

# Specialty Differences And The Ordering Of Screening Mammography By Primary Care Physicians

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**Background:** Careful attention to factors that affect women and their physicians is necessary to achieve the national goal that, by the year 2000, 60 percent of women should have had a screening mammogram in the previous 2 years. This report evaluates factors that differentiate primary care physicians who regularly order mammograms from those who do not. The study was conducted as part of a large demonstration project in Washington State and includes a survey of women served by the physicians.

**Methods:** We conducted a survey of primary care physicians and women in four counties to assess factors that influenced self-reported ordering of screening mammography.

**Results:** Among the 73 percent of family physicians, general practitioners, internists, and obstetrician-gynecologists who returned the questionnaire, there were more obstetrician-gynecologists (76 percent) who reported ordering screening mammograms in 90 percent or more of women aged 50 to 75 years, but they cared for only 15 percent of women in the sample. Women's survey results confirmed the physicians' reported differences and also revealed demographic characteristics that distinguished populations associated with particular primary care specialists. These specialists differed in their perceptions of their colleague's mammography practices, the adequacy of insurance coverage, and how often they had spent an unreasonable time explaining mammography results. In a multivariate model of factors expected to influence behavior, performance of clinical breast examination rather than specialty was the salient factor associated with ordering screening mammography.

**Conclusions:** These results suggest that the context of practice, rather than specialty type or beliefs about mammography, has the major influence upon behavior. To achieve national screening mammography goals in the Northwest, we must influence the context of family physicians' preventive care practices because they care for 47 percent of women aged 50 years or older. (J Am Board Fam Pract 1994; 7:375-86.)

Because the benefit of mammography results from its repeated use, more must be done to encourage regular ordering of mammography by physicians. Screening mammography saves lives when used at intervals of 1 to 3 years among women aged 50 to 75 years.<sup>1-4</sup> The US Department of Health and Human Services has set a national goal that by the year 2000, 60 percent of women aged 50 years and older should have had

a mammogram in the previous 2 years.<sup>5</sup> The proportion of women with a mammogram in the previous 2 years is one measure of regular use in a population. Promotion of its use throughout the late 1980s resulted in an increase from less than 50 percent of women aged more than 40 years ever having a mammogram by 1987 to just under 70 percent by 1989.<sup>6</sup> By the late 1980s, however, fewer than 26 percent of women aged 50 years and older reported having more than one mammogram, and the proportion of all women having a mammogram in the previous 2 years remained below national goals.<sup>6,7</sup>

One of the keys to achieving the national goal for mammography is to increase the proportion of physicians ordering them regularly.<sup>8</sup> In representative samples from around the nation, women who have not had mammograms consistently report that they do not recall that it was recommended by their physician.<sup>8</sup> Recent work also suggests that the practice of ordering screening

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mammograms can vary among different types of primary care physicians. For example, 42 percent of obstetrician-gynecologists reported ordering mammograms according to American Cancer Society guidelines in 1989 compared with 34 percent of family physicians.<sup>9</sup> An analysis of mammography ordering among Medicare enrollees in Minnesota showed that family practitioners were less likely to order mammograms than were obstetricians and internists.<sup>10</sup> Reasons for these differences might include more faith in the benefits of mammography among some specialty groups, but potential influences upon behavior have not been fully evaluated.<sup>9,11-13</sup>

The work reported in this paper was one of several projects funded by the National Cancer Institute to demonstrate and evaluate methods of promoting mammography in large communities.<sup>8,14-19</sup> Our project characterized physician practices in four target counties of Washington State that represented semirural counties with one moderate-sized urban center. We sought differences among physicians and specialties that might influence the planning of physician community interventions.<sup>15</sup>

The Precede/Proceed model for planning interventions helped guide the project and is described more fully below.<sup>20</sup> This planning framework categorizes variables into three groups called *predisposing*, *enabling*, and *reinforcing factors*. Green and Kreuter<sup>20</sup> have suggested that using this framework helps select the factors which should be addressed when trying to influence such complex behaviors as health care delivery. The results of the study have implications for others trying to influence the ordering of mammography, for those trying to understand reported mammography rates among women, for medical educators training primary care physicians, and for physicians trying to achieve improved preventive health care practices.

## Methods

In 1989 our project began implementing a community organization approach to change by seeking cooperation from both the physician and lay communities in two intervention counties.<sup>15,21,22</sup> We had two control counties for comparison. The counties were chosen based upon whether (1) they had a medium-sized city (population between 30,000 and 60,000) with surrounding rural area, and (2) they had a complete medical

care system with primary care, specialty referral centers, and fully staffed hospitals capable of complete breast cancer treatment. The largest county had a population of about 444,000, whereas the other three counties included about 150,000 individuals. The study included a mailed questionnaire to all primary care physicians and a telephone survey of women residing within each county, which used a random digit dialing technique.

As described elsewhere, the physician survey used multiple steps to achieve a response.<sup>23</sup> We first selected physicians in each county by using the *Washington State Medical Association Directory*, county medical society listings, and telephone directories.<sup>23</sup> We found a total of 474 physicians in the following specialties who worked within the four counties: family practice 206, general practice 52, general surgeons 43, internal medicine 109, obstetrics-gynecology 53, and oncology 11. Of 474 physicians selected, there were 380 who were eligible for the survey because they reported in a telephone contact that they provided some primary care to women aged 50 to 75 years. Physician survey recruitment included up to two mailings, separate postcard and telephone reminders, and telephone contact to complete the questionnaire.<sup>23</sup> Contact ceased when physicians were found to be ineligible, completed the survey, refused to complete it, or failed to respond after the second telephone reminder in a 6-week period.

The theory of reasoned action (TRA) guided the selection of salient factors that fit within the Precede/Proceed framework. The theory of reasoned action proposes that individuals make choices about whether to adopt a behavior after considering its outcomes and the expectations of those around them.<sup>24</sup> The theory also includes consideration of factors that facilitate performing the behavior once a decision to do so is made.<sup>25</sup>

Questions were assigned to each area of the Precede/Proceed framework based on the consensus of the investigators. Our survey analysis therefore included physician demographic information plus eight other items under *predisposing factors*. These items involved five physician beliefs about mammography, two measures of colleagues' perceived practices, and one estimate of perceived patient expectations. Belief measures included whether physicians thought mammography reduced mortality among women aged 50 years and older, and whether mammography

could find cancers physicians could not detect. Colleague and patient expectations included whether most colleagues ordered regular screening, whether a consensus existed regarding the optimal interval, and whether most patients wanted mammograms. *Enabling factors* included six items from the questionnaire that addressed facilitating conditions, such as whether physicians were aware of reduced cost packages for screening, and whether physician reminders to order screening mammograms were present in the practice. *Reinforcing factors* are not typically part of TRA but have become an important element of the Precede/Proceed framework. We therefore included three measures of *reinforcing factors* addressing the proportion of mammography reports that were ambiguous, whether a family member or friend had breast cancer diagnosed, and whether the physician had spent an unreasonable time explaining mammography reports. Most responses were made on seven-point Likert scales, though some questions included categorical responses. A summary of the questions and coding is included in the Appendix.

We also conducted a telephone survey of women by using random digit dialing techniques to reach households in the four counties. The survey personnel selected households with women aged 50 to 75 years and then conducted a 20-minute interview among a total of 72 percent (1538) of the eligible women.<sup>14</sup> The interview included questions that ascertained demographic characteristics, mammography use, and the types of physicians women saw regularly.<sup>14</sup> We asked whether women had received a mammogram in the previous 5 years and then asked the years in which the mammograms occurred. Women with two mammograms in the previous 4 years were defined as regular users. We classified the women's regular physicians into seven mutually exclusive categories: (1) family physician-general practitioner only, (2) obstetrician-gynecologist only, (3) internist only, (4) any physician except one of the above, (5) obstetrician-gynecologist plus any other physician, (6) two or more physicians who were not obstetrician-gynecologists, and (7) no regular physician. For the analysis presented here, we excluded women who were members of a staff model health maintenance organization (HMO) (n = 180) where recommendations for screening were mailed directly to them.<sup>26</sup>

### Analysis

Questions regarding *predisposing*, *enabling*, and *reinforcing factors* for ordering screening mammography were written and coded so that all questions could have affirmative answers. We dichotomized all responses as shown in the Appendix. Physician self-reported ordering of "regular screening mammography" was classified as 90 percent or more of women aged 50 to 75 years (yes-no) based on a continuous response variable. In a separate question using the same format, we asked physicians to provide the proportion of asymptomatic women aged 50 to 75 years on whom they performed regular clinical breast examinations. We compared demographic characteristics and mammography practices across specialty categories using t-tests and chi-square statistics.<sup>27</sup> The distribution of affirmative answers to the questions relevant to the conceptual framework was compared between specialties using chi-square statistics.

In addition, we compared the proportion of affirmative responses regarding factors that might affect physician performance of clinical breast examination for each specialty. These questions were not part of our original conceptualization of influences upon mammography use, but their answers provided additional insight into the findings.

We used two formats for these questions. In the first we asked whether "lack of confidence" in their breast palpation skills, "patient embarrassment and reluctance," "reassurance for patients," "time and effort in doing the examination," and "opportunity to detect other breast-related problems" affected their performance of clinical breast examination among asymptomatic women aged 50 to 75 years. Physicians responded on a seven-point Likert scale with "not at all" or "affects a great deal" at either end of the scale. In the second set of questions we asked their beliefs about whether clinical breast examinations were "effective in detecting lesions at an early stage" and "reduced breast cancer mortality in women older than 50 years." Responses to the latter questions were also provided on a seven-point Likert scale with "strongly disagree" and "strongly agree" at either end of the scale. Responses numbered 5, 6, and 7 on the scale were counted as affirmative responses for all questions.

We then used the dichotomous coding for self-reported ordering of regular mammography as the dependent variable in logistic regression.<sup>27</sup>

We tested the simultaneous influence of all *pre-disposing, enabling, and reinforcing factors* using the dichotomous (0,1) categorization of responses shown in the Appendix. The resulting model allows the estimation of the odds that a positive response to an item (i.e., value=1) is associated with physician self-reported ordering of mammography in greater than 90 percent of women aged 50 to 75 years. To test whether "clinical breast examination performance" or "specialty" of the physician was associated with ordering regular mammography, we ran the regression with and without the clinical breast examination variable in the model.

To provide validation of physician ordering and to lend additional insight into our findings, we also compared the demographic characteristics and self-reported mammography use among women categorized by the type of physician they saw regularly.

## Results

Among the 380 physicians who reported providing some primary care to women aged 50 to 75 years, we excluded 45 physicians (33 general surgeons, 11 hematologists-oncologists, and 1 other subspecialist) who did not provide primary care as their principle clinical activity. We subsequently excluded 27 physician members of a staff model

health maintenance organization (19 family physicians-general practitioners, 3 internists, and 5 obstetrician-gynecologists) who did not provide an answer to the outcome variable because their HMO had a formal screening program that greatly influenced their practices. As noted earlier, the women enrollees of this HMO were also excluded from the analysis presented here. The remaining 308 physicians included 151 family physicians, 38 general practitioners, 75 internists, and 44 obstetrician-gynecologists of whom 224 (73 percent) returned the questionnaire. Because the number of general practitioners was small (n=27) and the proportion of them who ordered mammography in 90 percent or more of women aged 50 to 75 years was not statistically different from the proportion among family physicians (family physicians, 46 percent; general practitioners, 37 percent;  $P=0.46$ ), we analyzed them as a group. Among the 308 eligible physicians, response rates were lower for internists (44 of 75, 59 percent) and obstetrician-gynecologists (29 of 44, 66 percent) compared with family physicians-general practitioners (151 of 189, 80 percent) ( $\chi^2=13.4$ ,  $P<0.01$ ).

Table 1 shows the results of the demographic comparisons across specialty. The differences achieved statistical significance only for the

**Table 1. Practice and Practitioner Characteristics (Percentage of Respondents).**

Characteristics	Family Physician-General Practitioner (n=151)	Internist (n=44)	Obstetrician-Gynecologist (n=29)	Sample Total (n=224)
<b>Sex</b>				
Women	16	7	25	15
Men	84	93	75	84
<b>Years since graduation</b>				
≤10 years	24	19	25	23
>10 years	76	81	75	77
<b>Practice type</b>				
Solo	44	44	57	46
Group, other or unknown	55	56	43	54
<b>Practice size (women aged 50 to 75 years)</b>				
≥25 a week	49*	66†	25*†	49
<25 a week	51	34	75	51
<b>Order regular mammograms in ≥90% of women ≥50 years</b>	42‡	51§	76‡§	50

\* $\chi^2=5.4$ , family physician-general practitioners vs. obstetrician-gynecologists,  $P<0.05$ .

† $\chi^2=11.4$ , internists vs. obstetrician-gynecologists,  $P<0.01$ .

‡ $\chi^2=9.6$ , family physician-general practitioners vs. obstetrician-gynecologists,  $P<0.01$ .

§ $\chi^2=4.4$ , internists vs. obstetrician-gynecologists,  $P<0.05$ .

estimated number of women aged 50 to 75 years seen each week. Obstetrician-gynecologists saw fewer women in these age categories compared with internists and family physicians-general practitioners. In the four counties, family physicians-general practitioners accounted for 64 percent of the eligible physicians and 67 percent of the questionnaire respondents. Significantly fewer family physicians-general practitioners (42 percent) and internists (51 percent) reported ordering screening mammography regularly, compared with obstetrician-gynecologists (76 percent,  $P < 0.01$ ). The proportion of internists and

family physicians-general practitioners ordering regular mammograms was not different.

Table 2 shows the results of the comparison of *predisposing*, *enabling*, and *reinforcing factors* for ordering regular screening mammography. In all three specialties the majority ( $\geq 78$  percent) believed that screening mammography reduces mortality for women aged 50 years and older. A minority of physicians ( $\leq 38$  percent) believed that their colleagues ordered regular screening mammograms, and obstetrician-gynecologists were much less likely to believe their colleagues ordered them than family physicians-general

**Table 2. Specialty Differences Regarding Predisposing, Enabling, and Reinforcing Factors for Ordering Screening Mammography (Percentage of Physicians Agreeing).**

Factors	Family Physician-General Practitioner (n=151)	Internist (n=44)	Obstetrician-Gynecologist (n=29)	Sample Total (n=224)
<b>Predisposing</b>				
<b>Beliefs and knowledge regarding screening mammography</b>				
Detects cancer physician cannot	94	88	90	92
Increases treatment options	96	93	90	95
Reduces mortality	90	78	86	87
Provides legal protection	85	86	83	85
Provides women sense of security	89	85	76	86
<b>Social norm</b>				
Most colleagues order regular screening mammograms	38*	32	15*	34
Consensus exists regarding optimum screening interval	50	40	38	46
Patients want and expect screening mammograms	71	78	72	73
<b>Enabling</b>				
Perform clinical breast examination in >90% women aged 50 to 75 years	43†	62‡	85†‡	52
Reduced-cost package exists	38	37	24	36
Inadequate insurance coverage exists	68§	68 <sup>  </sup>	45 <sup>  </sup>	65
Physician reminder exists	60	58	38	57
Convenient radiology facility exists	71	74	86	74
Positive relationship with radiologist exists	95	100	96	96
<b>Reinforcing</b>				
Family member or friend has diagnosis of breast cancer	54	53	62	55
>20% ambiguous reports	33	21	34	31
Unreasonable time explaining results	61	19 <sup>¶</sup>	11	9

\* $\chi^2 = 5.5$ , family physician-general practitioners vs. obstetrician-gynecologists,  $P < 0.05$ .

† $\chi^2 = 16.4$ , family physician-general practitioners vs. obstetrician-gynecologists,  $P < 0.01$ .

‡ $\chi^2 = 4.1$ , internists vs. obstetrician-gynecologists,  $P < 0.05$ .

§ $\chi^2 = 5.8$ , family physician-general practitioners vs. obstetrician-gynecologists,  $P < 0.05$ .

<sup>||</sup> $\chi^2 = 3.9$ , internists vs. obstetrician-gynecologists,  $P < 0.05$ .

¶ $\chi^2 = 6.7$ , family physician-general practitioners vs. internists,  $P < 0.01$ .

practitioners ( $P<0.05$ ). No other differences in predisposing factors existed.

Two enabling factors differed across specialties. Fewer family physicians-general practitioners and internists performed clinical breast examinations in 90 percent or more of the women aged 50 to 75 years compared with their obstetrician-gynecologist colleagues. Fewer obstetrician-gynecologists thought that insurance coverage for screening mammography was inadequate compared with either family physicians-general practitioners ( $P<0.05$ ) or internists ( $P<0.05$ ).

The only reinforcing factor differentiating specialties was that internists were more likely to report spending unreasonable time explaining the mammography results compared with family physicians-general practitioners ( $P<0.05$ ).

The multivariate model, which included all demographic characteristics and all predisposing, enabling, and reinforcing factors, is shown in Table 3. Two characteristics are positively associated with ordering regular mammography: (1) performance of clinical breast examination in at least 90 percent of the women aged 50 to 75 years ( $P<0.001$ ),

**Table 3. Associations of Physician Responses with Their Ordering of Regular Mammography.**

Associated Factors	Coefficient	Odds*	95% Confidence Interval
<b>Predisposing</b>			
<b>Demographics</b>			
Women	0.09	1.1	0.32-3.76
Graduation $\leq 10$ years	0.83	2.3	0.83-6.32
Individual practice	0.14	1.2	0.48-2.80
Sees $\geq 25$ women per week aged 50 to 75 years	-0.07	0.9	0.40-2.15
Obstetrician-gynecologist	0.89	2.4	0.63-9.51
Internist	-0.14	0.9	0.29-2.64
<b>Beliefs and knowledge regarding screening mammography</b>			
Detects cancer physician cannot	1.69	5.4	0.59-49.77
Increases treatment options	0.07	1.1	0.07-17.49
Reduces mortality	-0.13	0.9	0.21-3.64
Provides legal protection	0.15	1.2	0.26-5.10
Provides women sense of security	0.49	1.6	0.35-7.64
<b>Social norm</b>			
Most colleagues order regular screening mammograms	0.04	1.0	0.42-2.57
Consensus exists regarding optimum screening interval	0.28	1.3	0.56-3.13
Patients want and expect screening mammograms	-0.30	0.7	0.24-2.25
<b>Enabling</b>			
Perform clinical breast examination in $>90\%$ women age 50 to 75 years <sup>†</sup>	1.92	6.8	2.88-16.32
Reduced-cost package exists,	0.74	2.1	0.83-5.32
Inadequate insurance coverage exists <sup>‡</sup>	-0.87	0.4	0.18-0.98
Physician reminder exists	0.26	1.3	0.54-3.10
Convenient radiology facility exists	0.78	2.2	0.76-6.26
Positive relationship with radiologist exists	-2.07	0.1	0.015-1.06
<b>Reinforcing</b>			
Family member or friend has diagnosis of breast cancer	0.26	1.3	0.55-3.09
$>20\%$ ambiguous reports	0.05	1.0	0.37-2.44
Unreasonable time explaining results <sup>†</sup>	2.94	18.8	2.13-166.8

\*Calculated from logistic regression using EGRET software.

<sup>†</sup>An affirmative answer was positively associated with self-reported ordering screening mammography in  $\geq 90\%$  of women 50 to 75 years of age.

<sup>‡</sup>Individuals who reported inadequate insurance coverage existed for mammography were less likely to order mammograms in  $\geq 90\%$  of women 50 to 75 years of age.

and (2) spending an unreasonable time explaining mammography ( $P<0.01$ ). One variable was negatively associated with ordering regular mammography: the belief that inadequate insurance coverage existed for mammography ( $P<0.05$ ).

Specialty differences for ordering mammography were not significant when all variables were in the model. Removing the variable for "performance of clinical breast examination in 90 percent or more of women" resulted in a significant association between being an obstetrician-gynecologist and ordering regular mammography ( $P=0.05$ ).

Responses to the questions regarding clinical breast examination did not differ across specialties. Among the 224 physician respondents, only 2 percent thought that lack of confidence in their skills affected their use of clinical breast examination. The proportion of physicians who thought that "patient embarrassment and reluctance," "reassurance for patients," "time and effort in doing the examination," and "opportunity to detect other breast-related problems" affected their practice was 10 percent, 67 percent, 2 percent, and 28 percent, respectively. One-half the physicians believed that clinical breast examination was effective at detecting breast cancer at an early stage, and 67 percent thought it reduced breast cancer mortality.

Table 4 shows the characteristics of the 1358 non-HMO women respondents grouped according to the type of physician they see regularly. Women seeing gynecologists alone or in combination with other physicians had characteristics that differentiated them from women seeing other physicians. Women seeing obstetrician-gynecologists were significantly younger ( $P<0.001$ ) than women seeing other physicians, more likely to be in households with incomes of greater than \$35,000 ( $P<0.01$ ), have some college education ( $P<0.01$ ), and receive regular mammograms ( $P<0.01$ ). Women without a regular physician (10 percent) were least likely to receive regular mammograms. Women seeing only obstetrician-gynecologists were more likely to report receiving regular mammograms than women seeing family physicians-general practitioners only ( $\chi^2=12.6$ ,  $P<0.01$ ) or internists only ( $\chi^2=5.4$ ,  $P<0.05$ ). Women seeing a gynecologist plus any other combination of physicians were more likely to report receiving regular mammograms than women not seeing a gynecologist.

## Discussion

Achieving better use of mammography has become a national preventive care goal cited by the US Department of Health and Human Services.<sup>5</sup> Use of screening mammography, however, represents the complex interaction of the physician and a woman's behavior. The national goal that 60 percent of women aged 50 years and older should have had a mammogram in the previous 2 years, by the year 2000, might not change by focusing on one or the other group. The behavior of both groups must be assessed and influenced. In this study we emphasized the behavior of family physicians-general practitioners, internists, and obstetrician-gynecologists in a four-county area of Washington state. The physicians included in the analysis also reported providing primary care to women aged 50 to 75 years. This study was done as part of a larger project to address the behavior of both physicians and women. The results of that larger project are being assessed now and are beyond the scope of the work reported here.

One important limitation of our study is that we used self-reported rates of ordering and receiving mammograms. Reasonably good validation exists for women's-reported rates of mammography, but validation of physician ordering was not done.<sup>28</sup> Physician-reported rates of ordering mammography have overestimated their actual behavior.<sup>13</sup> The response must include an estimate of how many women the physician sees regularly, and then a guess at how many of those women are given the recommendation. Despite this limitation, the outcome variable chosen for physicians yields an estimate of regular use of mammography among women that corresponds qualitatively with women's reported experience. Fifty percent of the sample of physicians reported ordering regular mammography in 90 percent or more of women, and 37 percent of the women surveyed reported receiving regular mammography (Tables 1 and 4). Obstetrician-gynecologists reported ordering mammography in the highest proportion of women (76 percent), and women who saw them exclusively or in addition to another physician were most likely to report obtaining a mammogram (57 percent and 61 percent, respectively). Because it seems implausible that specialties would differ in their ability to estimate their rates of ordering, the outcome variable chosen is a

**Table 4. Physician Seen,\* Women's Characteristics, and Regular Mammography Use.**

Women's Characteristics	Physician Seen							Total Sample (1358)
	Only Family Physician-General Practitioner (n=526)	Only Internist (n=147)	Only Obstetrician-Gynecologist (n=51)	Only Other Physicians (n=121)	Gynecologist + Any Physician (n=151)	2+ Physicians, Not Gynecologist (n=217)	No Regular Physician (n=145)	
Average age (years)	63	63	59†	64	59†	64†	62	63
Income >\$35,000 (%)	22‡	32	45‡	20	47‡	25	20	26
Education ≥some college (%)	32‡	44	60‡	28‡	55‡	46§	37	39
Minority race (%)	3	3	0	2	1	3	8‡	3
Obtained mammogram in 2 of last 4 years (%)	32‡	38	57‡	33	61‡	46‡	11‡	37

\*Physician reported by woman as her regular health-care provider. "Other" includes all physicians other than family physician-general practitioner, internist, and obstetrician-gynecologist.

†P<0.01 for difference between mean age of women seeing this type of physician compared with mean age of all other women (t-test).

‡P<0.01 for distribution of proportion with characteristic among women seeing physician noted compared with proportion seeing all other physicians (chi-square).

§P<0.05 for distribution of proportion with characteristic among women seeing physician noted compared with proportion seeing all other physicians (chi-square).

reasonable method of comparing the behavior among the physicians.

Unlike the recent work of Lurie, et al.<sup>10</sup> on physician mammography use among Medicare-eligible women, our findings suggest that ordering regular mammography is not so much associated with physician gender or specialty as it is dependent upon their beliefs and practices. Our study reports on ordering behavior, whereas Lurie, et al. analyzed actual use. This analysis of actual use, however, did not account for socioeconomic differences among women or the reasons they sought care. Our work suggests that socioeconomic differences exist among the women who seek particular specialties for regular care, and these differences might also affect mammography use. Our study also shows that the odds are significantly increased that a physician will order regular mammography in at least 90 percent of women aged 50 years and older if the physician conducts a clinical breast examination in 90 percent or more women in this age category. Obstetrician-gynecologists reported ordering mammography more regularly than other primary care physicians. In the multivariate model, once clinical breast examination practices were accounted for, specialty type was no longer significantly associated with ordering regular mammography. This result suggests that performance of a screening breast examination affords the oppor-

tunity to order the screening mammogram and accounts for differences in ordering even within specialty types. The finding suggests that if women seek screening clinical examinations, they will be more likely to be referred for a mammogram regardless of the specialty of their physician.

Dietrich and Goldberg<sup>29</sup> found a similar result but examined all preventive practices among 20 generalists (family physicians and general internists) and 20 subspecialists (general internists listed as subspecialists in the *American Medical Directory*) in the San Francisco Bay Area. Their results show that the performance of a complete physical examination, rather than the specialty type, was associated with performing more preventive services, including screening mammography. In our study family physicians and internists reported performing clinical breast examinations in a smaller proportion of women than did obstetrician-gynecologists. The lower reported rates of performing clinical breast examinations make sense when one considers that internists and family physicians see women for a variety of medical problems including, but not restricted to, women's health. That specialty type is no longer a significant predictor of behavior, once performance of a clinical breast examination is in the model, suggests the latter variable is the salient predictor.

National groups have recommended a reduction in the frequency of complete physical examinations and Papanicolaou smears because of limited evidence that mortality is reduced by more frequent examinations.<sup>30,31</sup> Our study results suggest, however, that the logical reduction in frequency of Papanicolaou smears might have implications for the ordering of mammography. Physicians often conduct a clinical breast examination in association with the pelvic examination. It is time to consider performing screening clinical breast examination separately from the Papanicolaou smear and pelvic examination. Not only does the clinical breast examination contribute to detection, it affords the opportunity to order mammography.<sup>32-34</sup> The extent to which physicians currently perform screening clinical breast examinations alone needs closer examination.

Results from the women's survey suggest women seeking care from obstetrician-gynecologists have different demographic characteristics than women seeing other primary care providers. As would be expected from the univariate results of the physicians' survey, women who see obstetrician-gynecologists are more likely to have received regular mammograms than women seeing internists or family physicians. In our sample, women seeking care from obstetrician-gynecologists were younger, were more educated, and had higher incomes. In a separate analysis of women's behavior, Urban, et al.<sup>14</sup> showed that using an obstetrician-gynecologist for care increased the odds of getting regular mammography even after accounting for differences in insurance coverage. Whether women who see obstetrician-gynecologists are more likely to request well-adult care needs closer examination.

Practices of family physicians-general practitioners and internists must be affected to have a meaningful impact upon mammography performance in the population. Forty-seven percent of the women in our sample saw family physicians-general practitioners or internists exclusively. A minority of women (15 percent) in these four counties saw obstetrician-gynecologists on a regular basis. We need more research regarding which factors affect the use of the clinical breast examination, because it appears to be the context for ordering mammography. Our survey results suggest that primary care specialists held similar be-

liefs about clinical breast examinations, which indicates that such factors as reimbursement and the competing demands of symptomatic care might play important roles.

A limitation of this study is that we had to interpret cross-sectional associations. Family physicians and internists were more likely to think insurance coverage was inadequate, and they ordered mammography less frequently than obstetrician-gynecologists. At the time of the survey, only 50 percent of the women had some or all of a screening mammogram reimbursed by medical insurance. Our survey results could therefore indicate that inadequate insurance coverage had a negative influence or that family physicians and internists made different judgments about insurance coverage compared with obstetrician-gynecologists. We also found a positive association between ordering mammograms and spending an unreasonable time explaining results. The association probably reflected the reality of practice. If one orders more mammograms, then there will be more experience explaining results. The effect of both these factors needs prospective evaluation.

Another limitation of the study is that it included women and physician questionnaire respondents in four counties in northwest Washington. Questionnaire response was similar across specialty but higher for family physicians-general practitioners than for obstetrician-gynecologists. Women in these communities were similar in mean age to the statewide measures for the same age group (state mean age 61.5 years for women aged 50 to 75 years) but less likely to be minorities.<sup>35</sup> Women in our sample might have been somewhat less affluent than the state in general, where about 48 percent of the population had incomes greater than \$35,000 in 1990.<sup>35</sup> The state estimate, however, included women aged 45 to 50 years, and they are more likely to be employed than the women aged 50 years and older included in our sample.

Because the study results point to a reality of practice that is common throughout the United States, we think the results have general application to physicians in other communities. We have been told that women represent 17 percent of all physicians in the state according to American Medical Association statistics for Washington (Physician Master File, November 1993) and that

36 percent of state physicians belong to group practices. The physicians in our sample had a similar sex distribution but appeared more likely to be in group practice. Our physician sample appeared to be similar, but not identical, to the available state statistics regarding physicians. Application of our findings to other primary care physician populations needs examination, however. We need to determine whether ordering mammograms follows from preventive care visits; whether those visits need to begin to include breast physical examination alone; whether the proportion of family physicians, internists, and obstetrician-gynecologists is similar in other communities; and whether their beliefs and practices are similar to those reported here.

We think that the study has many strengths. The physician attitudes and practices were examined using a conceptual framework that encouraged consideration of a complex set of factors which might be influenced.<sup>20</sup> Key beliefs, practice characteristics, and *enabling factors*, such as insurance coverage, all affected ordering behavior. These factors must be addressed in interventions or by policy makers seeking to influence behavior.

Another strength of this study is the information about the women served by the physicians. Women's use of mammography confirms the relative frequency reported by physicians. The demographic characteristics of these women also show that selective factors influenced which specialist they chose. Factors such as health status could also have had an influence but were not measured. It might be that healthier women see obstetrician-gynecologists for well-adult care, whereas women with multiple illnesses see internists or family physicians.

Because the majority of women see family physicians or internists, more must be done to encourage these physicians to order mammography. The results of our research suggest that factors which encourage physicians to perform clinical breast examinations might be as important as changes in attitude. These factors could include automated reminders, changes in reimbursement, and performance of the clinical breast examination separate from a complete physical examination. The effect of systematic changes to influence these factors needs prospective evaluation.

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## Appendix

The predominant question type of the survey used seven-point responses on a Likert scale. For example:

Screening mammogram will detect cancer that I cannot detect with a breast self examination:

Strongly Disagree	Neither Agree Nor Disagree			Strongly Agree		
1	2	3	4	5	6	7

Some questions included categorical or continuous responses. The questions were dichotomized for the logistic regression as follows:

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	0	1
<b>Demographics</b>		
Sex	Men	Women
Graduation from medical school	>10 years ago	≤10 years ago
Practice type	Group, other, unknown	Solo
Practice size (women aged 50 to 75 years)	<25 per week	≥25 per week
Specialty	Family physician-general practitioner	Obstetrician-gynecologist, Internist
<b>Beliefs and knowledge</b>		
Detects cancer physician cannot	1-4	5-7
Increases treatment options	1-4	5-7
Reduces mortality	1-4	5-7
Provides legal protection	1-4	5-7
Provides women sense of security	1-4	5-7
<b>Social norm</b>		
Primary care physician colleagues order regular screening mammograms	Few, some, many	Most do
A consensus exists regarding the optimal screening interval	No, don't know	Yes
Patients want and expect screening mammograms	1-4	5-7
<b>Enabling factors</b>		
I perform clinical breast examinations in ≥90% of women aged 50 to 75 years	<90%	≥90%
Reduced-cost package exists	No, don't know	Yes
Inadequate insurance coverage exists	1-3	4-7
Physician reminder exists	No	Yes
Convenient radiology facility exists	1-4	5-7
Positive relationship with radiologist exists	1-3	4-7
<b>Reinforcing conditions</b>		
I had family member or friend with breast cancer diagnosed	No	Yes
Proportion of ambiguous mammography reports	≤20%	>20%
Spent unreasonable time explaining results	Never, once or twice, several times	Many times
<b>Outcome</b>		
Order mammograms in what proportion of women aged 50 to 75 years _____.*	<90%	≥90%

\*Continuous variable, physician provided proportion.