# An Intervention to Increase Mammography Screening by Residents in Family Practice

Sarah Fox, EdD, MPH, Carole V. Tsou, MD, and Dennis S. Klos, PhD
Ann Arbor, Michigan

Two groups of residents in family practice were used to evaluate the effectiveness of a multifaceted educational program that was designed to increase resident compliance with screening for breast cancer. In the experimental group, residents were given a two-hour seminar that responded to the literature on the difficulties of implementing preventive care in clinical practice; group consensus was developed for a more regular (exact frequency left to each resident) screening for women aged over 35 years, and specific barriers to breast cancer screening were analyzed and solutions presented whenever possible. In addition, these residents received two behavioral cues after the intervention to stimulate and reinforce referrals for mammography screening.

The study was conducted over a period of one year, including a five-month preintervention period, a three-month postintervention period, and a three-month follow-up period. As predicted, the increase in mean referral rate for the experimental group was significantly greater than for the comparison group. This increased rate of referral for mammogram was maintained for six months after the intervention. This intervention is easily reproducible in many residency training programs, especially those in family medicine and other small primary care programs.

The detection of breast cancer is accomplished through three methods: the clinical breast examination, breast self-examination, and mammography. Currently all three methods are recommended by the American Cancer Society (ACS), which has published guidelines in the journal *CA: A Cancer Journal for Physicians*.[1]

The clinical examination and breast self-examination methods have long been familiar to both the general public and physicians as useful in detection. Problems remain in persuading women to be more compliant in performing breast self-examination and in persuading physicians to be more compliant in teaching it and performing it during the office visit.[2] An additional problem with breast self-examination is the insufficient data supporting it as efficacious in detecting breast cancers.[3]

Mammography is the most recently available

From the Department of Family Practice, School of Medicine, and the Department of Psychology, School of Literature, Science, and Arts, University of Michigan, Ann Arbor, Michigan. Requests for reprints should be sent to Dr. Sarah Fox, Pediatric-Resident Training Program, Cottage 18, Harbor-UCLA Medical Center, 1000 West Carson St, Torrance, CA 90509.

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method of the three and is undergoing a phase of minimal recognition by the public and underutilization by physicians.[4,5] Mammography is the only one of the three methods that is capable of detecting breast cancers in their minimal, nonpalpable, and more curable stage. Thus, this test has great promise for affecting the survival rates of future victims of breast cancer. For this reason, it is particularly troublesome that the utilization of mammography by family physicians and probably others appears to be so out of line with the recent ACS recommendations.[4] What is needed now are trials that investigate methods of influencing the screening behavior of family physicians, particularly in their use of mammography. This study represents one approach to this problem.

## Intervention Rationale

The purpose of this study was to test the effectiveness of a one-session educational intervention on the subsequent screening behavior of residents. The session was part of the residents' usual month of intensive training in family medicine. Single-session educational interventions focused on a particular topic are common in residency training programs, although their effectiveness on the subsequent practice behavior of residents is evaluated rarely. In addition to evaluating the effect of a single session, the study tests whether two brief behavioral cues, or reminders, are effective for maintaining behavioral change for as long as six months after the intervention. If brief cues are effective, it would be unnecessary to use continual cues, such as computer reminders or checklists appended to charts, which require ongoing attention by a research assistant or staff member and are a burden on clinic operations. The brief behavioral reminders are (1) asking the physicians to keep a patient log for one week only, and (2) sending the physicians a memorandum two weeks after the educational session.

The hypothesis was that a multifaceted intervention program addressing the needs of the residents and reflecting recent research findings on the disease and screening for it would be effective for increasing mammography referrals by physicians. The strategy for this program had four elements:

1. To identify barriers to referral through a literature review and preworkshop questionnaire and to remove the barriers whenever possible
2. To increase the physicians' acceptance of the need for referral by presenting recent epidemiologic information on the high rank of breast cancer as a cause of female mortality
3. To facilitate referral by developing group consensus about appropriate screening behavior for breast cancer
4. To use both within and after the intervention those behavioral cues that would reinforce physicians' interest in continued referral[6]

## Methods

### *Subjects*

Second-year and third-year residents in family practice participated in the study. Random assignment of residents to a treatment group or to a control group was not possible because the two classes of residents were trained in tightly scheduled and differently timed block curricula. All members of a particular class had to have the same training. The second-year class of six residents received the intervention. This class was chosen because a special month of intensive training in family medicine was required of the group and the intervention fit naturally into the curriculum. The third-year class served as a comparison group. The two groups were equivalent in their referral rates for mammography for the five months preceding the session.

### *Procedure*

Two of the authors (S.F., C.T.) collaborated in planning and teaching a two-hour session on breast cancer and breast cancer detection. Previous sessions given by faculty members on topics in preventive medicine had been received with great interest by residents but were acted on infrequently in clinical practice. Before planning the session, it was learned by survey that the main concerns of second-year residents about mammography were safety and cost. In addition, the literature on the epidemiology of breast cancer and its risk factors was reviewed as well as the detection methods of breast self-examination, mammography, and the clinical examination. This preparation was the basis for identifying three content areas that were presented in the session:

1. Epidemiologic data on the cause of death, ranked by age, sex, and race, identifying breast cancer as a serious disease for women aged over 30 years[7,8]

2. Risk factor data, identifying age as the primary risk factor for all women aged over 35 years[9,10]

3. Characteristics of mammography as a screening test and new findings regarding its safety and efficacy[10-14]*

In addition to discussing these findings, a patient's case was presented so the residents could immediately apply the newly obtained information. This case was discussed in the group, and consensus was reached about the need for regular screening for all women aged over 35 years. The process of consensus development, based on the approach used by the National Institutes of Health,[15] has three parts: to become thoroughly familiar with current literature on a particular medical technology, which in this case is mammography; to present these findings to the group; and to discuss these findings and see whether consensus can be reached. The group discussion is a critical part of this process and should be facilitated by someone who is respected by the group involved.

The remainder of the two-hour session focused on the process of referral for mammography. Information on cost to the patient, patient time, safety of radiation exposure, indications for doing mammograms, waiting time for an appointment, and insurance coverage was provided to facilitate referral and remove barriers to preventive care.

Following this educational intervention, two brief behavioral cues were used to encourage behavior in accord with the group consensus. First, the residents were asked to keep a log for one week after the session including the number of women aged over 35 years seen in the clinic and the number of women aged over 35 years referred for mammography. The data in the logs indicated that residents infrequently counseled patients on mammography and limited its discussion to patients who had appointments for general physicals. So, a second behavioral cue was used; two weeks after the intervention the residents were sent a memorandum reinforcing the appropriateness of screening for breast cancer more frequently.

The study was conducted over a period of one year: July 1, 1982 to June 30, 1983. This study period was chosen because it encompassed the entire second- and third-year training periods for residents and June 30, 1983 coincided with the graduation of the comparison group, the third-year residents. The preintervention period was July through November 1982, or five months. The intervention occurred in mid-December, so that month was eliminated from the study period. The postintervention period was January through March 1983, or three months, and the follow-up period was April through June 1983, or three months.

*The handouts used in this session are available from the authors upon request.

### Measures

In each of the time periods the datum for each resident was a proportion: the number of mammograms ordered by a resident to the total number of female patients seen who were 35 years of age or older. This proportion controlled for the variance across residents in numbers of women seen who were aged 35 years or older. The number of referrals was confirmed with three data sources: Family Practice Center statistics on all patient referrals kept manually by patient coordinators, data from a computer system, and returned mammogram reports. This cross-checking was done to ensure reliability of the referral data. The total number of women seen by each provider was considered a reliable measure because its accuracy had been checked continually over the past four years.

### Data Analysis

The raw proportion for each provider in a particular period was converted to radians with the arcsine nonlinear transformation,[16] because the variance of the distribution of proportions from .00 to .99 is not constant. The transformation stabilizes the variance and permits the use of parametric statistics for analyzing group differences.

The *t* test was used in two ways. First, a standard, independent *t* test was calculated to see whether the mean referral rates differed between the two groups of physicians in the preintervention period.

Second, an independent *t* test was used for gain scores.[17] For each subject, a gain (or decrease) in referral rate from the preintervention period to the postintervention period was as follows: radians at $Time_2$ – radians at $Time_1$. This difference in radians was the datum for each provider. An independent *t* test was done on the differences to determine whether the mean gain for the treatment group was larger than the mean gain for the comparison group. Then this process was repeated, using a different period: preintervention period to the follow-up period. This latter analysis deter-

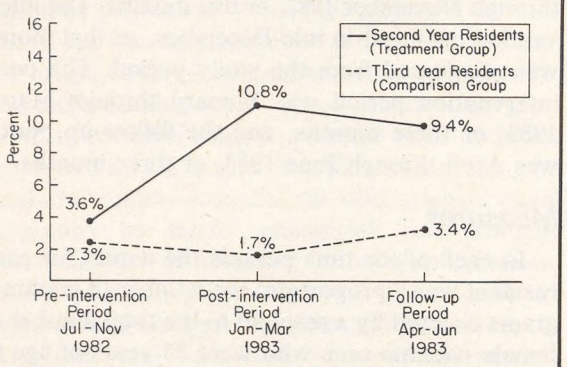


Figure 1. Mean referral rates for mammograms, by resident group and time period

mines whether the mean gain for the treatment group was sustained for six months.

## Results

The results of the intervention are shown in Figure 1. The second- and third-year residents did not differ in referral rates during the preintervention period ($t = 1.2$, not significant) and thus were considered equivalent in their use of mammography. The change in referral rates for the second-year resident group from the pre- to postintervention period was greater than for the comparison group ($t = 3.17$, $P < .01$) indicating that the intervention had an effect. Perhaps more importantly, this change in referral rate for the second-year resident group from the preintervention period through the follow-up period was maintained and was greater than for the comparison group ($t = 1.87$, $P < .05$).

A possible alternate explanation of the higher referral rates for the second-year resident group in the post treatment and follow-up periods was that this resident group saw a disproportionate number of women in an age group that was more likely to be referred for mammography. This rival hypothesis was not supported by the data. There was no association (nonsignificant chi-squares) between resident group and age group of patients (35 to 49, 50 to 64, over 65 years old) seen in the study periods.

## Discussion

The educational intervention was successful in improving physicians' compliance in referring for mammography. Residents in both groups had previously received the same training in family medicine that is characteristic of this high-quality university-based residency training program. Despite this training, the referral rate for mammography of both groups was about 2 to 3 percent at the beginning of the study. This rate is comparable to the national norm of 1 to 5 percent for physicians in primary care but should not be considered optimal, considering the seriousness of the disease and the availability of the test. In contrast with the comparison group, the residents who received the educational intervention increased their mean referral rate to 10 percent and maintained it, a rate significantly higher than that for their peers and higher than the national norm.

The results are especially impressive because the residents were asked to go beyond the ACS guidelines on mammography at the time of the intervention. The ACS guidelines were a baseline mammogram for women aged between 35 and 40 years, regular mammography between the ages of 35 and 50 years for women at high risk only, and annual mammograms for all women aged 50 years or more. Incorporated in the educational session for the residents was a summary of the recent research literature on the efficacy and safety of mammography, and this literature justified the use of mammography for routine screening of all women over the age of 35 years, and not just for those at high risk. The results of the intervention indicate that the residents were persuaded by the recent research literature. (In August 1983, the ACS referred to this same literature as the basis for recommending revised guidelines: a baseline mammogram between 35 and 40 years of age; regular mammograms, annually or biennially, between the ages of 40 and 49 years; and annually thereafter.)

The practical implications of this study are straightforward. Educational training sessions for residents can have an impact on residents' behavior in clinical practice that lasts as long as six months. The sessions should be practical and include needs assessment, consensus development, up-to-date information, and reinforcement with behavioral cues. One of the strengths of this intervention is that it is easily reproducible in other training programs. A class of six residents per year

is typical of family practice residency programs, and two-hour seminar sessions are provided on a regular basis for the instruction of residents. In addition, a clear behavioral measure of the outcome of the session—the change in referral rate—is obtainable by faculty who are interested in an evaluation of their teaching effort.

This study represents a methodological improvement over that reported in the research literature on influencing physicians' behavior.[18-21] First, this is a one-time instead of long-term intervention and thus is quickly and efficiently accomplished. Second, measurement of behavioral change as a result of the intervention is objective and obtainable in clinic settings. Third, because this intervention took place in the usual training setting of the residents (the Family Practice Center) and during a normal resident rotation, it was not necessary to find additional time beyond the full clinic schedule. Fourth, because the session was taught by already available personnel, assistants did not need to be recruited or trained to provide the intervention.

Three unavoidable limitations of the study should be mentioned. The first limitation is that the sample size was small. Nevertheless, the sample was the entire population of both groups, and this size of resident group is typical of many primary care residency programs, especially family medicine. In addition, the effect was significant in spite of the small size, which shows that the intervention was statistically powerful. The second limitation was the inability to assign residents randomly to the workshop or a control group, raising the issue of whether the nonequivalence of the two groups mattered. The data show that the groups were equal in their referral rates during the five-month preintervention period, probably the most important criterion for assessing equivalency. The third limitation was that two of the authors (S.F., C.T.) participated directly in the intervention by offering the workshop, but few small training programs can afford the services of objective outside evaluators, and if evaluation of educational sessions is to occur, it must be done by the educators themselves.

This study raises some interesting questions for further research. Is ordering a test such as mammography an easier or more difficult screening behavior for physicians than teaching patients breast self-examination, which requires physician teaching skills? Do the screening behaviors of residents in family medicine differ from the behaviors of residents in other primary care specialties? And finally, would a similar intervention be as effective for staff members who have been clinicians for many years and who have developed practice habits? A study in process addresses some of these questions.

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