Characterizing the Mammography Technologist Workforce in North Carolina

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Abstract

Purpose: Mammography technologists' level of training, years of experience, and feedback on technique may play an important role in the breast-cancer screening process. However, information on the mammography technologist workforce is scant.

Methods: In 2013, we conducted a survey mailed to 912 mammography technologists working in 224 facilities certified by the Mammography Quality Standards Act in North Carolina. Using standard survey methodology, we developed and implemented a questionnaire on the education and training, work experiences, and workplace interactions of mammography technologists. We aggregated responses using survey weights to account for nonresponse. We describe and compare lead (administrative responsibilities) and nonlead (supervised by another technologist) mammography technologist characteristics, testing for differences, using *t*-tests and χ^2 analysis.

Results: A total of 433 mammography technologists responded (survey response rate = 47.5%; 95% confidence interval [CI]: 44.2%-50.7%), including 128 lead and 305 nonlead technologists. Most mammography technologists were non-Hispanic, white women; their average age was 48 years. Approximately 93% of lead and nonlead technologists had mammography-specific training, but <4% had sonography certification, and 3% had MRI certification. Lead technologists reported more years of experience performing screening mammography ($P = .02$) and film mammography ($P = .03$), more administrative hours ($P < .0001$), and more workplace autonomy ($P = .002$) than nonlead technologists. Nonlead technologists were more likely to report performing diagnostic mammograms ($P = .0004$) or other breast imaging ($P = .001$), discuss image quality with a peer ($P = .013$), and have frequent face-to-face interaction with radiologists ($P = .03$).

Conclusions: Our findings offer insights into mammography technologists' training and work experiences, highlighting variability in characteristics of lead versus nonlead technologists.

Key Words: Mammography, workforce, technologist, variability

J Am Coll Radiol 2015;12:1419-1426. Copyright © 2015 American College of Radiology

INTRODUCTION

National estimates indicate that more than 38 million mammogram procedures are performed annually in facilities certified by the Mammography Quality Standards Act (MQSA) [1]. Each of these mammograms is performed by a mammography technologist and interpreted by a radiologist. Although a considerable literature describes and evaluates radiologists' characteristics associated with mammography performance [2-8], little information is available on the technologists who carry out these examinations. Often, the technologist is the sole point of contact for the patient during her breast-screening experience.

The mammography technologist is responsible for the quality of the image, which includes the accuracy of positioning, which is crucial for the radiologist to make an accurate interpretation. Under MQSA citation 900.12(a)(2)(ii)(A)(B)

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Dr. Schroeder is a paid consultant for GE Healthcare and is a stockholder for Matakina Technology Limited and Koning Corporation. The other authors have no conflicts of interest related to the material discussed in this article.

This work was supported by funding from the National Cancer Institute, National Institutes of Health, under grants R01CA155342 and U01CA70040.

1546-1440/15/$36.00 ■ http://dx.doi.org/10.1016/j.jacr.2015.06.001

and (C), the requirements for mammography technologists state: "All mammographic examinations shall be performed by radiologic technologists who meet the following mammography requirements: Have, prior to April 28, 1999 qualified as a radiologic technologist under paragraph (a)(2) of this section of FDA's interim regulations of December 21, 1993, or completed at least 40 contact hours of documented training specific to mammography under the supervision of a qualified instructor." [9]

Given the sparse data on mammography technologists, and the critical role they play in the breast-cancer screening process, we sought to describe the mammography technologist workforce and compare technologist characteristics and workplace experiences among the lead and nonlead technologists. We hypothesize that attributes of lead and nonlead technologists differ, and that these differences (ie, in number of years of experience or how they interact and communicate with radiologists) are important in understanding the role of the mammography technologist.

MATERIALS AND METHODS

Survey Methodology

We conducted a mailed survey to all radiologic technologists at MQSA-certified facilities in North Carolina. The MQSA-certified facilities were identified through the FDA website, which maintains a public database of registered mammography machines [10]. Using the FDA database, we identified 236 certified facilities in North Carolina during the fall of 2012. Because facility certification status may change over time, additional facilities may have been added or removed from this list. Each facility was contacted by phone to determine the number of technologists performing mammograms, and the best point of contact for distributing surveys to them.

Through this process, seven facilities were identified as satellite offices that rotate technologists, and five were identified as either no longer having a mammography machine or as having plans to close the breast-imaging department. Among the final sample of 224 North Carolina MQSA-certified mammography facilities, 912 individual technologists performing mammography were identified. Of these, 238 served as lead technologists (defined as having administrative duties), and 674 served as nonlead technologists (defined as being supervised by another technologist) at the time of survey distribution in the spring of 2013.

The survey content was developed through collaboration with two breast-imaging radiologists, three mammography technologists, an epidemiologist, and a survey methodologist. A total of 50 survey questions were included, focused on technologist sociodemographics, education and training, technologists' workplace involvement (responsibilities, experiences, and interactions with radiologists and other technologists), and facility-level questions. Education questions included those related to degrees and certifications obtained, as well as continuing education.

The work responsibility questions covered the type of imaging and nonimaging performed (film and digital mammography, other nonmammography breast imaging, other nonbreast imaging, and administrative hours or nonclinical work), as well as the number of years of experience for each responsibility. Workplace interaction questions focused on communication and contact of technologists with peers and radiologists. These questions were designed to reveal how technologists work with peers, as well as with one or several radiologists, and how technologists communicate with radiologists (ie, do they mark findings on images, make decisions about taking extra views without first consulting with the radiologist; have they ever been notified to improve positioning of the patient). Facility-level questions were asked of the lead technologist, to determine facility academic affiliation, staffing structure, and mammography certification requirements for mammography technologists.

The survey was pretested with three technologists from a breast-imaging facility outside of North Carolina. The purpose of pretesting was to receive feedback from technologists who did not participate in the study, with regard to survey flow, design, and ease of understanding and responding to the survey questions. Responses from the pretesting led to minor modifications in the survey, to clarify the intent of several questions.

We employed the "Mail and Telephone Surveys, the Total Design Method" by Dillman for our survey methodology [11]. A prenotification letter was mailed to the lead technologist at each of the 224 breast-imaging sites two weeks prior to mailing each lead technologist a study packet. Study packets included a formal cover letter introducing the project, a research informational sheet that defined the rights and expectations of each survey participant, surveys for the lead and nonlead technologists, a $10 cash incentive for the lead technologist, a $5 cash incentive for the nonlead technologists, and a prepaid return envelope.

Lead technologists were asked to distribute the surveys to all other nonlead technologists working at the mammography facility. Return of the survey implied consent for participation in the study. Reminder postcards were sent two weeks after survey distribution if the facility had at least one outstanding nonresponse. If no response was received after two weeks, additional copies of the