Not Over-Recommend Screening

Characteristic	Over-Recommendors (N=571) ^a		Not Over-Recommendors (N=625)	
	Unweighted No.	Weighted %	Unweighted No.	Weighted %
Physician characteristics				
Medical specialty ^b				
Family medicine/general practice	234	47.7	262	52.3
Internist	122	33.3	251	66.7
Obstetrics/gynecology	215	66.9	112	33.1
Sex ^b				
Men	367	42.6	444	57.4
Women	204	52.1	181	47.9
Age, y				
<50	277	44.1	324	55.9
≥50	294	47.6	301	52.4
Race/ethnicity ^b				
White, non-Hispanic	351	41.2	472	58.8
Other ^c	220	55.5	153	44.5
Board certified				
Yes	445	43.8	518	56.2
No	128	54.5	107	45.5
International medical graduate				
Yes	145	49.9	134	50.1
No	426	44.4	491	55.6
Medical school affiliation				
Yes	195	44.7	218	55.3
No	365	46.1	397	53.9
Missing	11	55.4	10	44.6
Guidelines from USPSTF				
Very influential	211	43.7	266	56.3
Other	354	47.1	356	52.9
Missing	6	66.5	3	33.5
Guidelines from ACS ^b				
Very influential	335	48.5	332	51.5
Other	233	42.3	289	57.7
Missing	3	39.5	4	60.5
Guidelines from ACOG ^b				
Very influential	344	54.2	266	45.8
Other	220	38.2	352	61.8
Missing	7	46.4	7	53.6
Practice characteristics				
Primary practice arrangement				
Physician-owned practice	365	46.5	384	53.5
Large medical group, HMO, university, hospital/clinic	198	44.2	236	55.8
Other/missing	8	60	5	40
Geographic location ^b				
Urban ^d	498	47.5	502	52.5
Large rural city/small rural town ^e	73	37.6	123	62.4
No. of physicians in practice ^b				
1	174	53.2	143	46.8
2-5	220	42.7	271	57.3
≥6	171	43.4	209	56.6
Missing	6	57.1	2	42.9
Practice type				
Single specialty	415	45.6	448	54.4
Multispecialty	137	45.6	162	54.4
Other/missing	19	51.7	15	48.3
Percentage of uninsured patients				
0-5	369	47.4	375	52.7
6-25	140	42.4	175	57.6

(Continued)

Table 3. (Continued)

Characteristic	Over-Recommendors (N=571) ^a		Not Over-Recommendors (N=625)	
	Unweighted No.	Weighted %	Unweighted No.	Weighted %
≥26	37	49.5	40	50.5
Do not know/missing	25	39.7	35	60.3
Percentage of Medicaid patients				
0-5	216	43.4	260	56.6
6-25	188	47.7	196	52.3
≥26	130	45.8	136	54.2
Do not know/missing	37	51.7	33	48.3

Abbreviations: ACOG, American College of Obstetricians and Gynecologists; ACS, American Cancer Society; HMO, health maintenance organization; USPSTF, US Preventive Services Task Force.

^a An over-recommender was defined as a primary care physician who recommended mammography alone or in combination with clinical breast examination for a woman aged 50 years, 65 years, or 80 years with a terminal comorbidity or unresectable nonsmall cell lung cancer.

^b Statistically significant variable ($P < .10$) in univariate logistic regression models predicting the odds of over-recommending screening mammography.

^c Includes black non-Hispanic, Asian, American Indian/Alaska Native, Native Hawaiian/Other Pacific Islander, multiple races, other race, and unknown.

^d Rural Urban Commuting Area 2 (RUCA2) codes 1.0, 1.1, 2.0, 2.1, 3.0, 4.1, and 7.1.

^e RUCA2 codes 4.0, 4.2, 5.0, 5.2, 6.0, 7.0, 7.2, 7.3, 7.4, 8.0, 8.2, 8.3, 9.0, 9.1, 10.0, 10.2, 10.4, 10.5, and 10.6.

women aged 50 years or 65 years with a moderate comorbidity. For healthy women aged 80 years, approximately 70% of FP/GPs and internists would recommend mammography versus 86.3% of OB/GYNs. Similarly, more OB/GYNs (67.5%) than FP/GPs (48.4%) or internists (40.1%) stated that they would recommend mammography to a woman aged 80 years who had a moderate comorbidity.

Many physicians reported that they would screen women who were unlikely to benefit from screening, indicating they would over-recommend screening mammography. A higher proportion of OB/GYNs stated that they would recommend mammography to women ages 50 years, 65 years, and 80 years with a diagnosis of nonresectable small cell lung cancer (64.7%, 58.5%, and 36.5%, respectively), compared with FP/GPs (46.7%, 37.9%, and 16.1%, respectively) or internists (32.1%, 27.3%, and 10.7%, respectively).

Factors Associated With Over-Recommend Screening Mammography

Table 3 lists the characteristics of PCPs who hypothetically would recommend screening mammography to women with terminal lung cancer compared with those who would not recommend such screening. Almost the same proportions of PCPs were over-recommending ($n = 571$; 47.7%) and not over-recommending ($n = 625$; 52.3%). However, several characteristics differentiated the 2 groups. Significant variables from the univariate logistic regression analyses included medical specialty, sex, race/ethnicity (non-Hispanic white vs other), practice location (urban vs rural),

practice size (1 vs 2-5 vs ≥ 6), and perceived influence of the ACS and ACOG guidelines. In the final multivariate logistic regression model (Table 4), only medical specialty, sex, race/ethnicity, and practice size were associated with over-recommending screening. Compared with FP/GPs, OB/GYNs had 1.69 times higher odds and internists had 0.45 times lower odds of over-recommending screening. PCPs who were women were 1.40 times more likely than PCPs who were men to over-recommend screening. Being of a race/ethnicity other than non-Hispanic white was associated with a 1.72 times higher odds of over-recommending screening. PCPs in larger practices were less likely to over-recommend than PCPs in solo practice (2-5 PCPs: OR, 0.66; ≥ 6 PCPs: OR, 0.71). Practice location (urban: OR, 1.47; $P = .0517$) and rating the ACOG guidelines as "very influential" (OR, 1.37; $P = .0512$) compared with "somewhat influential," "not influential," or "not applicable/not familiar with" were marginally significant predictors of over-recommending screening.

DISCUSSION

This nationally representative study used PCPs' responses to hypothetical vignettes to examine their intent to recommend screening mammography to women of varying age and health status. The number of PCPs who indicated that they would recommend screening mammography decreased as women's ages increased and their health status worsened; however, almost half of PCPs stated that they would recommend mammography to older women with comorbid conditions, a finding consistent with a

Table 4. Multivariate Logistic Regression Predicting the Likelihood of Primary Care Physicians' Over-Recommendation of Mammography Screening^a

Variable	OR	95% CI	Wald P
Physician specialty^b			
FP/GP	Ref		.000
Internist	0.45	0.33-0.62	
OB/GYN	1.69	1.21-2.36	
Sex^b			
Men	Ref		.0298
Women	1.40	1.03-1.90	
Race/ethnicity^b			
Non-Hispanic white	Ref		.0008
Other	1.72	1.26-2.35	
Location^c			
Rural	Ref		.0517
Urban	1.47	1.00-2.16	
No. of physicians in practice^b			
1	Ref		.0271
2-5	0.66	0.48-0.90	
≥6	0.71	0.51-1.00	
Guidelines from ACOG^c			
Other	Ref		.0512
Very influential	1.37	1.00-1.89	

Abbreviations: ACOG, American College of Obstetricians and Gynecologists; CI, confidence interval; FP/GP, family physician/general practitioner; OB/GYN, obstetrician/gynecologist; OR, odds ratio; Ref, reference category.

^aOver-recommending mammography screening was defined as a primary care physician recommending mammography alone or in combination with clinical breast examination for a woman aged 50 years, 65 years, or 80 years with a terminal comorbidity or unresectable nonsmall cell lung cancer.

^bStatistically significant variable ($P < .05$).

^cMarginally significant variable ($P = .05$).

previous study.¹³ On the positive side, most PCPs in our study did not appear to discriminate against women based on their age alone (ie, "ageism") in recommending screening mammography. However, although it was not the focus of this article, it is disconcerting that approximately 30% of physicians indicated they would not recommend mammography to a healthy woman aged 80 years. Another study of Medicare claims suggests that mammography rates for older women who do not have specific mental or medical conditions, including cancer, are even lower.²³ Future guidelines should consider the utility of screening based on health status and not simply age. In addition, a report using data from our national survey recently was published that assessed US PCPs' overall recommendations and practices for breast cancer screening in average-risk women.¹⁷ Despite the lack of screening trials among this population,¹⁵ it is likely that older women who are healthy or who have moderate comorbidities may

continue to benefit from screening and from the treatment of early detected breast cancer.²⁴

On the negative side, a surprisingly high proportion of PCPs (47.7%) said they would recommend screening mammography for women with a terminal comorbidity. Women with terminal lung cancer have a 7.7% to 14.1% 1-year survival rate, depending on their age (calculated by A. Mariotto using SEER data 1975-2007²¹). They most likely would receive no benefit from screening, and it is noteworthy that they probably would not be treated for breast cancer if the disease were detected. Screening women for breast cancer who would be ineligible for breast cancer treatment raises several concerns, including lack of any benefit to the patient, exposure to radiation, physical discomfort, anxiety, worry, and increased cost to the patient and the health care system.^{6,7} Our findings complement a recently released analysis of Medicare claims data indicating that many older women with an advanced cancer diagnosis continue to be screened with mammography²⁵; however, those data²⁵ were limited to women aged ≥65 years and did not include provider information, such as medical specialty. In addition, in the Medicare claims analysis, it is not known whether physicians knew of the cancer prognosis of women for whom they ordered mammography. However, in our study, physicians reported their screening recommendations in response to specific vignettes in which the comorbidity status of the potential patient was specified in detail.

Numerous factors were associated with a greater likelihood of over-recommending screening. Consistent with previous findings,¹³ PCPs who were women were more likely than their counterparts who were men to state that they would recommend mammography to older women with compromised health (OR, 1.40). PCPs with a race/ethnicity other than non-Hispanic white also were more likely to over-recommend screening (OR, 1.88). Although few studies have investigated physician race/ethnicity and screening recommendations, studies of patient race/ethnicity have demonstrated that white patients receive mammography recommendations more often than African American patients.²⁶ In contrast to our current findings, 1 study that examined physician race/ethnicity and colorectal cancer screening recommendations²⁷ reported that Hispanic physicians were less likely to recommend cancer colorectal screening than non-Hispanic white and African American physicians. Additional research is needed to understand potential over screening within the context of physician race and ethnicity. PCPs from larger practices were less likely to over-recommend

mammography. Solo practitioners may have limited ability to consult with their colleagues about screening eligibility issues and, thus, may continue to screen women with advanced diseases to be cautious. In addition, the possible financial incentive from screening higher numbers of patients may exert a larger effect on a small practice.

A key factor associated with over-recommending screening was medical specialty. Compared with FP/GPs, OB/GYNs had the highest odds (OR, 1.69) and internists had the lowest odds (OR, 0.45) of over-recommending screening, consistent with prior research.²⁸ Many women build lifelong relationships with their OB/GYN, which may influence mammography recommendations. Alternatively, OB/GYNs may be sensitized to issues of medical malpractice, in that their specialty faces particularly high costs for liability insurance because of high rates of malpractice suits involving the care they deliver.²⁹ In the 2009 ACOG Medical Liability Survey, 91% of OB/GYNs reported having at least 1 liability claim filed against them since beginning to practice medicine, and 63% reported that fear of liability claims led them to make changes to their practice.³⁰ Furthermore, 24% of gynecologic liability claims were because of a delay in or failure to diagnose a medical problem.²⁹ Fear of litigation from a late diagnosed breast cancer or death stemming from a decision not to screen may motivate some OB/GYNs to practice in a culture of defensive medicine.³¹

Another factor associated with over-recommending screening was PCP endorsement of the ACOG guidelines, but this had only marginal statistical significance. Although practicing in accordance with ACOG guidelines may have contributed to OB/GYNs' increased likelihood of over-recommending screening, it should be noted that other PCPs consider ACOG guidelines as influential in their cancer screening practices.³²

There are several inconsistencies among USPSTF,⁵ ACS,^{33,34} and ACOG³⁵ guidelines. All 3 support screening healthy women ages 50 years and 65 years as well as women ages 50 years and 65 years with moderate comorbidity. However, the guidelines are less consistent for women aged 80 years and for those with limited life expectancy. The USPSTF states that there is insufficient evidence for mammography among women aged ≥ 70 years and suggests that life expectancy should be considered when making screening recommendations. Similarly, ACS guidelines recommend taking into consideration a woman's age, health status, and estimated life expectancy in individualized decisions for women aged ≥ 75 years.

ACOG guidelines, conversely, do not address either older age or limited life expectancy. The lack of "stopping rules" may make decisions about whether to undergo screening mammography confusing for physicians and patients. In a recent study, 62% of physicians reported that more than 1 guideline influenced their screening recommendations for patients.³² More consistent messages among the main guideline organizations could reduce confusion as well as over-recommendation of screening.

Other reasons may explain the high percentage of PCPs who indicated that they would recommend mammography to a woman with a terminal illness. First, many PCPs may have difficulty accurately predicting the life expectancy of their patients³⁶ and may choose to screen to be on the safe side. Second, screening in many practices has become a routine part of wellness visits whereby physicians may not consider not offering it. Third, with the advancement of technology, cancer treatment at the end of life has become more aggressive,³⁷ warranting further investigation of whether such care provides long-term benefit for the patient. Fourth, PCPs often have insufficient time to address all acute, chronic, and preventive health topics during patient visits.³⁸ A discussion about the potential benefits and risks associated with screening mammography may not be feasible for PCPs alone to provide. The active involvement of nonphysician health professionals (eg, physician assistant, nurse, health educator) may provide patients with the necessary information to understand and participate in decisions about screening.³⁹

This study has potential limitations. We used data from a cross-sectional survey conducted during 2006 and 2007 and are unable to assess temporal changes in mammography recommendations. Physicians' perceptions and behaviors can be expected to shift as breast cancer screening guidelines are updated. Examining this topic in future surveys will help to assess trends in intent to recommend mammography to different groups of women over time. In addition, this study used PCP responses to hypothetical vignettes rather than examining actual practice (eg, using chart review or recordings of clinic visits). Although potentially difficult and expensive, future studies need to evaluate rates of actual mammography recommendations, along with subsequent receipt of such screening, among older women and women with chronic conditions.

This study also has several strengths. To our knowledge, it is the first of its kind to examine factors associated with over-recommending screening mammography for

terminally ill women, and it uses a large, nationally representative sample of PCPs. The US population is aging, and the number of individuals living with chronic conditions is rising. An estimated 80% of Medicare beneficiaries live with at least 1 chronic disease, and 65% live with 2 or more chronic health conditions.⁴⁰ With the aging of the baby boomers, the number of individuals living with chronic conditions will continue to dramatically increase in the upcoming decade,⁴¹ adding to the complexity of determining who will benefit from screening mammography in the future. Many women may be unaware of the potential risks of screening mammography, particularly in later life. Screening decisions need to be made through an informed, shared decision-making process with the patient, her family (as appropriate or desired), and the health care team. An individualized approach would promote a discussion about the potential risks and benefits of screening for the woman's specific age and health status and elicit the patient's beliefs and preferences. Careful consideration of these factors would promote informed and collaborative screening decisions, especially for older and terminally ill women.

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CONFLICT OF INTEREST DISCLOSURES

The authors made no disclosures.

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