

**Practice Analysis and Content Specifications
for Vascular-Interventional Radiography**

Final Report

For New Documents Implemented July 2017

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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 Vascular-Interventional (VI) Radiography conducted between the dates of January 2015 and July 2017. The purpose of the overall project was to identify tasks currently required of the typical technologist 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 a number of 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 2017. The first exam under the new content and eligibility requirements was administered in July 2017.

CHAPTER 2

TASK INVENTORY SURVEY

Development of Task Inventory Survey

The task inventory survey was developed between November 2015 and July 2016 by the Practice Analysis Committee with facilitation from ARRT staff. The Practice Analysis Committee held its first meeting in November 2015. Part of the meeting was devoted to the development of a task inventory survey. The survey consisted of tasks thought to define VI. A brief description of the survey is provided below.

Format of Survey. The survey consisted of a one page cover letter, a page with directions on how to use the frequency responsibility scale to rate job tasks, the job tasks that needed to be rated, and a section with demographic and work experience questions.

Section 1. The first major section of the survey consisted of 123 job tasks that were to be rated using the frequency responsibility scale. The first 39 job tasks focused on non-procedure related tasks and the remaining 84 job tasks focused on imaging procedures. The frequency responsibility scale had six scale points (not responsible, yearly, quarterly, monthly, weekly, and daily) and respondents were instructed to use this scale to rate each task.

Section 2. The second major section of the survey consisted of 15 demographic and work experience questions. These included questions on the respondents' work place, experience, job duties, and demographic characteristics as well as how long it took them to complete the survey.

Survey Sample

Evaluation of Original Sample. The original sample was drawn from registered technologists in the ARRT database. The criteria used to construct a population of individuals from which to sample included people who reported working full-time in VI, having less than 10 years of experience, having a job title classified as a staff position, and not being sampled in the most recent practice analysis survey. Ultimately, 5,864 technologists were identified by ARRT staff that satisfied the above criteria. From the population of technologists a stratified random sample of 1,500 was drawn such that 1,000 people had 1 to 5 years of experience and 500 people had 6 to 10 years of experience. The survey sample was stratified based on years of experience with a majority of people having 1 to 5 years of experience because the VI examination is an entry-level exam and people with less experience represent the people typically working at entry level.

Once the sample was determined, the task inventory survey was mailed in January 2016. The initial mailing was followed up by a reminder postcard. Survey respondents could complete the survey by returning the mailed survey or by filling it out online. A total of 398 surveys were returned by February 2016 (allowing 6 weeks for completion), for a response rate of 26.5%. Responses from those returning the survey were screened to assure that the surveys were correctly filled out, the responses were realistic, and the responses were from the intended population. After the complete screening process, a total of 360 surveys were retained for an effective response rate of 24.0%.

Data Analysis

Data were analyzed using a few different strategies. First, the percentage of people reporting that they were responsible (e.g., provided a response of yearly, quarterly, monthly, daily, or weekly) for each task was determined. ARRT's typical guideline for a task to be included in the task inventory is that at least 40% of people report responsibility for the task. Results suggested that out of the 123 job tasks that were surveyed, 110 of the tasks were above the 40% threshold. Next, the percentage of people reporting daily or weekly performance of each of the job tasks was examined. Results suggested that 97 out of the 123 job tasks had over 20% of people reporting daily or weekly performance. It is important to examine daily or weekly performance in conjunction with percentage responsible because tasks with a high daily or weekly performance and low percentage responsible or tasks with high percentage responsible and low daily or weekly performance may require special consideration. Of the 110 tasks above the 40% responsibility threshold only 17 had less than 20% daily or weekly performance. Of the 13 tasks that were below the 40% responsibility threshold there were four tasks with greater than 20% daily or weekly performance. Several of these tasks were the focus of discussion when making final decisions on whether to include the tasks in the final task inventory.

Additional analyses were performed to examine whether there may be important differences in task responsibility based on years of experience or size of the facility. Results suggested that there were not significant differences based on years of experience. There were four tasks that showed significant differences based on size of the facility. The four tasks with differences based on work location were all related to different neurological imaging procedures. All four procedures were above the 40% threshold. These procedures tended to be much more prevalent in facilities that had more than 500 beds. It appears that some of the neurological procedures are much more common at larger facilities. These results were discussed with the Practice Analysis Committee and they confirmed that some facilities do not perform neurological procedures. However, the committee felt that these tasks were an important part of the job duties of an entry-level technologist working in VI and recommended that these tasks be retained on the final task inventory.

CHAPTER 3

CONTENT SPECIFICATIONS AND CLINICAL REQUIREMENTS

Revision of the Task Inventory

The Practice Analysis Committee met in April 2016 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 clinical tasks that were deleted from or added to the task inventory are listed here.

The following tasks surveyed at less than 40% responsible, but were kept on the task inventory because the committee believed the tasks represent entry-level knowledge that is critical for patient safety:

- Monitor and record vital signs.
- Monitor and maintain medical equipment (e.g., IVs, oxygen) used during the procedure.
- Prepare or assist in administering (e.g., obtain medication, fill syringe) the following types of injectable medications according to physician's orders: Analgesics.

The following tasks represent new content and were added to the task inventory because they surveyed at greater than 40% responsible:

- Verify the type, concentration, amount, and expiration date of medications.
- Assess distal pulses pre- and post-procedure.
- In conjunction with physician, select the appropriate contrast agent: Gadolinium.
- Take appropriate precautions to minimize radiation exposure to the patient.
- Document fluoroscopy time.
- Document fluoroscopy dose.
- Take appropriate precautions to minimize occupational radiation exposure.
- Advocate radiation safety and protection.
- Describe the potential risk of radiation exposure when asked.
- Wear a personnel monitoring device while on duty.
- Evaluate individual occupational exposure reports to determine if values for the reporting period are within established limits.
- Assist with the following procedures: Vascular Access Assessment - Arterial access.
- Assist with the following procedures: Vascular Access Assessment - Venous access.
- Assist with the following procedures: Vascular Access Assessment - Vascular patency (e.g., ultrasound, Allen test).
- Assist with the following procedures: Bronchial arteriography.
- Assist with the following procedures: Central venous device check (e.g., port, PICC, hemodialysis catheter).
- Assist with the following procedures: Tunneled drainage catheter placement – Thoracic.
- Assist with the following procedures: Tunneled drainage catheter placement – Abdominal.

The following task that was previously on the task inventory was removed because it surveyed below 40% responsible:

- Prepare or assist in administering (e.g., obtain medication, fill syringe) the following types of injectable medications according to physician's orders: Moderate sedation medications.

The following new task surveyed above 40% responsible, but the committee did not add it to the task inventory because they could not identify any testable content related to the task:

- Determine appropriate procedure code(s) and billing information.

The Board of Trustees approved the final task inventory at the July 2016 board meeting

Content Specifications and Structured Education Requirements

Outline of Topics. 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 in 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. The most notable changes from the previous version of the content specifications are:

- The content was restructured into four major content sections following the universal content outline. The sections are: patient care, safety, image production, and procedures.
- Topics regarding handling and disposal of hazardous materials were added to the Patient Care section.
- Topics regarding moderate sedation (IV) medications and BLS were removed from the Patient Care section.
- Radiation protection topics were added to the Image Production section.
- Reproductive angiography was removed from the list of examinations in the Procedures section since this topic is covered in pelvic angiography.
- Tunneled thoracic and abdominal drainage catheter placement procedures were added to the list of examinations in the Procedures section.

The restructuring of the major content categories impacted the structured education requirements as the content categories of the structured education requirements were also retitled to follow the naming conventions in the universal content outlines. The structured education requirements document was also updated to include the new version of the content specifications.

The Board of Trustees approved the final content specifications document implemented July 2017. The final content specifications can be found at: [Examination Content Specifications | ARRT - The American Registry of Radiologic Technologists](#). The final structured education requirements can be found at: [Structured Education Requirements | ARRT - The American Registry of Radiologic Technologists](#).

Clinical Requirements

The purpose of clinical experience requirements is to verify that candidates have completed a subset of the clinical procedures within a modality. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the certification examination, provides the basis for the acquisition of the full range of clinical skills required in a variety of settings. Thus, when establishing the clinical experience requirements, the Practice Analysis Committee focused on those procedures in the task inventory typically performed by most entry-level technologists. The most notable changes from the previous version of the clinical experience competence requirements are:

- Scrubbing and monitoring were added as examples of primary roles for candidates completing clinical procedures.
- Documentation of current basic life support (BLS) certification with application submission was added as a clinical requirement.
- Genitourinary and gastrointestinal nonvascular catheter/drain exchange and thoracic and abdominal tunneled drainage catheter placement were added to the list of procedures.

The Board of Trustees approved the final clinical requirements document implemented July 2017. The final clinical competency requirements can be found at: [Clinical Experience Requirements | ARRT - The American Registry of Radiologic Technologists](#).

CHAPTER 4

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. The Practice Analysis Committee considered the changes in content to the VI exam, the field of VI, and when the last standard setting was done in VI. The committee noted that there have been large changes in the content and population of candidates taking the VI exam. The committee also noted that the last time that VI had a standard setting performed was in 2002. The committee recommended that standard setting be performed on the VI exam. The Board reviewed this recommendation and decided to perform a standard setting. The standard setting study was conducted in October 2016. The results from the standard setting study were presented to the Board in January 2017 and Board recommended that new cut score be used on the VI exam beginning in July 2017. More information on the VI standard setting can be found at the following location: [ARRT News | ARRT - The American Registry of Radiologic Technologists](#).

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 insure that the content of the exam and the eligibility requirements remain relevant with current practice. This study noted a number of significant changes to the field of VI, and thanks to the efforts of all involved it assures that the ARRT VI exam program will continue to be an excellent assessment of technologists wishing to demonstrate their qualifications by seeking certification and registration.