

Increasing Compliance with Mammography Recommendations: Health Assessment Forms

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Background. Inexpensive reminder systems are needed to ensure that primary care physicians consistently provide health maintenance services to their patients. The purpose of this study was to determine the effectiveness of a simple, inexpensive health assessment form in place of the standard chart note to increase physician compliance with mammography recommendations.

Methods. A health assessment form with a reminder for screening mammography was implemented in a family practice in 1987 and was to be used as the official chart record for health maintenance visits. The charts of all women 50 years of age and older with two or more office visits during the years 1985 through 1988 were audited to determine how many mammograms were completed. Results were compared with mammography completion rates at a similar practice that did not use a health assessment form.

Results. The study group showed a significant increase

in mammography completion after implementation of the form, with compliance increasing from 7.3% to 32.0% ($P < .001$). The comparison group had an increase in mammogram completion from 12.0% to 17.8% ($P < .001$). The difference between the changes in rates of mammography in the two practices was statistically significant ($P < .001$). Among women in the study group who had a scheduled health maintenance visit during the study period the average rate of mammography completion increased from 21.2% to 65.2% ($P < .001$).

Conclusions. The addition of a health assessment form with a mammography reminder at the health maintenance visit is an effective and inexpensive method to increase compliance with mammography.

Key words. Mammography; reminder systems; preventive health services; clinical protocols. *J Fam Pract* 1993; 36:59-64.

For the past 10 years, the American Cancer Society, the National Cancer Institute, and other groups have recommended screening procedures to detect cancer in its early and presumably more curable stages. Most recently the American Cancer Society,¹ the US Preventive Services Task Force,² and the National Cancer Institute³ have recommended screening mammography every 1 or 2 years for women 50 years of age and older.

Nationally, the percentage of women aged 50 years and older who have had at least one mammogram rose from 39% in 1986⁴ and 29% to 59% in 1987,⁵⁻⁸ to 48% in 1988⁹ and 64% in 1990.¹⁰ Unfortunately, nationwide the number of women aged 50 years and older who have a mammogram yearly remains low (20% in 1986 to 31%

in 1990).^{4,6,8,10} Several studies have examined the reasons why physicians and patients fail to follow screening recommendations. Reasons identified for patient non-compliance include lack of physician-initiated discussions of mammography and lack of patient understanding regarding the importance of having a screening mammogram.^{5,7,11-14} Identified reasons for physician non-compliance include failure to remember to recommend mammography and concern about cost to the patient.¹⁵⁻¹⁷

Successful strategies to increase physician compliance with screening recommendations include a chart checklist,¹⁸⁻²² educational programs,¹⁹⁻²⁴ and handwritten or computer-generated reminders attached to the chart before the patient's visit.²³⁻³⁵ Many of these strategies are costly, labor intensive, or both. Furthermore, most studies of compliance with screening recommendations have been conducted in residency programs where physicians may be more highly motivated. Many of the studies were conducted in settings in which other inter-

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ventions to increase compliance were simultaneously implemented, making it difficult to accurately determine the usefulness of one technique over another.

This paper presents the results of a simple, low-cost health assessment form designed to reduce physician workload and increase compliance with mammography recommendations. Unlike other reminders or checklists for preventive services that could be easily overlooked or ignored by the physician, the health assessment form was used instead of the usual chart notes to document the visit. Our hypothesis was that use of the form, which contained a mammography reminder, at the health maintenance visit would increase compliance with mammography recommendations.

Methods

In 1987, a health assessment form was introduced at Pickens Health Center in an attempt to improve the preventive care received by patients. The form was designed in response to external guidelines from national organizations. During the study years, Pickens Health Center was a large family practice on the campus of Duke University with a patient volume of 30,000 visits per year. The practice offered medical care to university students, employees, and their families, as well as to local residents. The practice was staffed by 11 family physicians, 3 physician assistants, and 1 nurse practitioner.

In 1990, the effect of the form on the rate of mammography completion was retrospectively analyzed. To attempt to control for secular trends in mammography, an historical comparison site was selected. A nearby family medicine center was chosen because it was the only other large family practice in the area and no organized effort to improve screening had been conducted during the study years. The comparison site was located approximately 5 miles from the university and also averaged 30,000 patient visits a year. It was staffed by 7 or 8 family physician faculty, 2 physician assistants, 2 nurse practitioners, and from 30 to 36 family medicine residents. Unlike the study site, the comparison site served as the center for the Duke family medicine residency program and used a flow sheet reminder system similar to that introduced by Frame.³⁶

As the comparison site had an active reminder system in use during the study years, and the study site had no initial reminder system, we expected that the comparison site would initially have somewhat higher rates of mammography than the study site because of the flow sheet and the residency program's emphasis on preventive services. For this reason, the rates of change in mammography screening were compared rather than the

rates themselves. We hypothesized that if the health maintenance form was effective, the study site would show a greater rate of increase in mammography completion than the comparison site.

New Health Assessment Form Introduced

A health assessment form was introduced in 1987, as a replacement for the written chart note.* A series of questions on past medical history and a health risk-assessment profile that included screening questions on exercise, smoking, and alcohol were completed by each patient just before entering the examination room. The nurse gave the partially completed form to the physician, who recorded the physical findings, assessment, and health maintenance plan. There were variations of the form for different age groups; however, each form contained a reminder checklist of age-specific screening tests located in the plan portion of the form. As indicated by the patient's age and sex, the list of recommended screening tests included reminders for Pap smears, stool hemocult testing, mammography, tetanus immunization, and cholesterol screening. The completed form became the official chart note for the office visit. Physicians who chose not to use the form as their official chart note were required to write or dictate a note. Before implementation of the health assessment form, physicians, physician assistants, and nurse practitioners were educated about the need for screening at several Grand Rounds given by the division chief and family practice director. During the last session, at a practice management meeting, the form was introduced.

At the comparison site, each patient's chart contained a generic health maintenance flow sheet, which was located in the front of the chart. Unlike the health assessment forms being evaluated at the study site, the flow sheet was separate and distinct from the official chart note for the visit.

Data Collection

At the study site, eligible women were identified by a search of the practice database that contained patient laboratory and billing information. The charts of all eligible women were audited to identify the patients who had a mammogram. All chart audits were performed by a single LPN; a random sample of 50 charts was re-audited by another LPN. The interrater reliability by

* A copy of the updated Health Assessment Form, which has been revised several times since 1988, can be obtained by writing to the first author.

kappa statistic³⁷ was 0.75 ($P < .001$), indicating very good agreement between the auditors.

At the comparison site, eligible women were also identified by a search of the practice database. All mammograms were recorded in a radiology logbook before filing in the chart. For the study, a research assistant matched the computer list of eligible patients with the logbook entries to determine how many had completed a mammogram.

Patients were considered eligible for the study if they were women aged 50 years or older between January 1985 and December 1988 and saw a physician or mid-level practitioner at least twice at either site during the study period.

Definitions of Compliance

Compliance with mammography recommendation denoted documentation of a mammogram report in the official record, as defined by each practice. For the study site, compliance was defined as an official mammogram report in the chart. For the comparison site, compliance was defined as a notation in the radiology logbook that a mammogram report had been received. For both practices, mammograms that were ordered in one calendar year but completed the following year were counted in the year completed.

Data Analysis

For each study year, compliance rates for patients at the study site were calculated using as the numerator the number of women who had chart documentation of mammogram completion, and as the denominator the number of eligible women. Mammography compliance rates for patients at the comparison site were calculated using the total number of logbook entries of mammogram completion as the numerator and the number of women eligible for mammography screening as the denominator.

The effect of using the health assessment form was determined by comparing the average change in compliance rates for each practice for the 2 years before implementation of the form (1985 and 1986) with the average change for the 2 years after use of the health assessment form was initiated (1987 and 1988). Statistical testing was performed using the chi-square test.

Results

The demographics of the patient populations at the two sites were similar. At the study site from 1985 through

1988, 46% of the patients were male. Ten percent were younger than 18 years, 57% were 18 to 29 years of age, 23% were 30 to 44 years of age, 7% were 45 to 59 years of age, and 9% were 60 years of age or older. The insurance status changed over the 4 years under study because of an influx of new prepaid or health maintenance organization (HMO) patients. In 1985 the payer mix of the practice was made up of 2.4% Medicare patients, 16.4% HMO patients, 34.4% university students with a prepaid health insurance plan, and 46.8% self-pay patients (fee for service). In 1988, HMO and university students increased to 22.7% and 35.6%, respectively, while the percentage of fee-for-service patients dropped to 39.3%.

At the comparison site from 1985 through 1988, 34% of the patients were male. Twelve percent were younger than 18 years of age, 27% were 18 to 29 years of age, 38% were 30 to 44 years of age, 11% were 45 to 59 years of age, and 12% were 60 years of age or older. Like the study site, the insurance status of the comparison site changed over the years under study as the result of an influx of new HMO patients. In 1985 the practice payer status was 20% Medicaid or Medicare patients, 44% HMO patients, and 36% fee-for-service patients. In 1988, the percentage of HMO patients rose to 54.8% and fee-for-service and Medicaid or Medicare patients dropped to 34.9% and 10%, respectively.

At the study site, the rate of mammogram completion was an average of 7.3% ($n = 807$) for the 2 years before the intervention, compared with an average of 32.0% ($n = 1040$) in the 2 years after the intervention ($P < .001$). In the comparison practice, the mammogram completion rate rose over the same period from an average of 12.0% to an average of 17.8% ($P < .001$). The differences of the increases in the rates of change in mammography completion between the study site and control site (24.7% as compared with 5.8%) was statistically significant by chi-square test ($P < .001$) (Figure 1). For the subgroup of women who had made a health maintenance visit and at least one other visit to the study site, the average rate of mammogram completion increased from 21.2% in the 2 years before implementing the new reminder form to 65.2% in the following 2 years ($P < .001$).

Discussion

This study demonstrated a positive effect on compliance with mammography recommendations when a simple health assessment form with a mammogram reminder was used in place of the usual chart note in routine practice. The impact of the reminder form was particu-

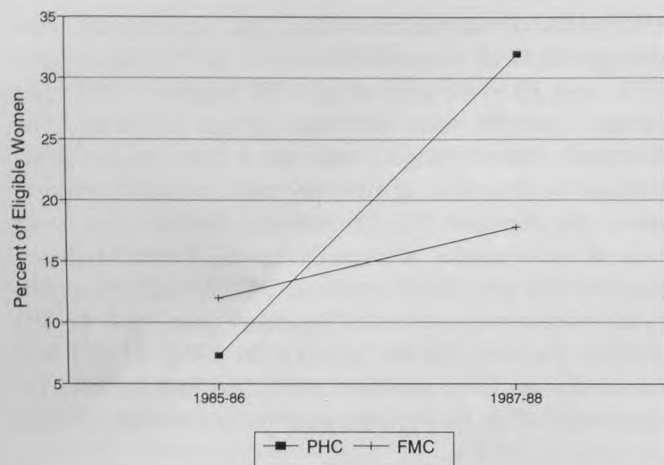


Figure 1. Change in average rates of mammography completion among eligible women in a study site (Pickens Health Center [PHC] at Duke University) where a health assessment form was introduced and in an historical control site (a nearby family medicine center [FMC]).

larly impressive for the subgroup of patients who had a health maintenance examination, the patients the form was designed to reach. In contrast, the comparison practice had a smaller, although statistically significant, increase in compliance with mammography recommendations over the study period. As there was no organized effort to increase mammography compliance at the comparison site during the study years, the increase in compliance probably reflects the emphasis on cancer screening seen in both the professional and lay literature.³⁸ While this trend may have also contributed to the rate increase in the study practice, it is not of sufficient magnitude to explain all of the increase.

To put these results in a broader perspective, in 1988, according to various US studies, the percentages of eligible women who had had a mammogram within the previous 12 months ranged from 15.6% to 41%.^{4,9,11,39,40} In contrast, the percentage of eligible women at the study site who had a mammogram in 1988 was 44.8%. In addition, a 33-state survey showed that 29% of the women 50 years of age and older who had a health maintenance physical in 1987 also had a mammogram.^{6,38} In contrast, at the study site the percentage of eligible women who had a health maintenance physical and a mammogram rose from 15.0% in 1985 to 70.7% in 1988.

There are several possible sources of bias in this study. One potential source of bias may have occurred during the introduction of the health assessment form when the division chief discussed at length the recommendations for screening mammography made by various organizations and indicated that screening mammog-

raphy would be considered a standard of care for the practice. Statements from a division chief and several Grand Rounds discussing the need for screening mammography educated physicians and the physician extenders about the benefits of screening.

Previous studies have shown, however, that physician education has only a minimal effect on compliance with screening recommendations.^{20,21,24} Mandel and coworkers²⁰ concluded that an educational session introducing the need to screen coupled with a reminder flow sheet failed to increase compliance with screening recommendations. Fox and colleagues²⁴ showed a statistically significant increase in compliance with screening recommendations when an educational program was implemented. Their educational programs were followed by a mandatory completion of a log and reminder memos; nevertheless, only a 6% increase in compliance with mammography screening recommendations was shown during the 6 months after the education program. The introduction of the health assessment form was immediately preceded by several educational sessions, but there was no further educational follow-up over the subsequent 2 years; therefore, it is unlikely that the sessions contributed directly to the observed increase. Rather, the educational sessions facilitated the introduction of the forms, and the forms themselves served as a reminder of the needed behavior.

Other sources of possible bias include the retrospective comparison of two large family practice clinics that had differences in patient populations and clinic staff. There may also be some bias from the different methods of data collection, although data in both sites were collected from a primary source (ie, charts and logbooks).

Other studies evaluating reminders to physicians have demonstrated increased compliance with mammography recommendations, at least in internal medicine and family medicine residency programs and large internal medicine HMOs.^{18-33,41} These interventions have ranged from flow sheets to manually updated reminders to elaborate computer-generated reminders. The interventions have had varying degrees of success. Two studies conducted during the same period as this study evaluated the addition of chart flow sheets affixed conspicuously to each patient's chart. These studies showed an increase in residents' compliance with mammography recommendations. Madlon-Kay¹⁹ showed an increase in mammography compliance for patients who received health maintenance examinations from 51% to 71% over a 5-month period in a military family medicine residency program. However, her results did not reach statistical significance because of the small sample size. Shank and coworkers¹⁸ showed an increase in resident compliance with screening mammography recommenda-

tions over 4 years (1982 to 1986) from 0% to 56%. Their intervention included a faculty audit and frequent feedback to the residents, a scenario that may not be possible in other settings.

Manual reminders based on chart audits have previously been shown to increase mammography compliance rates to as high as 32% of eligible patients.²² All of the studies using manual reminders occurred in internal medicine residency programs over a maximum period of 1 year.^{22,31} Manual reminders have the disadvantage of requiring an assistant to audit each patient's chart before an office visit, a costly option for a private primary care practice. Likewise, monthly chart audit with feedback on individual vs peer performance has been shown to be effective in a large HMO,¹⁸ but this is impractical for a small private practice. Computerized reminders to the physician have resulted in mammography compliance rates as high as 60% in residency programs equipped with the most advanced office computer systems.^{33,41} When coupled with patient education, computerized reminders have reached compliance rates as high as 75%.^{33,41} Most computerized reminder systems, however, have compliance rates with mammography recommendations that range from as low as 15% to as high as 27% when used as single interventions.^{23,29,34,35} The computer reminder prompts have a disadvantage in that computerization in a practice requires additional data entry personnel; again, impractical and costly for a small private practice.

This study differs from previous studies because it was conducted in a university-owned community-based family practice with no resident involvement during the study period. In addition, unlike previous studies, this study evaluated the impact of a simple health assessment form with a mammogram reminder that was completed during the routine health maintenance visit. The form described in this paper can be easily adapted to any size primary care practice and costs relatively little to implement. Training to use the form is minimal, requiring only that the user have a knowledge of prevention and the recommended screening tests. The cost of the health assessment form is minimal: printing costs and the nursing time required to hand out the form to the patient before the encounter. In fact, the health assessment form may reduce costs to the practice by reducing either physician time spent writing a note or the cost associated with dictation.

Further research is needed to determine if this type of intervention is generalizable to other primary care practices, such as busy rural and publicly funded practices. If the health assessment form is useful in other settings, public health organizations and other groups with an interest in cancer control would then have a

simple and inexpensive system for promoting physician compliance with health promotion efforts. The health assessment form can be modified as changes in prevention guidelines are made in the future.

Our findings also have implications for quality assurance programs. The form is easy to locate during a random chart audit and could be used to quickly assess the rate of physician compliance with screening recommendations. As physician recommendation is the primary motivator for patient compliance with mammography recommendations,^{9-14,39} the question must be raised whether all practices should be encouraged to use some form of a reminder system.

Simple, inexpensive, and effective methods are needed to assist patients and physicians in screening for breast cancer. While a large number of strategies have been tried, a health assessment form with a mammogram reminder has been effectively used for over 4 years in a large family practice, with a sizable increase (from 7.3% to 32%) in compliance with screening mammography recommendations.

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