Effect of Continuing Medical Education and Cost Reduction on Physician Compliance with Mammography Screening Guidelines

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Background. Primary care physicians perform breast cancer screening in women aged 50 years and older less frequently than recommended by national guidelines.

Methods. A multimethod continuing medical education (CME) intervention was tested in an attempt to increase breast cancer screening practices in a predominantly fee-for-service practice community in New York State. Preintervention and postintervention surveys of primary care physicians were conducted in 1988 and 1990, respectively. Project-initiated, low-cost mammography in one town and the unanticipated provision of free mammography services in another town under nonproject auspices permitted a comparison to be made between these towns and towns where mammography screening was provided at the prevailing fees to determine the impact that cost has on physicians' referral of women patients for mammography.

Results. Physicians practicing in the towns in which the CME intervention was provided showed a significant increase, consistent across specialty groups and greatest among family physicians, in the number of reported mammography referrals of asymptomatic women aged 50 to 75 years. Changes in the CME control town were smaller and not statistically significant for the sample size available. The increase in compliance was as large in the CME-intervention towns, one without (19%) and one with low-cost mammography (20%), as the increase in the town with free mammography alone (18%). There were no significant increases in reported performance of breast examination.

Conclusions. A multimethod program of CME is a feasible approach to increasing community physician compliance with mammography screening guidelines, particularly among family physicians, and can enhance the impact of reduced cost or have at least the equivalent effect of free mammography services.

Key words. Mammography; education, medical, continuing; preventive health services; breast neoplasms. *J Fam Pract 1991; 33:359-368.*

In 1989 the National Cancer Institute (NCI) released a consensus report on breast cancer screening guidelines that was endorsed by 11 organizations, including the American Academy of Family Physicians, several other specialty societies and associations, and national cancer groups.[1] These guidelines included a longstanding recommendation for annual mammography and physical breast examination in women 50 years of age and older. Numerous studies have indicated that a large proportion of primary care physicians are not following national recommendations for breast cancer screening. While the proportion of primary care physicians who reported following the same American Cancer Society (ACS) guidelines for mammography increased from 11% in a 1984 ACS survey to 37% in 1989, 63% of physicians were still not in compliance.[2,3] A decline in the breast cancer mortality rate in the United States, in the face of a rising incidence of the disease, will not occur until there is greater utilization of mammography and breast physical examination at the recommended intervals.

Continuing medical education (CME) is appropriate for updating practicing clinicians about guidelines for preventive practices; however, the bulk of CME offerings traditionally relate to the treatment rather than the prevention or the early detection of disease. Physician screening practices have been improved by using computer and manual reminder systems and other strategies within resident or university-based practices,[4–9] but there

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are few reports that involve community-wide or predominantly fee-for-service practice settings. To substantially influence physician screening practices, approaches are needed that can reach physicians in this more common practice mode.

This paper describes the outcome of an NCI-supported, community-wide approach to increasing the use of mammography and physical breast examination for women 50 years of age and older through physician and public education, and is limited to the physician intervention aspect of this experience. Data from our baseline survey of samples of women in the target age group residing in the same four communities were published as part of a group report from all the projects within the NCI Breast Cancer Screening Consortium.[10]

Our study tests the hypotheses that a community-wide, multimethod approach to CME can increase physician compliance with national guidelines for breast cancer screening, and that cost reduction can also increase compliance and decrease concern about cost as a barrier to mammography referral. Our physician education interventions were also designed to test our hypothesis that the local community hospital could serve as an effective focus for CME about early breast cancer detection, which was directed at physicians with hospital staff appointments who were engaged in fee-for-service office practice in the community.

Methods

Sites, Subjects, and Design

The research design for the entire project, described in greater detail elsewhere,[11] included the use of incremental levels of interventions by town. The project control town in Nassau County (Hempstead) had no project-related interventions; one town in Suffolk County was also a control town for the physician education intervention and had only public education (Smithtown); two towns in Suffolk had both public and physician education (Brookhaven and Islip), and one of them also had the availability of low-cost mammography (Brookhaven). University Hospital, which is located on the north shore of Brookhaven and is accessible to all parts of the town, provided mammography screening at a cost ($55.00) lower than prevailing fees ($75 to $200). A large private radiology practice on the south shore of Brookhaven also offered screening mammograms at the same lower fee to women who had coupons distributed by the project at community education programs.

The targeted physicians included all those providing primary adult care (family physicians, general internists, and obstetrician-gynecologists) who were practicing in the two physician-intervention towns in Suffolk County (Brookhaven and Islip) and in the two control towns, one in Suffolk County (Smithtown) and one in Nassau County (Hempstead).

Table 1. Type and Level of Intervention, by Town

Type of Intervention	Control, Smithtown	Nonproject Intervention, Hempstead	Project Intervention	
			Islip	Brookhaven
CME intervention	No	No*	Yes	Yes
Cost intervention	No	Yes/free	No	Yes/low-cost

**Limited to single mailing of educational materials to physicians.*
CME denotes continuing medical education.

Community-based research does not allow for the control of events that is possible in the laboratory. Approximately 1 year after our baseline survey, Nassau County (which includes our project's control town of Hempstead) received federal, state, and county support to conduct a breast cancer screening project, which included free mammography. Therefore, the control area for physician education was limited to those physicians practicing in Smithtown, where only public education but no physician education was provided by our project. A useful result of the unanticipated event is that we can provide outcome data relating to both project and nonproject interventions, especially the impact on physician response to the availability of free mammography in the town of Hempstead. Table 1 shows the final designation of interventions by individual town.

Description of Interventions

Continuing medical education is defined in this study as the "package" of methods included in the physician education intervention as described below. While all of our CME methods meet the American Medical Association (AMA) House of Delegates definition of CME for use of the Physician Recognition Award (PRA)[12] program, some would not qualify for PRA credits as further defined by the AMA or for prescribed American Academy of Family Physicians (AAFP) credits as distinguished below.

A multimethod approach to physician education was used to reach a larger number of physicians through their preferred (and perhaps different) learning styles. The American Cancer Society–Long Island Division was cited as a cooperating agency in connection with these offerings. The baseline physician survey was used as a method of needs assessment and included a section in which the physician could suggest topics of interest that related to breast cancer detection.[13] A medical advisory

committee to the project was formed, composed of the directors of the targeted primary care departments (family practice, internal medicine, obstetrics-gynecology) and/or directors of medical education at the five community hospitals located in the intervention community. In addition, the committee included three physicians from the medical school/university hospital (besides D.S.L.): a radiologist (the director of the mammography services), a surgeon (the director of the breast clinic) and a gynecologic oncologist (who provided training in breast examination as described below). This committee of community medical leaders played an important role in recommending strategies to reach practicing physicians through various educational methods. The CME interventions are described only briefly, but related materials are available from the author.

Project Interventions

FORMAL CME CONFERENCES

As an initial CME event, a half-day conference entitled "Advances in Breast Cancer Detection" was provided for the staffs of the five community hospitals at or near these institutions and at the Health Sciences Center for house staff, students, and faculty. The program included a didactic portion, which covered topics of interest from the baseline survey (see below), and two alternating workshops, one about patient communication and compliance, and the other about office systems for patient education and recall and referral.

Those who attended the conference obtained category 1 AMA/PRA credits and prescribed AAFP credits. The didactic portion of the conference was also videotaped and made available for viewing through any of the five hospital medical libraries for those who missed the conference. One hundred ninety-eight physicians attended the program, including 129 in the targeted specialties. Ninety-eight additional health professionals including medical and other health professional students also attended. Although we directly reached only 40% of the target group through the formal program, 19 others are known to have viewed videotapes of the program and others may have been influenced by their colleagues who attended. In addition, during the second intervention year of the project, the associate dean for continuing medical education (D.S.L.) offered assistance to the departmental directors and directors of medical education at the community hospitals in obtaining speakers about breast cancer for their monthly departmental CME meetings. Two such programs were arranged in this way, and others were conducted at the hospitals without project-related assistance or prompting.

PHYSICIAN NEWSLETTER

Two editions of a two-sided, single-page physician newsletter were mailed to all 371 targeted primary adult care physicians in the intervention towns. The newsletter provided information about project survey (see below) results (including local prevailing practice regarding mammography use and specialty variation in breast cancer screening practices) as well as other important information about breast cancer detection, such as the consensus guidelines, insurance coverage for screening mammography, and upcoming CME offerings on breast cancer.

BREAST EXAMINATION SKILLS TRAINING

This 3-hour workshop, designed to enhance the technique of physical examination of the breast and the workup of breast masses, was conducted at University Hospital and provided one-on-one teaching and supervision by a faculty preceptor during a clinical session with outpatients. This course is also approved for category 1 AMA/PRA credits. Only six physicians in family practice or internal medicine had completed the breast palpation skills course at the medical school before the 1990 survey.

BREAST CANCER CME MONOGRAPH

A monograph was developed to provide a review and update for the primary care physician in breast cancer detection and treatment so that the information could be applied in daily office practice. It was mailed without charge to all intervention area physicians in the target specialties. Physicians who read the monograph and completed and returned a 42-item quiz were able to receive category 1 AMA/PRA credits and prescribed AAFP credits. Although only 17 physicians mailed in their answers to the monograph quiz, this may underestimate the numbers who read the monograph, since some physicians are reluctant to identify themselves for scoring or do not need or want additional CME credits. This was substantiated by the response to survey questions relating to the monograph (see below).

"QUESTION OF THE MONTH" AT HOSPITAL STAFF MEETINGS

At the suggestion of the medical advisory committee, a monthly question was mailed to the directors of the targeted primary care clinical departments of the five community hospitals, to be asked of staff physicians as a group during the business portion of their monthly staff meeting. It was suggested that the importance of breast cancer screening would be emphasized if it was discussed along with hospital quality assurance activities at each

meeting. A new question, accompanied by a published article or other related material, was forwarded each month for a 6-month period. Responses were called for by a show of hands to generate discussion. Members of the medical staff of these hospitals are required to attend 50% to 75% of departmental meetings. The directors of the hospital's services reported that questions were asked at 48 departmental meetings during the 6-month period (ie, 12 family practice, 14 internal medicine, 17 obstetrics-gynecology, and 5 missing a specialty designation). At some hospitals the family physicians also attended the internal medicine department meetings; therefore, the departmental figures may underestimate their exposure.

PRIMARY CARE OFFICE VISITS

On a pilot basis the project offered, by mail and through a sign-up sheet at hospital department meetings, the opportunity for physicians to receive a brief on-site office visit by a project educator to assist in improving office systems for promoting breast cancer screening and patient compliance. This "face-to-face" CME is similar to "detailing" by pharmaceutical representatives and has been demonstrated to be effective for modifying prescribing practices.[14] The focus of these meetings with the physician and any designated member of the office staff was the review of medical record charting aids, patient tracking or reminder systems, and patient education teaching aids and resources. Participation in the office visit intervention was limited to 40 family practice physicians or general internists because it required a significant commitment of project staff time. Obstetrician-gynecologists were not included in the offering because the baseline survey revealed their higher use of office reminder systems for patient recall for breast cancer screening (63% vs 43% for family physicians and 46% for internists).

PATIENT EDUCATION MATERIALS

Materials were developed to encourage women to obtain breast cancer screening, including a brochure, flyers, and posters. Before distribution to women in the community, they were mailed to primary care physicians in the intervention area for their information and use in the office setting or they were distributed at community hospital departmental meetings (poster).

Nonproject Intervention

In March 1988, immediately following our baseline physician survey, free annual mammography was offered to any woman aged 35 years or older residing in Nassau County. All households in the county received a letter from the county executive notifying them of this "benefit," and there were announcements in the media and through health department public education activities. Mammography was (and continues to be) provided at the county hospital and in three county-funded free-standing health centers. Both the county hospital and one of the health centers are located in the original project "control" town of Hempstead.

In late February 1990, 2 to 3 weeks before the first mailing of our postintervention physician survey (see below) to Hempstead physicians, all physicians practicing in Nassau County received a mailing with three separate cover letters signed by the governor's wife, the president of the county medical society, and the president of the American Cancer Society–Long Island Division, respectively, all urging compliance with screening guidelines and mentioning the free mammography. The mailing included a copy of a brochure for patients about breast cancer screening that made reference to the availability of free mammography and an order form to obtain additional brochures, the consensus guidelines,[1] and three articles about the efficacy of mammography as noted in the reference list.[15–17] Because this isolated mailing was not accompanied by any formal activity that would meet the criteria for category 1 AMA/PRA or prescribed AAFP credits, in our evaluation of the impact of interventions we refer to Hempstead as a non-CME (non-project) intervention town. We evaluated the effect of the availability of free mammography in this town on physician behavior and concern about the cost of mammography.

Measurements and Data Collection Procedures

The baseline survey of physicians was conducted from December 1987 through March 1988, before the implementation of educational interventions. The second or postintervention physician survey was conducted from January 1990 to May 1990. We limited surveys to physicians on the staffs of any of the hospitals located in the intervention and control towns in order to identify actively practicing primary care physicians at their office locations. Virtually all physicians in active practice in the area had a hospital appointment. The survey instrument collected data on physician characteristics, breast cancer screening practices, and concerns that would influence ordering screening mammograms or performing breast physical examination. There was no financial incentive for completing the survey, which took approximately 5 minutes to answer.

A focus group of physicians in the target specialties from the intervention area recommended that the survey be conducted at medical staff departmental meetings at

the community hospitals. Physicians who did not attend the meeting would receive the survey by mail. To enhance the response rate, physicians completed the survey anonymously in the hospital. They were asked to record their name and address on a separate form (not linked with their survey) so that they would not be surveyed by mail. Only mail surveys were numbered to permit identification of nonrespondents for repeat mailings. This "mixed-mode" approach was used in surveying physicians in the physician intervention towns, which included five community hospitals. In the physician control towns, only the mail survey approach was used because of project staff limitations and overlapping schedules of monthly department meetings during the survey period. Three attempts were made to contact physicians by mail; the final communication was sent certified mail.

The overall response rate to the baseline survey (including Hempstead) was 72% (555) and to the postintervention survey was 69% (642), excluding physicians who were retired, deceased, had moved out of the area, or had never received the survey because of an unknown forwarding address. As expected, the rate was higher with the mixed-mode approach (ie, 87% in 1988 and 81% in 1990, respectively) than with the mail-only approach (ie, 59% in both 1988 and 1990).

Statistical Analysis

Changes in physicians' self-reported mammography referrals and attitudes about making such referrals were examined by comparing responses to the preintervention and postintervention physician surveys. Changes were compared in the physician CME intervention and control areas, as well as by individual towns. The analysis also examined the change by physician specialty as well as the association between specialty and screening practices within each survey year.

The primary outcome variable in the analysis, change in mammography referrals, was measured in three ways. First, the dichotomous variable was used: whether or not physicians say they refer all of their patients 50 to 75 years of age for routine mammography. This was derived from responses to the question, "For approximately what percentage of your asymptomatic (without breast symptoms) female patients between the ages of 50 and 75 do you order regular screening mammograms?" The second measure for this outcome was whether the physician refers patients 50 to 75 years of age for mammography at an annual interval, based on responses to a question about "usual interval for ordering screening mammograms." The third and primary measure for referral combined the two previous survey responses to determine whether the responding physician referred all patients 50 to 75 years of age annually for mammography, which would be in complete compliance with national guidelines for mammography screening.

Changes in physicians' attitudes about making mammography referrals were analyzed through questions that asked physicians to rank their level of concern with nine possible deterrents to mammography referral. Physicians responded by ranking their level of concern on a scale of 1 to 5, where 1 was "no concern" and 5 was "a great deal of concern." Because the ranking of level of concern for all nine items clustered on the low end of the scale, all responses falling between 2 and 5 were collapsed into one category and compared with "no concern." Statistical analysis involved chi-square tests. The P values in the tables are reported to three decimal places (as low as $P < .001$).

Results

Physician Characteristics

Respondents to the pre- and postintervention surveys had similar characteristics, including a varied distribution by years since graduation from medical school. About 36% of the respondents in the 2-year sample were family physicians, 36% were general internists, and 27% were obstetrician-gynecologists. There was no difference in the two survey years in the proportion of gynecologists within or between the intervention and control towns. Over 86% of the physicians were either in solo or group private practice, and over 92% were board certified or eligible in both survey years. There were no significant differences in screening practices by sex, practice mode, certification status, or number of years since graduation from medical school (data not shown).

CME Intervention Towns vs Control Town

SCREENING PRACTICES: BASELINE COMPARED WITH POSTINTERVENTION

There was a significant increase from 1988 to 1990 in the proportion of physicians reporting that they regularly refer *all* of their asymptomatic female patients aged 50 to 75 years for mammography screening in the CME intervention area ($P < .05$), while in the control area there was no change (Table 2). At baseline, physicians in the control area (Smithtown) reported a higher rate of mammography referral (71.4%) than those in the intervention area (47.9%). This difference was unlikely to be due to nonrespondent bias in the control area because Hempstead physicians, who were also surveyed only by mail

Table 2. Physician Reports of Mammography Screening of Asymptomatic Women Aged 50 to 75 Years

Refer for Mammography	Preintervention, %	Postintervention, %	% Difference	*P* Value
CME intervention towns				
All women aged 50–75 y	47.9	58.2	10.3	.017
At annual interval	50.8	77.0	26.2	<.001
Both	33.3	53.0	19.7	<.001
Control town				
All women aged 50–75 y	71.4	71.4	0	NS
At annual interval	62.1	77.1	15.0	NS
Both	53.6	64.3	10.7	NS

CME denotes continuing medical education; NS, not significant.

and had a response rate comparable to those in Smithtown, had a referral rate (50.3%) similar to that in the intervention area at baseline. The reason for the reported higher referral rate in Smithtown is uncertain but may be related to the slightly higher socioeconomic status of women in that town and the positive association of mammography use with income and education.[10,18,19] Also, as discussed in detail below under the heading "Changes in Physician Concerns," a higher proportion of Smithtown physicians at baseline indicated that cost was not a concern to them in making such referrals.

Theoretically, it could have proved more difficult to increase the proportion of physicians referring all target patients for mammography when the baseline level was already high, as in the control area; however, our data by specialty do not support this. At baseline, gynecologists practicing in the intervention towns had an even higher level of referral (87.2%) than those in the control town (71.4%) and yet increased their referral rate to 92.4% by 1990. Similarly, Hempstead gynecologists, with about the same baseline level at 71.2%, increased their referral rate significantly to 86.8% by 1990.

Within the intervention area (Table 2) there was also a statistically significant increase in the proportion of physicians reporting that they referred women at an *annual* interval for mammography ($P < .001$) and a decrease in the proportion referring every 2 years and at longer intervals (data not shown). While the direction of change was the same in the control area, it was smaller and not statistically significant. The increase from 1988 to 1990 in physicians who follow the guidelines of referring all women at an annual interval was statistically significant in the intervention area but was smaller and not statistically significant in the control area (Table 2). None of the differences in the control town reached statistical significance because of both the small magnitude of the change and the small sample size.

Both the intervention and control area showed a small and statistically insignificant increase in the reporting of annual breast examination of all asymptomatic women aged 50 to 75 years (data not shown). In the intervention area, the proportion of physicians reporting compliance with the guidelines for breast examination in 1990 (60%) was still higher than the proportion following mammography guidelines (53%), but the gap was smaller than in 1988 (59% compared with 33%).

SPECIALTY DIFFERENCES

Within the intervention area, there was a statistically significant association between compliance with mammography screening guidelines and specialty. This was due largely to higher compliance among obstetrician-gynecologists compared with family physicians and internists (Table 3). Compliance with mammography screening recommendations also increased significantly within each of the three specialties from 1988 to 1990, even for gynecologists who had a high level at baseline. The greatest difference from baseline occurred among family physicians (27.3%). Within the control area there was not a similar trend toward increasing compliance among all the specialties (family physicians and gynecologists showed a decline in compliance). This was based, however, on small numbers in each specialty.

DIFFUSION AND INFLUENCE OF CME METHODOLOGIES

About 45% of the respondents to the postintervention survey reported having received a newsletter from the

Table 3. Percent of Physicians in CME Intervention Towns Who Reported Referring All Women Aged 50 to 75 Years Annually for Mammography Screening, by Specialty

Specialty	Preintervention	Postintervention	*P* Value*
Obstetrician-gynecologist	66.0	84.9	.008
Family physician	18.4	45.7	<.001
General internist	18.9	34.2	.018
Total	33.3	53.0	<.001

**Change in referral from 1988 to 1990 within each specialty.*
NOTE: Association between specialty and referral, both towns, within each year: $P < .001$.
CME denotes continuing medical education.

Table 4. Percent of Physicians Reporting Some Level of Concern* About Items That Affect Their Referral for Mammography

	CME Intervention Towns				Control Town			
	Preintervention (n = 323)	Postintervention (n = 265)	% Difference	*P* Value	Preintervention (n = 30)	Postintervention (n = 49)	% Difference	*P* Value
Some concern about								
Inadequate insurance	54.3	49.4	−4.9	.243	34.5	45.8	+11.3	.327
Equivocal radiology reports	52.9	49.1	−3.8	.361	48.3	36.2	−12.1	.297
High price	51.6	43.5	−8.1	.048	37.9	41.7	+3.8	.746
Radiation exposure	36.4	25.1	−11.3	.004	31.0	31.9	+0.9	.936
Unnecessary biopsies	33.7	34.7	+1.0	.785	13.8	29.8	+16.0	.111
Not cost effective	33.2	24.0	−9.2	.014	13.8	19.6	+5.8	.520
Patient discomfort	32.5	30.4	−2.1	.595	31.0	25.0	−6.0	.565
Sufficiency of physical examination	28.9	22.4	−6.5	.077	20.7	12.8	−7.9	.357
Insufficient time to discuss	20.6	17.9	−2.7	.402	13.8	14.9	+1.1	.895

**Ranking of 2 to 5 on a scale of 1 = no concern to 5 = a great deal of concern.*
CME denotes continuing medical education.

project. Among these, 20% read it (or 12% of total respondents). Similarly, about 35% of the survey respondents reported receiving a CME monograph on breast cancer. Among these, about 35% said they read the monograph (or 19% of total respondents). Although no newsletters or monographs were mailed by the project to the control area, eight physicians in this area reported receiving them (if not reading them), possibly reflecting confusion of our materials with others.

The percentage of physicians who reported in 1990 that they had increased their mammography screening practices during the past 12 months was 34.7% in the intervention area as compared with 20.5% in the control area. Physicians in the intervention area who said they had increased mammography referrals and who attributed it to the CME interventions ranked them in the following order of influence: CME conferences (43.7%), department meetings (37.9%), newsletters (31.0%), posters (28.7%), and CME monograph (24.1%). The number of physicians in the control area indicating they had increased mammography referral in the past year was too small (n = 9) for further analysis.

CHANGES IN PHYSICIAN CONCERNS

Physicians were asked to rank their level of concern about a number of items that might influence their referral for mammography. As described in the Methods section, these results were collapsed in Table 4 to indicate those reporting some concern vs no concern. Within the intervention area there was a decline between 1988 and 1990 in reporting of some level of concern for eight of the nine items, and a slight (statistically insignificant) increase in those expressing concern about unnecessary biopsies. The decline in frequency of some concern achieved statistical significance for the price of mammography ($P < .05$), radiation exposure ($P < .005$), and cost effectiveness ($P < .05$). Within the control area there was no clear trend of change in concern between 1988 and 1990, and none of the changes achieved statistical significance. In 1990 as in 1988, in both the intervention and control areas, the most common concerns related to cost (inadequate insurance coverage and high price) and equivocal radiology reports.

Role of Cost of Mammography in Compliance with Mammography Guidelines

This section includes the findings from the town of Hempstead in Nassau County, which had a nonproject intervention of free mammography, and separates the project CME intervention area into the town with and the town without low-cost mammography (Table 1) in order to examine the influence of cost on physician behavior and concern.

As indicated above, the price of mammograms ranked as one of the most common concerns that would affect physicians' ordering of screening mammograms (Table 4). The proportion of physicians indicating *no* concern about price increased significantly between 1988 and 1990 in Hempstead, where free mammography was available (Table 5). The difference was greatest in Hempstead (11.6%), followed by Brookhaven (9.3%), where low-cost mammography was available as part of the project research design. In Islip, where physician education was available without modification of price, the difference was 6.4%, whereas in Smithtown (with no physician or cost interventions) there was actually an increase in concern about price (−3.8% difference in the proportion of physicians indicating no concern about price).

Further analysis showed that physicians who expressed concern about price were significantly less likely

Table 5. Percent of Physicians Reporting No Concern About Price* When Ordering Screening Mammograms

Town Intervention	Preintervention	Postintervention	% Difference	P Value
Free mammography	54.3	65.9	11.6	.022
Low-cost and CME intervention	50.0	59.3	9.3	.097
CME intervention only	46.7	53.1	6.4	.304
No intervention	62.1	58.3	−3.8	.746
Total	51.3	60.2	8.9	.004

**Physicians ranked level of concern about price at 1 on a scale of 1 = no concern to 5 = a great deal of concern.*
CME denotes continuing medical education.

to comply with the guidelines for mammography. In 1988, among physicians in all towns surveyed who reported some concern about price, only 20% referred all asymptomatic women aged 50 to 75 years annually for mammography, in contrast to 48% among those who had no concern about price ($P < .001$). Similarly, in 1990, among these groups of physicians, the percentages of physicians who referred were 36% and 61%, respectively ($P < .001$).

Smithtown experienced the smallest increase (10.7%) in physician-reported compliance with mammography screening guidelines during the 2-year period (Table 6). Brookhaven and Islip, the project physician CME intervention towns, one with and one without low-cost mammography, had the greatest change in compliance with screening guidelines (19.7% and 19.3%, respectively), followed closely by Hempstead (18.3%), which had the availability of free mammography.

Discussion

Our findings showed an increase from 1988 to 1990, beyond that previously reported by ourselves and others,[3,18,20] in physician reporting of referral for mammography. Nevertheless, we are still far from reaching uniform primary care physician compliance with national recommendations.

Physician-reported mammography screening practices were increased in communities where a multimethod approach to CME was used. A large sample of surveyed physicians in the intervention area showed a significant increase in referral for annual mammography screening of asymptomatic women aged 50 to 75 years, from 33.3% in 1988 (preintervention) to 53% in 1990 (postintervention) (Table 2). While there was a significant increase in reported referrals among all three primary care specialties, the change was greatest among family physicians.

We were able to demonstrate that surveying physicians at community hospital department meetings was a cost-effective method of obtaining a high survey response rate. The use of a mixed-mode approach in the CME intervention area compared with a mail-only approach in the control area raised initial concern that the differences in mammography screening practices could be attributed to a bias due to survey mode, but this was not substantiated. Examination of the data from the town with free mammography, which were also collected through mail-only approach, showed that, at baseline, reported mammography referral rates were comparable to the area surveyed by a mixed-mode approach.

In our 1988 baseline physician survey, 33% of respondents in our intervention area indicated that they referred *all* their asymptomatic female patients aged 50 to 75 years for mammography at an annual interval. In 1989, 37% of respondents to a national sample surveyed by the American Cancer Society indicated that they followed ACS guidelines for mammography screening,[3] as

Table 6. Percent of Physicians Who Reported Referring All Asymptomatic Women Aged 50–75 Years Annually for Mammography Screening

Town Intervention	Preintervention	Postintervention	% Difference	P Value
Free mammography	37.6	55.9	18.3	<.001
CME intervention and low cost	34.4	54.1	19.7	.001
CME intervention only	32.2	51.5	19.3	.002
No intervention	53.6	64.3	10.7	.370
Total	36.0	55.1	19.1	<.001

CME denotes continuing medical education.

compared with 11% in 1984.[2] Our figure of 33% in 1988 is consistent with the ACS data, if one assumes that the national trend was about 5% per year. Although our control town started at a higher level at baseline, the change over the 2-year period within that town was the same as that expected from the national trend, while in the intervention area the change far exceeded it (about 20% in 2 years).

Our project was not designed to evaluate the effectiveness of individual educational programs on a selected participant population but rather to measure change within the total physician target community after a multimethod approach to physician education. Although only a limited proportion of the total target physician population participated in an isolated CME intervention, there may have been a cumulative effect from a "package" of CME offerings. Also, changes in physician practices may reflect both direct and indirect effects of the individual CME activities. Although a multimethod approach permitted us to address various physician learning styles, it did not provide for assessment of the comparative efficacy of the component methods, which might contribute to decisions about adopting specific CME activities.

Nevertheless, the CME intervention methods that we used were largely of low cost and are replicable. Among physicians who believed that they increased mammography referrals, formal conferences were ranked highest as influencing their screening practices and were followed closely by other interventions at departmental meetings. This suggests an expanded role for the local community hospital departmental staff meeting that extends beyond inpatient concerns and influences private office preventive practices. Such meetings provide an important setting to reach a large proportion of private (fee-for-service) physicians and potentially to influence behavior through peer dialogue. More detailed studies are needed. Physicians recognize the need for more patient education and want training and materials to accomplish this.[13] Our findings indicate that some physicians (28.7%) associated the availability of educational materials (eg, posters) for office use with increased referrals, perhaps because they serve as reminders to both physician and patient.

A limitation of our study is that it relies on self-report of physicians, and there is evidence in the literature that such reports overinflate actual practice.[5] Caution is therefore indicated in interpreting the reported level of compliance with guidelines, although we would expect the bias due to self-reporting to affect equally both the pre- and postintervention survey data. Although a discussion of the results of our community surveys of women 50 to 75 years of age residing in the same towns is beyond the scope of this paper, the self-reports of these women in the combined study areas (four towns) also indicate an increase in mammography use in the past year, from 28% in 1988 to 44% in 1990 ($P < .001$). In contrast to physicians, women's self-reports have been found to be highly reliable.[21] Also, the reason most commonly cited by women who never had a mammogram in both years in the same towns was that a physician never recommended it; however, the frequency with which this response was given declined from 44% in 1988 to 24% in 1990 ($P < .001$). The importance of physician recommendation for patient compliance with mammography guidelines has been documented.[10,19,22–24] In addition, University Hospital, which is located in our CME-intervention area, has experienced an increase in mammography utilization over the 2-year period sufficient to require purchase of an additional machine to accommodate the demand. A survey of other radiology facilities in the two-county area is in progress, which will provide further information on trends in mammography use.

Our study provides data on the self-reported breast cancer screening practices of a large proportion of all primary care physicians engaged in fee-for-service practice in the study communities on Long Island, New York, and represents one of few reports of the impact of CME interventions and cost-reduction in this type of practice setting. On the other hand, we did not have access to more definitive corroborating data such as mammography billings, chart audits, and patient interviews, which would have been more readily available had we restricted our study to a salaried practice setting (eg, university or resident practice, HMO, or health center) or to a selected group of physicians who consented to release such objective data. Study of our CME approach is warranted in settings where the majority of physicians provide such consent or where objective data are available from insurers (eg, Medicare).

An increase in compliance with mammography screening guidelines without an increase in compliance with guidelines for breast examination was also found in the ACS surveys.[2,3] This raises the concern that there may be some undue reliance on mammography alone, despite evidence that mammography misses 10% to 15% of breast cancers.[25] Emphasis needs to be placed on the value of physical examination in the detection of breast cancer. Over 20% of physicians responding to our baseline survey indicated that lack of confidence in their own skills influenced whether they performed breast examinations.[18] Yet we found it difficult to get community physicians to participate in such CME training even without charge, suggesting the need to develop new strategies to reach those with a perceived or actual deficit in physical examination skills, perhaps using an office-based ap-

proach as in "detailing"[14] with greater reliance on the use of breast models.[26] Opportunities should be made available to sharpen this clinical skill, especially during medical school and residency training.

Referral rates for mammography continue to be lower for family physicians and internists,[2,3,18,19] the specialists on whom the overwhelming majority of older women exclusively rely for their primary care.[27,28] The need for CME is therefore greatest among family physicians and internists who, in our study, showed increased compliance with national screening guidelines following CME interventions. Obstetrician-gynecologists, who more closely approximate the national goal for breast cancer screening, also significantly increased their compliance after CME interventions.

A major finding of this study concerned a nonproject intervention involving the availability of free mammography, in comparison with the areas involved in our CME interventions. Both CME intervention areas experienced statistically significant increases in physician-reported mammography referral, and the differences from baseline in the towns having the project-related CME intervention, with or without reduction of cost, were as great (20% and 19%, respectively) as the difference in the town with free mammography (18%). The control town, in which there were prevailing mammography charges and the absence of project CME, had a smaller increase (11%) that was not statistically significant for the sample size involved (Table 6). These findings suggest that the potential impact of recently (1991) enacted Medicare coverage on mammography referral rates could be enhanced by CME, and CME is recommended so that we reap the full benefit of this rare example of coverage of a preventive service.

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