

**Practice Analysis and Content Specifications
For Sonography**

**Final Report
For New Documents Implemented January 2019**

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CHAPTER 1

PROJECT BACKGROUND AND INTRODUCTION

The ARRT establishes the job relatedness of an examination via a practice analysis (also called a job analysis). Practice analyses document the role to be credentialed and the topics to be covered by the examination used in the credentialing decision as well as the degree of emphasis that each topic receives. The rationale for practice analyses is outlined in *The Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, National Council on Measurement in Education, 2014) and in the National Commission for Certifying Agencies (NCCA) *Standards for the Accreditation of Certification Programs* (NCCA, 2014). Legislative activity and legal precedence also stress the importance of practice analysis in the development and validation of certification exams. The ARRT conducts a practice analysis for each discipline every five years. Such updates are important for professions that continually evolve, due to advances in technology, because they help assure that the content specifications and other certification requirements reflect current practice.

This report describes the practice analysis for Sonography conducted between the dates of October 2016 and January 2018. The purpose of the overall project was to identify tasks currently required of the typical sonographer and determine the knowledge and cognitive skills required to effectively perform those tasks.

Projects such as this require a coordination of numerous activities. During the project several committee meetings were held, a survey was developed and administered, the survey data was analyzed, and decisions were made regarding revisions to the exam content and eligibility requirements. The project was completed when the ARRT Board of Trustees approved the changes to the exam content and eligibility requirements in January 2018. The first exam under the new content and eligibility requirements was administered in January 2019.

CHAPTER 2

TASK INVENTORY SURVEY

Development of Task Inventory Survey

The task inventory survey was developed between June 2016 and September 2016 by the Practice Analysis Committee with facilitation from ARRT staff. The Practice Analysis Committee held its first meeting July 2016. Part of the meeting was devoted to the development of a task inventory survey. The survey consisted of tasks thought to define the job role of an R.T. working in Sonography. A brief description of the survey is provided below.

Format of Survey

The existing Task List in 2016 consisted of 101 tasks. The committee began developing a survey by starting with that list and then adding tasks that they thought may be emerging in the field; they also added some tasks to clarify or add detail to existing tasks. The final task analysis survey consisted of 84 tasks, with an additional 33 tasks listed on an *Omitted Task List*. The omitted list consisted of tasks that the committee was certain that nearly 100% of the survey population was performing on a regular basis, and for which there would be no benefit in collecting data. These tasks will be included on the final task list but will not be on the survey. For each task, the survey asked: *How often do you perform this task?* The possible responses were: NP – never perform; Y – yearly; Q – quarterly; M – monthly; W – weekly; and, D – daily.

Another part of the survey consisted of 15 questions about equipment, work environment, and demographics.

Survey Sample

The survey sample was drawn from registered technologists in the ARRT database. The focus of the survey was on the job duties of staff sonographers at entry level. For this practice analysis project, the entry-level technologist was defined as a full-time staff or chief sonographer with one to five years of experience; surveys were also sent to those with five to ten years of experience so we could include 1,000 in the total survey sample.

The task inventory survey was mailed in October 2016. The initial mailing was followed up by a reminder postcard approximately three weeks after the initial mailing. The returned surveys were first screened to exclude those that it was thought did not seriously fill out the survey (e.g., partial surveys, same response to all questions), and those that did not primarily work in Sonography; there were 261 in this total group, for a usable response rate of 26%. The remaining surveys were then filtered to only include staff sonographers working more than 32 hours per week in sonography with one to five years of experience - this create a target sample of 146. We often base decisions primarily on the responses of the target group, but the total group for this survey was also considered in making any decisions for the project.

Data Analysis

The primary variable of interest was the percent that personally performed a task. We also analyzed the frequency responses for tasks, noting the added importance of tasks that are performed more frequently than those infrequently performed.

Normally, a task must be performed by at least **40% of the target group** for it to be included on the task list. The 40% criterion is used because it is consistent with ARRT's goal of assessing tasks typically performed in practice. However, exceptions can be allowed for tasks that are performed by a smaller portion of the target group if the task is deemed highly critical, or if it is thought to be an emerging task that experts agree will soon be performed by greater than 40%.

When tasks are near the 40% threshold it is common to incorporate additional data into the discussion. The demographic variables allowed us to break responses down by work environment and years of experience, and that data was employed when appropriate.

CHAPTER 3

CONTENT SPECIFICATIONS AND CLINICAL REQUIREMENTS

Revision of the Task Inventory

The Practice Analysis Committee met in February 2017 to review the practice analysis survey data and determine whether any tasks should be dropped from, added to, or changed in the final task inventory. The content of the Sonography Task List is a direct result of the responses to the Practice Analysis Survey. The normal criterion used by the ARRT is that at least 40% of the target group must be responsible for performing a task for it to appear on the final task list. If a task falls below this threshold, a compelling argument must be made for it to be included. Most of the decisions of whether to include a survey task on the final list were relatively easy because most tasks were either clearly above or clearly below the cut-off percentage. Decisions made by the Advisory Committee follow.

Survey data indicated that less than 40% performed the following tasks, but they were kept on the task inventory because the committee believes the tasks represent entry-level knowledge that is critical to image quality and patient safety:

- *Spatial compound imaging* (26.7%) Rationale: Although this surveyed at less than 40%, the committee indicated that this function is on most scanners and it is important for sonographers to understand its use.
- *Vital signs-pulse* (28.8%) Rationale: The committee believes that it is important for candidates to be able to demonstrate this procedure in the workplace when needed.
- *Guidance for line placement* (29.5%) Rationale: The survey indicated that 38% of respondents that have worked 1 to 3 years in sonography are performing this task. This suggests that it is important entry level knowledge.
- *Oxygen monitoring* (30.1%) Rationale: The committee believes that this knowledge is critical when needed.

The following tasks represent new content and were added to the sonography task inventory because greater than 40% of the survey responders indicated that they performed them:

- *Communicate effectively with physician during interventional procedures* (84.1%).
- *Use 3D/4D imaging as appropriate* (52.7%).
- Following clinical protocols, position patient and transducer using appropriate technical factors to produce diagnostic images and recognize pathology of:
 - *hernia* (84.9%)
 - *pelvic floor* (73.8%)
 - *salivary glands* (56.8%)

The following tasks were deleted because they are redundant with other tasks:

- *Verify exam ordered is appropriate for clinical symptoms.* This task is like: *Verify order for accuracy and completeness of information including clinical symptoms.*
- *Access patient data from an electronic medical record.* This task is like: *Access and review pertinent patient data (e.g., electronic medical records, patient charts, previous examinations/reports) for correlation with sonographic examination findings.*
- Following clinical protocols, position patient and transducer using appropriate technical factors to produce diagnostic images and recognize pathology of:
 - *Maternal Uterus, Cervix, and Adnexa.* This task is like *uterus, ovaries, and adnexa.*

The following tasks were previously on the task inventory but were removed because less than 40% of the survey responders said they now performed them:

- *Select proper recording media other than PACS for archival (39%).* Rationale: The committee believes that the use of PACS will continue to increase so the need for other recording media will decrease.
- Following clinical protocols, position patient and transducer using appropriate technical factors to produce diagnostic images and recognize pathology of:
 - *Nuchal translucency (27.1%)* Rationale: This task is down from 36% in 2011. The committee indicated this is a specialized task not done by general sonographers.
- Assist with the following sonographic interventional procedures:
 - *Sonohysterography (34.2%)* Rationale: This task is down from 37% in 2011 and the committee believes this task will continue to decline.
 - *Amniocentesis (17.2%)* Rationale: This task is down from 30% in 2011. The committee indicated that this task is often done with the assistance of non-sonography staff in the medical field.

Other tasks were reworded to better define the task and reflect current practice.

The Task List was submitted to the ARRT Board of Trustees for consideration for approval in July 2017. The Board approved the document and it can be seen at [Sonography Task List 2019](#)

Revision of the Content Specifications

Revising the content specifications is based on changes to the final task inventory, comments from the professional community, and judgment of the Practice Analysis Committee. A final draft of the content specifications was completed after the task inventory had been finalized and approved. For every activity on the task inventory, the Practice Analysis Committee was asked to consider the knowledge and skill required to successfully perform that task and verify that the topic was addressed in the content specifications. Similarly, topics that could not be linked to practice were not included on the final content specifications.

Based on the approved changes to the *Task Inventory for Sonography*, updates to the *Content Specifications for the Sonography Examination* were prepared by the Sonography/Vascular Sonography Practice Analysis and CQR Advisory Committee and posted on the ARRT website for professional community comment. Professional organizations, such as the ASRT, SDMS, and AIUM were notified of the proposed changes and invited to submit comments via a survey on the ARRT website. Sonography educational programs were sent a copy of the proposed content specifications along with a postage-paid pre-addressed envelope and invited to return them with their comments.

The committee reviewed and discussed the comments from the professional community and proposed changes to the *Content Specifications for the Sonography Examination*. The following reflect the recommended changes and the rationale for the changes:

- The content in the Patient Care section was reorganized. The infection control area was edited to more closely reflect the CDC recommendations. Rationale: The topics in patient care apply to all primary pathway disciplines and the section was reorganized to maintain consistency among exams.
- The Image Production section was expanded, and more detail was added. Rationale: Some extra content related to vascular sonography was added since vascular sonography exams are included in the procedure section.
- Pelvic varices and pelvic floor (74%) were added to the gynecology procedures section. Rationale: The committee wanted to include a more complete list of possible pathologies, and pelvic floor was added to the task inventory.
- Salivary/parotid glands (57%) and lymph nodes (88%) were added to the neck procedures section. Rationale: Although lymph nodes are also listed in the abdominal procedures, the committee believes that it is important to emphasize the pathologies of lymph nodes in the neck. Salivary/parotid glands were added to the task inventory.
- Nuchal translucency (27%) and amniocentesis (17%) were removed from the Procedures section. Rationale: These procedures were removed from the task inventory.

The final content specifications were submitted to the ARRT Board of Trustees in January 2018, and the Board approved the document. The 2019 content specifications can be seen at [Sonography Content Specs 2019](#)

Clinical Competency Requirements

As part of the comprehensive practice analysis, the Sonography/Vascular Sonography Practice Analysis Committee modified the clinical competency requirements based upon the task inventory approved by the Board of Trustees in July 2017. The mandatory and elective procedures are like those on the clinical experience requirements

that candidates must obtain prior to taking the sonography examination as a postprimary candidate. They were posted on the ARRT website for professional community comment. Professional organizations, such as the ASRT, SDMS, and AIUM were notified of the proposed changes and they were invited to submit comments. Sonography educational programs were sent a copy of the proposed clinical competency requirements along with a postage-paid self-addressed envelope and invited to return them with their comments.

The committee reviewed and discussed the comments from the professional community and made minor changes to the *Clinical Competency Requirements for Sonography*. The following reflect the recommended changes and rationale for the changes:

- *O₂ monitoring* (30%) was removed from the mandatory patient care procedures list. Rationale: The committee believes that the low percentage of sonographers performing this task is because a nurse most often performs this task.
- *Gray scale (2D)* was added to the mandatory scanning techniques list. Rationale: The committee believes that this is a fundamental task that primary candidates need to demonstrate.
- *Prepare transducer for intracavitary use* and *Clean and disinfect transducer* were added to the mandatory equipment care activities list. Rationale: The survey showed that 97% of respondents are performing uterus and adnexa scans and 90% of respondents are performing first trimester obstetrics. These scans are often done with using a transvaginal technique, so these competencies are important for infection control.
- The number of mandatory procedures decreased from 22 to 16 and the required number of elective procedures increased from 5 to 11. Rationale: The total number of procedure that a candidate must demonstrate remains the same, but this change provides more flexibility for the candidate.
- The requirement to demonstrate competence using both transvaginal and transabdominal technique on gynecology studies was removed. Competence can now be demonstrated either with transvaginal or transabdominal technique for gynecology exams. Rationale: The committee believes that many institutions no longer allow students to perform transvaginal exams due to liability concerns. After much discussion, it was decided that since the anatomy is the same, competence can be demonstrated either way.
- The following tasks were added to the elective procedures list: *lymph nodes* (88%) and *salivary glands/parotid glands* (57%). Rationale: The committee believes that since many sonographers are performing these tasks, they should be added to the elective procedures list.

- The following tasks moved from the mandatory to elective procedures list: *vasculature* (90%), *biopsy* (75%), *aspiration* (68%), and *drainage procedures* (68%). Rationale: The committee believes that these studies are performed by some but not all sonographers. They believe that vasculature was misinterpreted and is done by fewer than 90% of sonographers.

All areas of the clinical competency requirements were edited for clarity and to update terminology to reflect current practice. The Clinical Competency Requirements were submitted to the ARRT Board of Trustees for consideration for approval in January 2018; the Board approved the requirements and they can be seen at [Sonography Clinical Competencies 2019](#)

Clinical Experience Requirements

Updates to the *Clinical Experience Requirements for Sonography* were prepared by the committee and posted on the ARRT website for professional community comment. Professional organizations, such as the ASRT, SDMS, and AIUM were notified of the proposed changes and invited to submit comments. These requirements will only be in place for one year because the postprimary pathway for sonography will be discontinued December 31, 2019.

The committee reviewed and discussed the comments from the professional community and proposed changes to the *Clinical Experience Requirements for Sonography*. The following reflect the recommended changes and rationale for the changes:

- The rule for simulating mandatory procedures changed from:
 - 12 of the 17 mandatory procedures must be demonstrated on patients; to
 - the candidate can simulate up to 50% of repetitions on volunteers. Rationale: The committee believes that performing repetitions on patients at least 50% of the time allows the candidate to see various pathologies and be able to gain experience scanning various areas.
- The rule for simulating elective procedures changed from:
 - all repetitions can be simulated; to
 - a maximum of 50% of repetitions can be simulated.

Rationale: The committee believes that it is important to scan patients at least 50% of the time so the candidate can see various pathologies that may not be seen on volunteers.
- The number of required repetitions for some of the mandatory and elective procedures changed. The minimum total number of repetitions decreased from 1,372 to 1,181. Rationale: The committee believes that the new numbers are more realistic to achieve.

- *Main portal vein* (90%) was added to the mandatory procedures list. Rationale: This procedure is on the task inventory and is very commonly performed.
- *Abdominal wall (e.g., hernia)* (79%), *salivary glands/parotid glands* (57%), *non-cardiac chest (pleural space)* (72%) were added to the elective procedure list. Rationale: These procedures are on the task inventory.
- *Breasts and axilla* (65%) went from a mandatory procedure to an elective procedure. Rationale: The committee believes it may be difficult for some sonographers to perform this study.
- The number of repetitions for second (85%) or third trimester (84%) obstetrics changed from 125 repetitions for either trimester combined, to 100 repetitions for the second trimester; the third trimester became an elective with 25 repetitions. Rationale: The committee believes it is important for candidates to have mandatory experience scanning second trimester patients since this is when many fetal abnormalities are found.
- *Amniocentesis* (17%) was removed from the elective procedures list. Rationale: This procedure was removed from the task inventory.

All areas of the clinical experience requirements were edited for clarity and to update terminology to reflect current practice. The clinical experience requirements were submitted to the ARRT Board of Trustees in January 2018 for consideration for approval. The Board approved the requirements for implementation in January 2019 and they can be found at [Sonography Clinical Experience 2019](#)

CHAPTER 4

EXAM PASSING STANDARD

Appropriateness of Current Exam Passing Standard

Many factors go into deciding when to readdress the passing standard for an exam. When conducting a practice analysis study, the degree to which the content is changed is the primary factor that goes into making the decision. Because the committee thought that the current passing standard was appropriate and performing well, and because the changes to the content specifications were not considered major, it was decided that a new standard did not need to be set at this time, but this issue will continue to be monitored and periodically reevaluated. Cut scores for new forms going forward will be determined by IRT equating using the existing standard.

Non-Compensatory Scoring

Beginning in 2013 passing the ARRT Sonography exam requires the candidate to attain a scaled score of 75 or greater on the total exam, and a section scaled score of 7.5 or greater in both the *Abdominal Procedures*, and the *Obstetrical and Gynecological Procedures* sections. This change was made to ensure that those certified in Sonography demonstrate competence in abdominal procedures and in OB/GYN procedures, as well as in the total exam content addressed by the ARRT Sonography exam.

ACR/AIUM Acceptance of Sonography Credential

The following statement describes the acceptance of the ARRT Sonography Certification by the ACR and the AIUM from January 1, 2013 moving forward: **The American College of Radiology (ACR) accepts this ARRT credential for sonographers in practices seeking ACR ultrasound accreditation or reaccreditation, and the American Institute of Ultrasound in Medicine (AIUM) accepts this ARRT credential for sonographers in practices seeking AIUM accreditation or reaccreditation in general abdominal ultrasound, obstetric ultrasound and/or gynecologic ultrasound.**

CHAPTER 5

CONCLUSION

Numerous individuals contributed to this project, as committee members, document reviewers, or as survey respondents. Periodic practice analysis is a necessary step in the life cycle of an exam program to ensure that the content of the exam and the eligibility requirements remain relevant with current practice. This study noted several significant changes to the field of Sonography, and thanks to the efforts of all involved it assures that the ARRT Sonography exam program will continue to be an excellent assessment of technologists wishing to demonstrate their qualifications by seeking certification and registration.