Impact of an Educational Intervention Designed to Reduce Unnecessary Recall during Screening Mammography

Patricia A. Carney, PhD, Linn Abraham, MPH, Andrea Cook, PhD, Stephen A. Feig, MD, Edward A. Sickles, MD, Diana L. Miglioretti, PhD, Berta M. Geller, EdD, Bonnie C. Yankaskas, PhD, Joann G. Elmore, MD, MPH

Rationale and Objectives: The aim of this study was to describe the impact of a tailored Web-based educational program designed to reduce excessive screening mammography recall.

Materials and Methods: Radiologists enrolled in one of four mammography registries in the United States were invited to take part and were randomly assigned to receive the intervention or to serve as controls. The controls were offered the intervention at the end of the study, and data collection included an assessment of their clinical practice as well. The intervention provided each radiologist with individual audit data for his or her sensitivity, specificity, recall rate, positive predictive value, and cancer detection rate compared to national benchmarks and peer comparisons for the same measures; profiled breast cancer risk in each radiologist's respective patient populations to illustrate how low breast cancer risk is in population-based settings; and evaluated the possible impact of medical malpractice concerns on recall rates. Participants' recall rates from actual practice were evaluated for three time periods: the 9 months before the intervention was delivered to the intervention group (baseline period), the 9 months between the intervention and control groups (T1), and the 9 months after completion of the intervention by the controls (T2). Logistic regression models examining the probability that a mammogram was recalled included indication of intervention versus control and time period (baseline, T1, and T2). Interactions between the groups and time period were also included to determine if the association between time period and the probability of a positive result differed across groups.

Results: Thirty-one radiologists who completed the continuing medical education intervention were included in the adjusted model comparing radiologists in the intervention group (n = 22) to radiologists who completed the intervention in the control group (n = 9). At T1, the intervention group had 12% higher odds of positive mammographic results compared to the controls, after controlling for baseline (odds ratio, 1.12; 95% confidence interval, 1.00−1.27; P = .0569). At T2, a similar association was found, but it was not statistically significant (odds ratio, 1.10; 95% confidence interval, 0.96 to 1.25). No associations were found among radiologists in the control group when comparing those who completed the continuing medical education intervention (n = 9) to those who did not (n = 10). In addition, no associations were found between time period and recall rate among radiologists who set realistic goals.

Conclusions: This study resulted in a null effect, which may indicate that a single 1-hour intervention is not adequate to change excessive recall among radiologists who undertook the intervention being tested.

Key Words: Mammography screening; continuing medical education; reducing recall rates.

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From the Departments of Family Medicine and Public Health and Preventive Medicine, Oregon Health & Science University, MC-FM, 3181 SW Sam Jackson Park Road, Portland, OR 97239-3098 (P.A.C.); the Group Health Research Institute, Group Health Cooperative, Seattle, Washington (L.A., A.C.); the Department of Radiological Sciences, University of California, Irvine, California (S.A.F.); the Department of Radiology, University of California, San Francisco, California (E.A.S.); the Group Health Research Institute, Biostatistics Unit and University of Washington Department of Biostatistics, Seattle, Washington (D.L.M.); the Office of Health Promotion Research, University of Vermont, Burlington, Vermont (B.M.G.); the Department of Radiology, University of North Carolina at Chapel Hill, Chapel Hill, North Carolina (B.C.Y.); and the Department of Internal Medicine, University of Washington, Seattle, Washington (J.G.E.). Received February 21, 2012; accepted May 3, 2012. This work was supported by grants 1R01 CA107623 1K05 CA104699 from the National Cancer Institute (Bethesda, MD) (Breast Cancer Surveillance Consortium grants U01CA63740, U01CA86076, U01CA86082, U01CA63736, U01CA70013, U01CA69976, U01CA63731, and U01CA70040), grant 1R01 CA107623 from the Agency for Healthcare Research and Quality (Rockville, MD), the Breast Cancer Stamp Fund, and the American Cancer Society (Atlanta, GA), made possible by a generous donation from the Longaberger Company's Horizon of Hope Campaign (Newark, OH) (SIRGS-07-271-01, SIRGS-07-272-01, SIRGS-07-273-01, SIRGS-07-274-01, SIRGS-07-275-01, and SIRGS-06-281-01). The collection of cancer data used in this study was supported in part by several state public health departments and cancer registries throughout the United States. For a full description of these sources, please see http://breastscreening.cancer.gov/work/acknowledgement.html. **Address correspondence to:** P.A.C. e-mail: carneyp@ohsu.edu

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Recall rates for screening mammography are higher in the United States compared to those in other countries (1,2). Identification of the reasons for this difference has been complex (3–6). The harms associated with unnecessary workup are now well recognized (7,8) and were part of the rationale for changing the US Preventive Services Task Force screening mammography guidelines (9). If unnecessary recall rates could be diminished and recall brought below minimally acceptable cut points (10), the number of false-positive examinations could be reduced by 880 per 100,000 women screened (10). Although several studies have illustrated improved interpretive performance (11–14), they combined several strategies, such as audit data review, participation in a self-assessment and case review program, and increasing interpretive volume. In two of these studies (13,14), the intervention content ranged from 8 to 32 hours, which is a significant time commitment for busy clinicians. The extent to which a single interactive audit component may assist in improving performance has not been well evaluated.

We developed an interactive, Web-based intervention designed to provide peer comparison audit data and to explore individualized factors that may increase recall rates without improving cancer detection. The intervention was implemented using a randomized wait-list study design to assess its impact on reducing excessive recall. The purpose of this paper is to report the findings of this study.

METHODS

Performance Data

Four mammography registries of the Breast Cancer Surveillance Consortium (BCSC; http://breastscreening.cancer.gov) participated in this study: the Carolina Mammography Registry, the Group Health Breast Cancer Surveillance Project (Seattle, WA), the New Hampshire Mammography Network, and the Vermont Breast Cancer Surveillance System. Patient information and radiologists' interpretation and follow-up recommendations according to the American College of Radiology Breast Imaging Reporting and Data System (15) are collected at all these registries and are later linked to regional cancer registries and/or pathology databases to determine cancer outcomes. All data are annually pooled at the BCSC Statistical Coordinating Center, located in Seattle, for analysis.

Each registry and the Statistical Coordinating Center received institutional review board approval for either active or passive consenting processes or a waiver of consent to enroll participants, link data, and perform analytic studies and for all study-related activities described here. All procedures were compliant with the Health Insurance Portability and Accountability Act. All registries and the Statistical Coordinating Center have received federal certificates of confidentiality and other protection for the identities of women, physicians, and facilities that are subjects of this research (16). In addition, institutional review board approval was obtained at each participating site for all radiologists activities related to this intervention study.

Study Participants and Intervention Development

Radiologist recruitment and intervention development are reported in detail elsewhere (17,18). Briefly, eligibility included actively interpreting mammograms at a facility at one of the four participating BCSC registries between January 2006 and September 2007. To characterize study participants, we administered a radiologist survey (19). Completion of the survey was not required to participate in the Web-based intervention. One hundred ninety-six radiologists were eligible to take part in the intervention. One hundred twenty-two did not consent to the intervention, leaving 74 radiologists who did consent. Among these, 46 (62.2%) actually logged on to start the intervention, 41 of these 46 (89.1%) completed it, and 40 radiologists additionally completed the radiologist survey. Eight radiologists did not have screening mammography interpretation data in the follow-up period and were excluded from analysis, as our outcome measure was reduction in excessive recall. This left 32 radiologists in the study. Of these, 23 were randomly assigned to the intervention group and nine to the control group. Among radiologists who consented but did not complete the intervention, 10 were assigned to the intervention group and 12 to the control group.

Intervention development is reported in detail elsewhere (17,18). Briefly, the intervention was Web based and had three components. Module 1 provided audit data for sensitivity, specificity, recall rate, positive predictive value, and cancer detection rate individualized for each participating radiologist with comparisons to both national benchmarks and to peers for the same measures during the same time period. These data were derived from the respective mammography registries associated with the participating radiologists. Module 2 profiled breast cancer risk in each radiologist's respective patient population, also ascertained from respective BCSC sites, to illustrate how low breast cancer risk is in population-based settings, and module 3 presented information on the possible impact of medical malpractice concerns on recall rates, which was shown in our previous research to influence recall rates (20,21).

Knowledge questions were embedded into the intervention system we used to award continuing medical education (CME) credits. The entire program took an average of 1 hour to complete.

Radiologists were able to insert their goals for changes they would like to make in their clinical practice, especially regarding recall rates, into a text field at the end of each module. We defined realistic goals as planned actions that, if implemented, would likely bring their recall rate closer to national targets (22). Using this definition, two authors (P.A.C., E.A.S.) classified each radiologist's goals as being realistic or unrealistic.

The main performance outcome in this study was recall rate, defined as the percentage of screening mammograms