



ARDMS[®]

Breast Sonography (BR) 2017 Job Task Analysis Summary Report

Inteleos Psychometrics Services
October 2017

American Registry for Diagnostic Medical Sonography (ARDMS)
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ACKNOWLEDGEMENTS

This study was completed through the work of many individuals at Inteleos, who worked together to construct the survey, administer the survey, and analyze the data. Six subject matter experts also volunteered many hours to draft and review materials before and after the survey was administered. Thanks to the 1100+ ARDMS sonographer registrants around the nation and other countries who took the time and interest to participate in the job task survey.

EXECUTIVE SUMMARY

The American Registry for Diagnostic Medical Sonography (ARDMS) is the globally recognized standard of excellence in sonography. It is responsible for the preparation of valid and reliable certification examinations in sonography. The performance of job task analyses (JTAs) at the national and international levels assists ARDMS in evaluating the current practice expectations and performance requirements of the specialty. The Breast Sonography (BR) Examination went through the JTA process twice. The first BR JTA was initiated in June 2016 but the Working Group had concerns about the proposed content outline that resulted from the 2016 JTA which had fewer tasks. A decision was made to repeat the JTA in 2017. The second JTA was initiated in March 2017 and completed in September 2017. The BR JTAs were designed to collect information on the sonography-related work activities sonographer registrants perform in practice. The results were used in updating the test content outline that guides content distribution of the BR Examination. This report details the methodology, data collection & analysis, and survey results. It also includes the test content outline that resulted from the JTA.

METHODOLOGY

1st Job Task Analysis Working Group

The JTA was initiated in June 2016. A JTA Working Group consisting of eight (8) subject matter experts (SMEs) led this project. All eight JTA Working Group members were Assessment Oversight Team (AOT) members and volunteers.

1st Survey Questionnaire Development

ARDMS facilitated a process whereby the JTA Working Group developed the task list and demographic items for the survey. The JTA Working Group reached consensus on a list of 36 tasks to be used in the survey. These tasks were divided into four domains: (1) Gather pertinent medical history; (2) Obtain diagnostic images; (3) Assess diagnostic images; (4) Interventional procedures. All task statements and response options were relevant to RDMS-BR credentialed sonographers.

The survey questionnaire was pilot-tested with the eight members from the 1st JTA Working Group.

1st Survey Process

Survey Administration Procedure

The survey was made available to participants as a web-based survey through the survey platform Qualtrics®. An invitation to participate in the survey was sent via email to the prospective respondents.

ARDMS sent the job task analysis survey to 2,891 registrants credentialed since 2001. These registrants were selected randomly using a stratified sampling method so that the sample is representative of all ARDMS sonographer registrants in terms of specialty, gender, and geographic region. The survey was made available to the participants for two weeks between Nov 21st and December 5th, 2016. All responses made by the participants were kept confidential.

Response Rates

A total of 1,542 (53.3% of those sampled) sonographers responded to the survey. Of these, 1,327 (86.1% of respondents) reported that they currently perform breast sonography. The data analysis was based on the responses from the 1,327 sonographers currently performing breast sonography.

1st Data Analysis and Results

Of the 1,327 participants who were currently practicing breast sonography, 1220 completed all the JTA survey questions.

After the data was analyzed, a proposed content outline was developed. However, the Working Group and ARDMS team identified additional tasks that they wanted to include on the survey.

As a result, the Working Group and ARDMS decided to implement the 2nd Breast Job Task Analysis survey in 2017.

2nd Job Task Analysis Working Group

A JTA Working Group consisting of eight (8) subject matter experts (SMEs) led this project. All eight JTA

Working Group members were Assessment Oversight Team (AOT) members and volunteers. Seven of the eight members also served on the 1st JTA.

2nd Survey Questionnaire

Development

ARDMS facilitated a process whereby the JTA Working Group updated the task list and demographic items from the 1st JTA. The JTA Working Group reached consensus on a list of 46 tasks to be used in the survey (compared to 36 tasks on the 1st JTA). These tasks were divided into seven domains: (1) Anatomy and Physiology; (2) Pathology; (3) Integration of Data; (4) Protocols; (5) Physics; (6) Emerging Technology and Treatment; and (7) Other. All task statements and response options were relevant to RDMS-BR credentialed sonographers.

The survey questionnaire was pilot-tested with the eight members from the 2nd JTA Working Group.

2nd Survey Process

Survey Administration Procedure

The survey was made available to participants as a web-based survey through the survey platform Qualtrics®. An invitation to participate in the survey was sent via email to the prospective respondents.

ARDMS sent the job task analysis survey to 2,116 registrants credentialed since 2001. These registrants were selected randomly using a stratified sampling method so that the sample is representative of all ARDMS sonographer registrants in terms of specialty, gender, and geographic region. The second registrant sample was independent of the first registrant sample. The survey was made available to the participants for two weeks between May 22nd and June 4th 2017. All responses made by the participants were kept confidential.

Response Rates

A total of 1124 (53.1% of those sampled) sonographers responded to the survey. Of these, 1,004 (89.3% of respondents) reported that they currently perform breast sonography. The data analysis was based on the responses from the 1,004 sonographers currently performing breast sonography.

2nd Data Analysis

Respondents were asked the following questions for each task: How frequently do you perform the task in your practice, and how important is the task in affecting clinical decisions and patient outcomes? The frequency and importance rating scales were scored using a scale of 1-5. The response options for the frequency scale were Never, Rarely, Occasionally, Often, and Always. The response options for the importance scale were Not Important, Somewhat Important, Important, Very Important, and Critically Important.

The frequency and importance rating scales were combined into a single measure of overall criticality (ranged from 0-16) using a hierarchical method where a particular value on the importance scale would outweigh or outrank all values on the frequency scale, with the exception of 'Never' (see Table 1). Higher criticality values indicate the most critical tasks for a sonographer performing DMS exams. These criticality values were averaged for each task and rank ordered and reviewed by the JTA Working Group. In addition, the criticality values were summed within each domain to derive the initial percentages of the examination content in each domain.

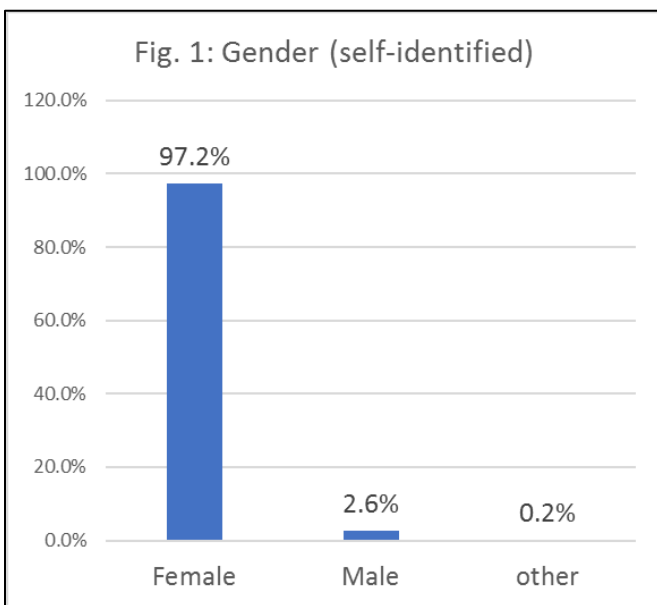
2nd SURVEY RESULTS

Demographics and Backgrounds of Participants

Of the 1,004 participants who were currently practicing breast sonography, 865 completed all the JTA survey questions, and this section is based on those 865 participants.

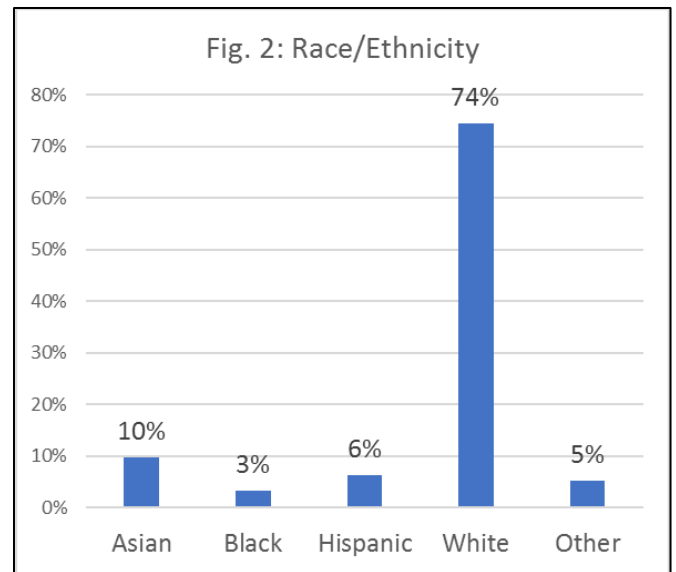
Gender

Approximately 97% of the respondents were female and 3% were male (Figure 1).



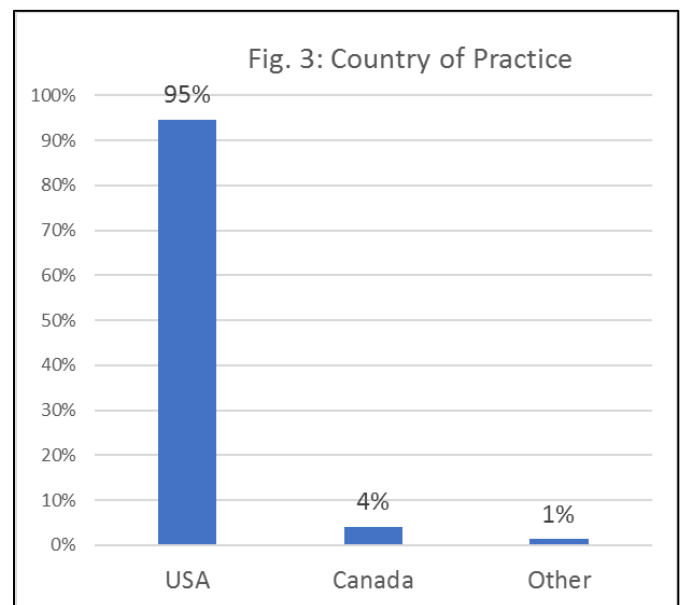
Race and Ethnicity

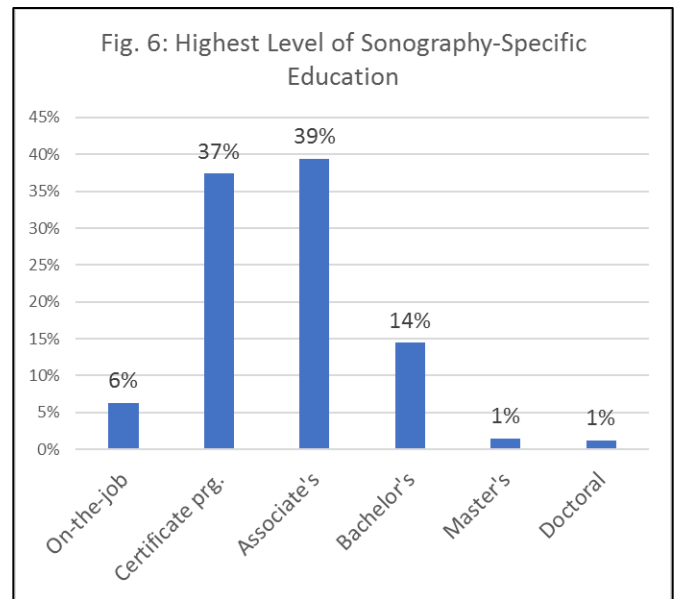
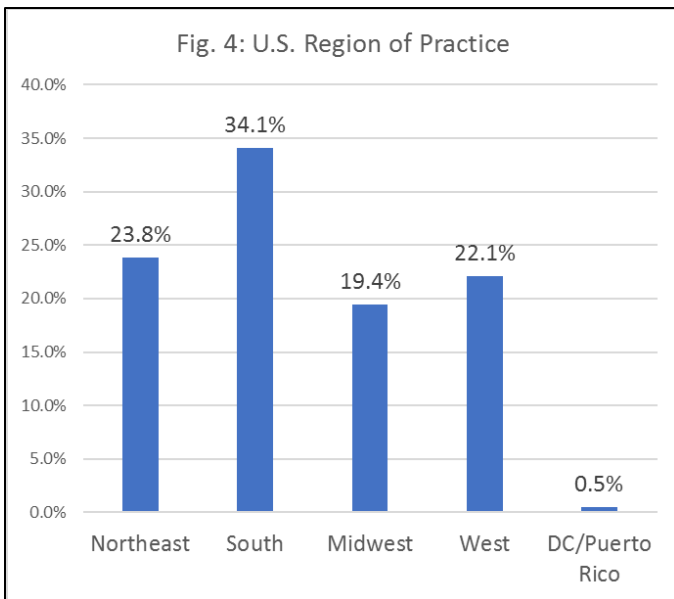
Approximately 74% of respondents were white or Caucasian, 10% of respondents were Asian, 3% black or African American, and 6% Hispanic or Latino. Additionally, 5% of respondents marked “other” (Figure 2). Less than 1% of respondents selected American Indian or Pacific Islander (not shown), and 2% of respondents selected more than one race/ethnicity.



Location/Region of Practice

Of the respondents who reported the country in which they practice, 95% reported practicing in the United States and 4% in Canada, with the other 1% of respondents practicing in 12 other countries (Figure 3). Among US residents who provided the US state they practice in, over a third (34%) practiced in the southern region of the United States (as defined by the US Census Bureau) (Figure 4).

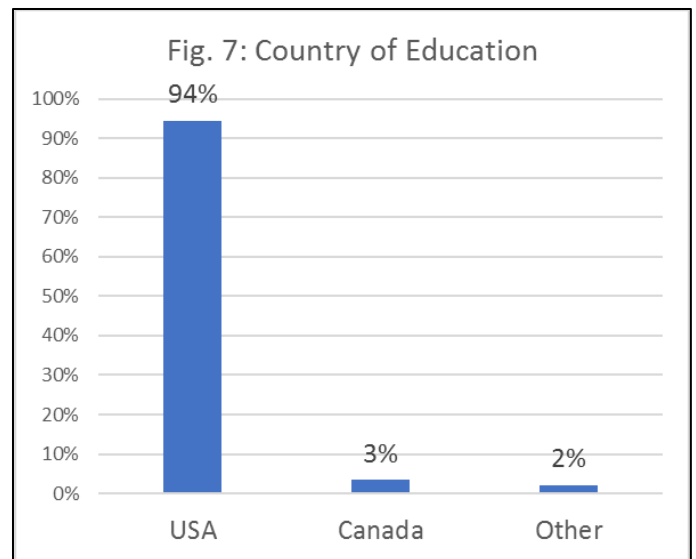
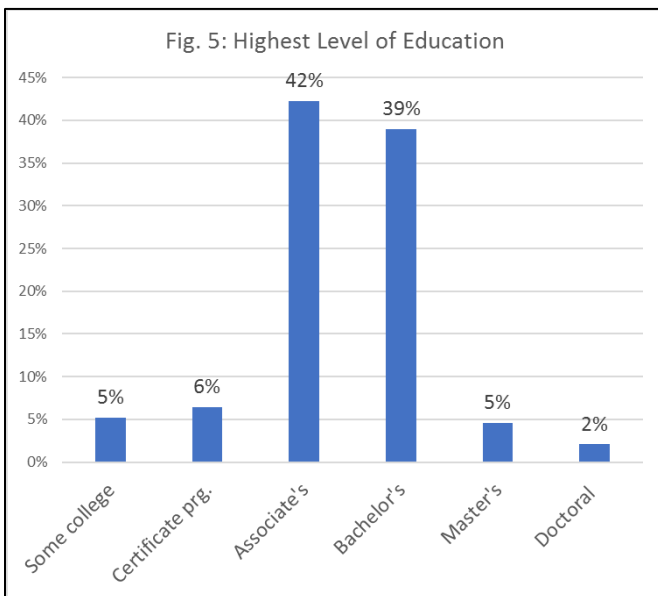


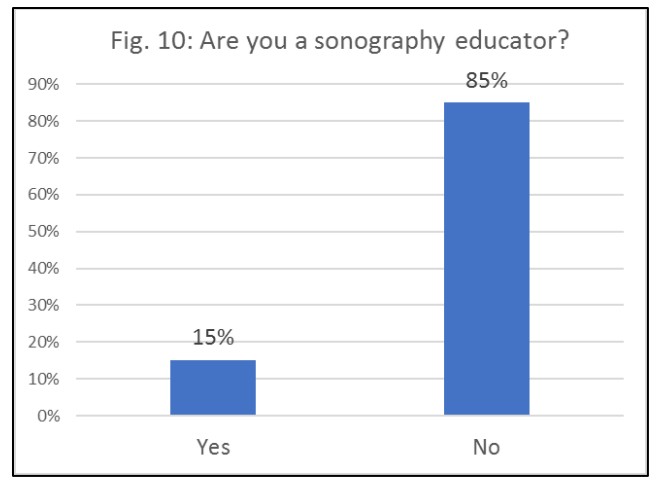
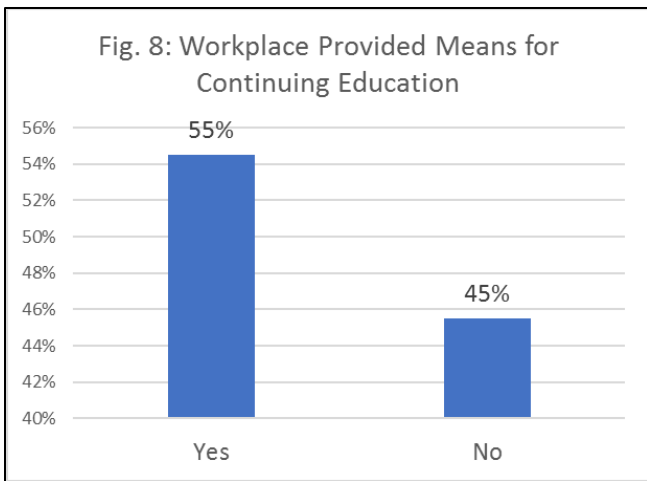


Level of Education

Approximately 42% of respondents had an Associate's degree and 39% had a Bachelor's degree as their highest level of education (Figure 5). Within sonography-specific education, 39% of respondents had an Associate's degree and 37% of respondents had a certificate program as their highest level of education (Figure 6).

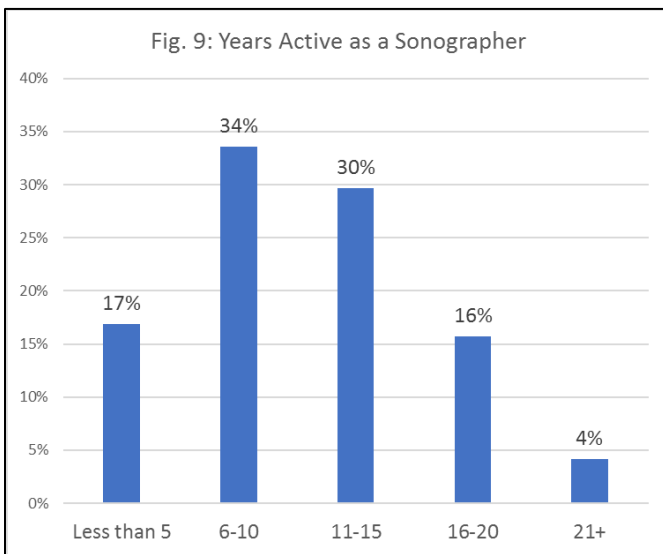
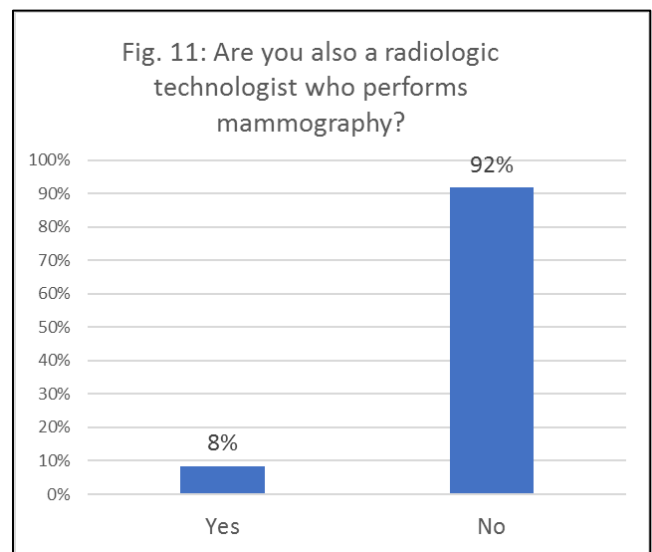
Almost all (94%) of respondents received the majority of their education in the United States, 3% in Canada, and the remaining 2% of respondents were educated in 18 other countries around the world (Figure 7). A little over half of respondents (55%) had opportunities to continue their education provided by their employers (Figure 8).



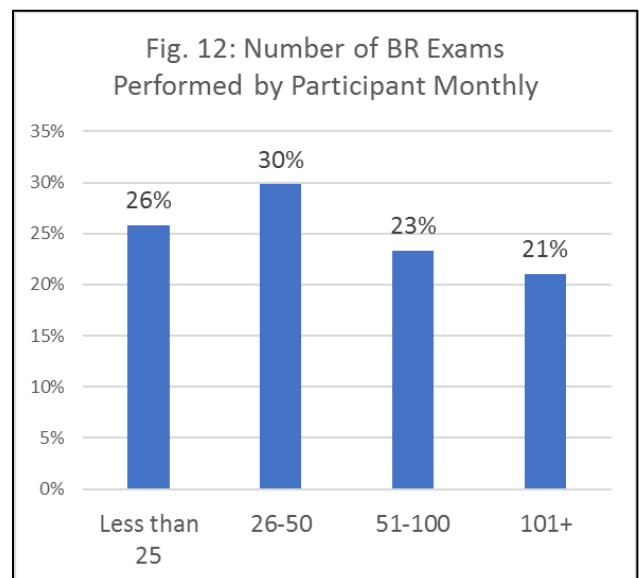


Work Experience

Approximately 34% of respondents had been practicing sonography for 6 to 10 years, and 30% had been practicing for 11 to 15 years (Figure 9). Approximately 15% of respondents are also sonography educators (Figure 10). Only 8% of respondents were also radiologic technologists who perform mammography (Figure 11).

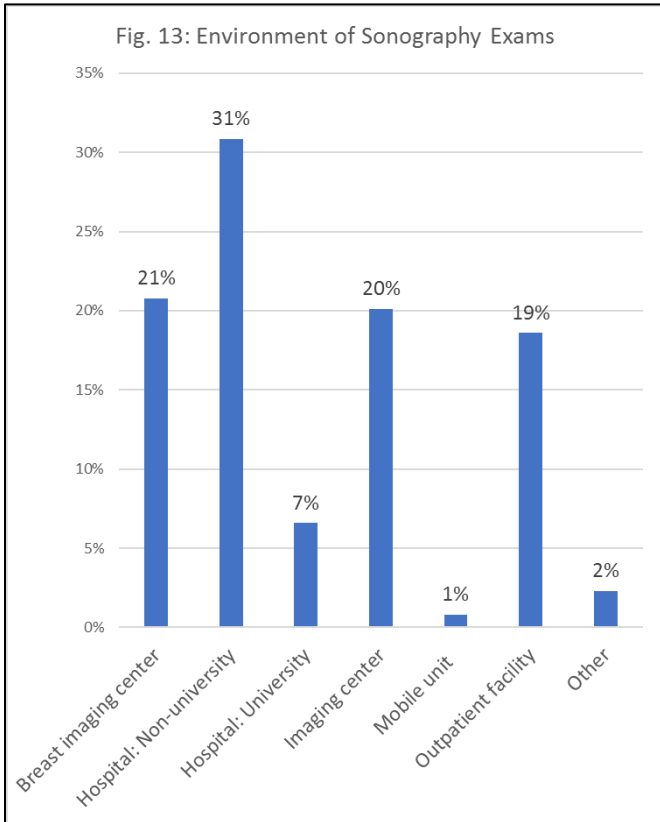


The number of breast exams performed in a month varied widely, but the most common range selected was between 26 and 50 (Figure 12).

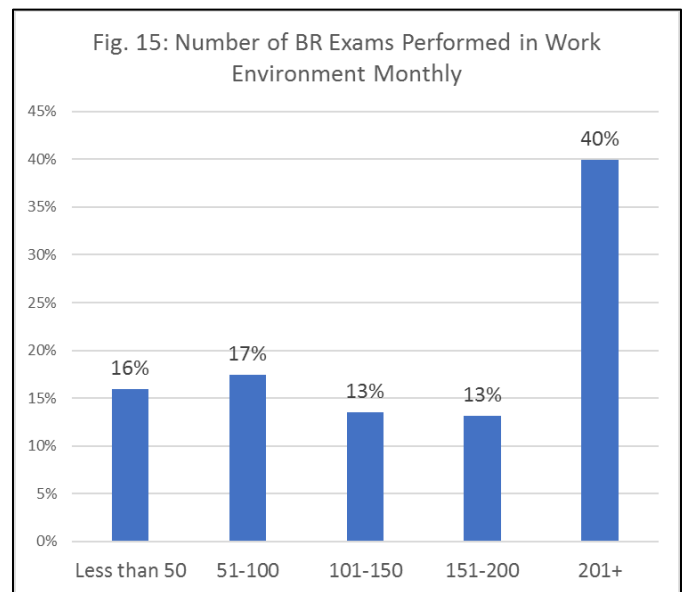
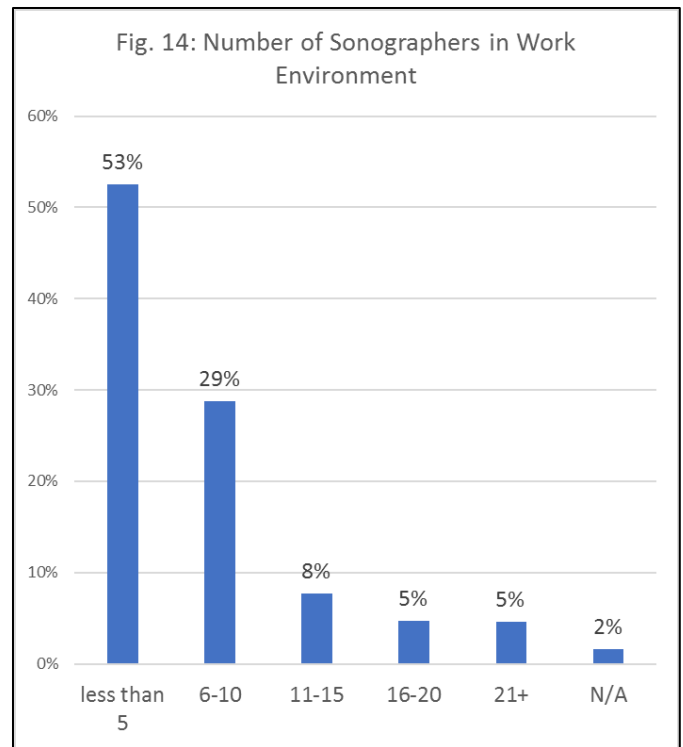


Work Environment

The respondents were asked to indicate the type of environment they perform most of their sonographic examinations in. The most common response (31%) was a non-university hospital (Figure 13).



Respondents reported working in labs with various numbers of sonographers. The most common number of sonographers in respondents' labs was less than 5 (53%) followed by 6 to 10 (29%) (Figure 14). Respondents reported that their labs performed a large number of breast exams in a month, with 40% performing over 200 (Figure 15).



Value of Certification

When asked to rank the reasons why they valued taking the Breast Sonography (BR) certification exam, respondents had a variety of responses, but the most popular options were “Professional Growth” and “Validation of Specialized Knowledge and Skills”. Out of the 619 valid responses given, 158 respondents (26%) chose “Professional Growth” as the most valuable reason for pursuing a BR certification and 235 respondents (38%) chose “Validation of Specialized Knowledge and Skills.”

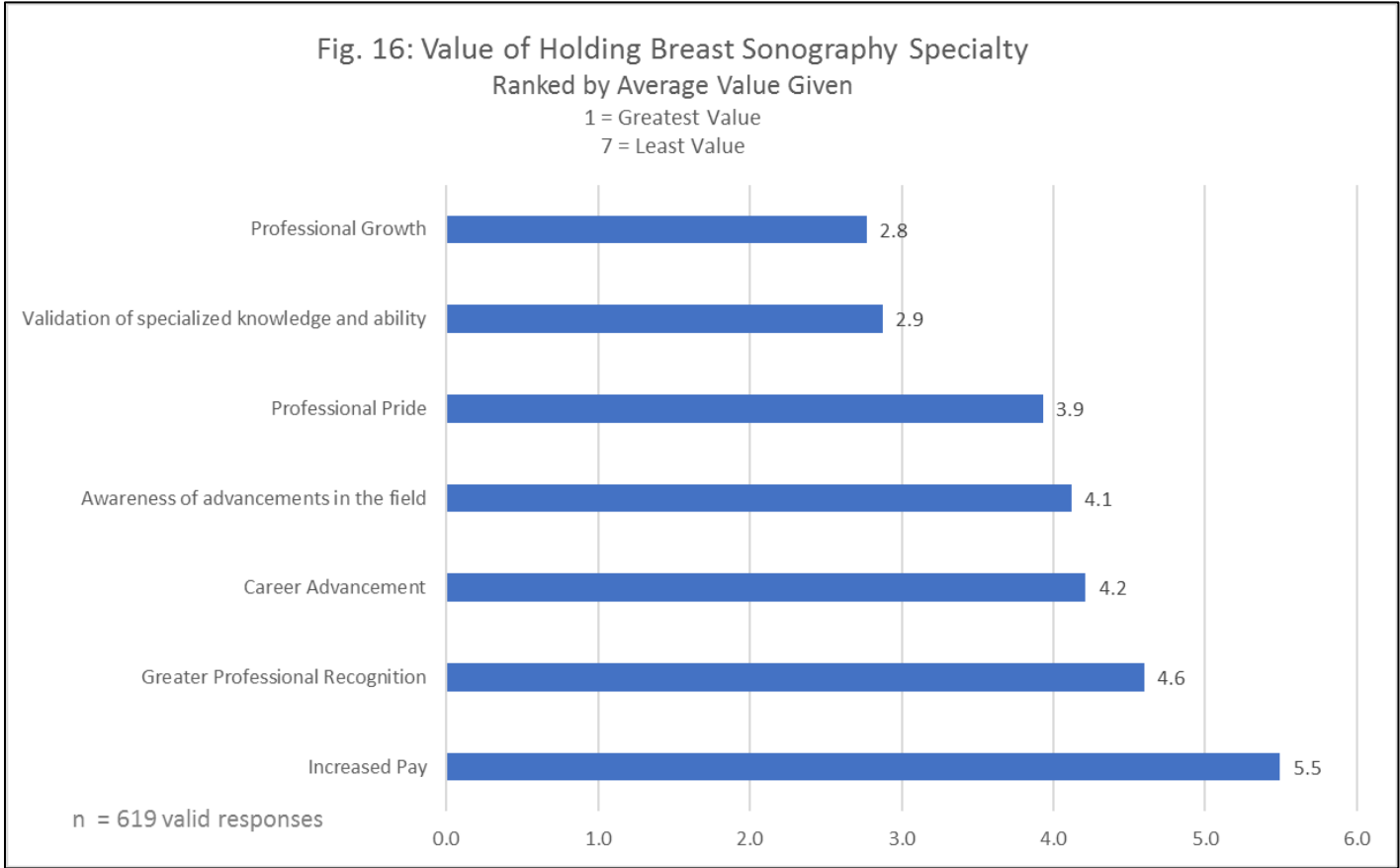


Table 2: Results of Respondents Ranking Reasons to take the BR Certification Exam from greatest (1) to least (7) based on their value and/or influence.

Reason	Average Score Given	Sum of Scores Given	Number of Respondents Giving Each Rank to Reason						
			1	2	3	4	5	6	7
Professional Growth	2.8	1716	158	141	150	78	53	24	15
Validation of specialized knowledge and ability	2.9	1781	235	95	80	64	57	41	47
Professional Pride	3.9	2433	59	96	104	126	91	90	53
Awareness of advancements in the field	4.1	2549	42	122	82	89	111	105	68
Career Advancement	4.2	2609	70	70	84	94	98	140	63
Greater Professional Recognition	4.6	2844	16	60	81	113	151	128	70
Increased Pay	5.5	3400	39	35	38	55	58	91	303

APPENDIX D: Approved BR Content Outline

Breast Sonography Examination Content Outline

(Outline Summary)

#	Domain	Subdomain	Percentage
1	Anatomy and Physiology	Normal anatomy and physiology	15%
2	Pathology	Abnormal perfusion and function Benign vs. suspicious findings	34%
3	Integration of Data	Incorporate outside data	19%
4	Protocols	Clinical standards and guidelines Measurement techniques	13%
5	Ultrasound Physics	Artifacts Hemodynamics Imaging Instruments	12%
6	Emerging Technology and Treatment	New technologies Interventional procedures	7%

(Detailed Outline)

1.	Anatomy and Physiology 15%	Knowledge and/or skill related to anatomy and physiology
1.A.	Normal anatomy and physiology	
1.A.1.	Distinguish lymph nodes related to the breast	Knowledge of lymph node anatomy and various locations Ability to differentiate between normal and abnormal lymph nodes Knowledge of age-related or hormonal sonographic changes of the breast Knowledge of breast anatomy at various life cycles (e.g., tissue composition, layers, terminal duct lobular units (TDLU), lobes, lobules) Knowledge of female breast anatomy
1.A.2.	Assess lymph node anatomy	
1.A.3.	Identify age-related or hormonal sonographic changes of the breast tissue and its components	
1.A.4.	Identify functional units of the breast (e.g., lobes, ducts)	
1.A.5.	Identify the components comprising each tissue layer of the breast	
1.A.6.	Identify the tissue layers within the breast	
2.	Pathology 34%	Knowledge and/or skill related to pathology
2.A.	Abnormal perfusion and function	
2.A.1.	Evaluate for vascularity related to a mass/lesion (e.g., using spectral, color, or power Doppler)	Knowledge of vascularity characteristics related to a mass/lesion (e.g., as shown using spectral, color, or power Doppler)
2.B.	Benign vs. suspicious findings	
2.B.1.	Evaluate characteristics of infectious processes	Knowledge of benign, infectious, indeterminate, and suspicious characteristics of findings
2.B.2.	Evaluate lesions classified by Breast Imaging Reporting and Data System (BI-RADS)	

2.B.3.	Assess masses by evaluating surface characteristics	Knowledge of terminology related to patient reports (e.g., BI-RADS classification, pathology, surgical notes)
2.B.4.	Evaluate patterns on breast tissues that surround malignant tumors or inflammatory reactions	Knowledge of surface characteristics of masses Ability to identify breast tissue patterns surrounding benign and malignant tumors
2.B.5.	Evaluate malignant processes including breast-specific malignancies (e.g., ductal, lobular, medullary)	Knowledge of malignant processes including breast-specific malignancies (e.g., ductal, lobular, medullary) Knowledge of premalignant and atypical breast processes (e.g., atypical hyperplasia)
2.B.6.	Evaluate premalignant and atypical breast processes (e.g., atypical hyperplasia)	Ability to evaluate postoperative and post-interventional sites for complications (e.g., seroma, hematoma, fat necrosis)
2.B.7.	Evaluate postoperative biopsy site for complications (e.g., seroma, hematoma, fat necrosis)	Ability to evaluate postoperative breast tissue changes Knowledge of implant types and related complications (e.g., silicone, saline, subpectoral)
2.B.8.	Evaluate postoperative breast tissue changes	Ability to differentiate between benign and malignant masses, calcifications, infectious processes, associated features, and various other findings
2.B.9.	Evaluate implant integrity (e.g., silicone, saline, subpectoral)	Ability to access pathology related to nipple discharge Knowledge of male breast anatomy
2.B.10.	Evaluate benign findings including benign pathologies (e.g., fibroadenomas, fibrocystic changes, hamartomas, lipomas)	
2.B.11.	Assess nipple discharge	
2.B.12.	Evaluate the male breast	
3.	Integration of Data 19%	Knowledge and/or skill related to integration of data
3.A.	Incorporation of outside data (e.g., clinical assessment, history and physical (H&P) examination information, lab values)	
3.A.1.	Apply results/findings of the mammogram to guide scanning of the breast tissue	Knowledge of mammographic findings to guide scanning of the breast tissue
3.A.2.	Correlate ultrasound findings with mammography	Knowledge of mammographic terminology and findings Ability to understand and apply information obtained from different modalities
3.A.3.	Correlate ultrasound findings with magnetic resonance imaging (MRI) results	Knowledge of factors for breast disease (e.g., clinical history, medications, treatments, other diseases)
3.A.4.	Obtain pertinent clinical history from the patient and/or the medical records (e.g., risk factors)	Ability to recognize signs, symptoms, and locations of breast disease on visual assessment (e.g., skin changes, characteristics of nipple discharge)
3.A.5.	Use the patient's signs and symptoms to help guide the ultrasound exam	Knowledge of pathological correlation
3.A.6.	Obtain pathology correlation	
4.	Protocols 13%	Knowledge and/or skill related to protocols
4.A.	Clinical standards and guidelines	
4.A.1.	Evaluate the breast using various scan planes (e.g., longitudinal/transverse, radial/antiradial)	Ability to analyze the breast using various scan planes (e.g., longitudinal/transverse, radial/antiradial)

4.A.2.	Evaluate the breast using various scan techniques (e.g., palpation, standoff pad, transducer pressure, fremitus)	Ability to analyze the breast using various scan techniques (e.g., palpation, standoff pad, transducer pressure, fremitus)
4.A.3.	Evaluate the breast with the patient in various positions (e.g., oblique, supine, upright)	Knowledge of optimal patient positions for the exam being performed (e.g., oblique, supine, upright)
4.A.4.	Document the breast exam using standard imaging protocols (e.g., quadrants, clockface, distance from nipple)	Ability to document standard imaging protocols (e.g., quadrants, clockface, distance from the nipple)
4.B.	Measurement techniques	
4.B.1.	Perform various measurements to assess breast anatomy and pathology	Knowledge of caliper placement to achieve desired measurement
5.	Ultrasound physics 12%	Knowledge and/or skill related to ultrasound physics
5.A.	Artifacts	
5.A.1.	Identify common artifacts seen on breast ultrasound	Ability to identify artifacts and modify the exam as appropriate
5.B.	Hemodynamics	
5.B.1.	Adjust transducer pressure when using Doppler	Knowledge of appropriate transducer pressure when using Doppler
5.C.	Imaging instruments	
5.C.1.	Adjust console settings to optimize the image	Knowledge of knobology, physics and instrumentation
5.C.2.	Select the appropriate transducer	Ability to select the appropriate transducer and frequency for a given examination and body habitus
6.	Emerging Technology and Treatment 7%	Knowledge and/or skill related to emerging technology and treatment
6.A.	New technologies	
6.A.1.	Understand various breast cancer treatments (e.g., brachytherapies, adjuvant therapies)	Knowledge of brachytherapies and adjuvant therapies
6.A.2.	Use three-dimensional imaging when evaluating the breast	Knowledge of three-dimensional imaging when evaluating the breast
6.A.3.	Use elastography when evaluating the breast	Knowledge of elastography when evaluating the breast
6.A.4.	Use automated whole-breast ultrasound when evaluating the breast	Knowledge of automated whole-breast ultrasound when evaluating the breast
6.B.	Interventional procedures	
6.B.1.	Obtain images during interventional procedures, including specimen imaging and sentinel lymph node procedures	Knowledge of sentinel lymph node and related procedures Knowledge of image acquisition during ultrasound-guided interventional procedures