

Sample Pilot Item and Data

Several patients with the same anatomical thickness are radiographed using identical exposure factors.

The patient whose radiograph is most likely to be underexposed is:

| | % | AVG. SCORE |
|---------------|----|------------|
| A. obese | 15 | 78.5 |
| B. geriatric | 03 | 79.3 |
| C. dehydrated | 02 | 80.4 |
| D. muscular* | 80 | 83.8 |

Sample Interpretation:

- 80% of the group chose the correct answer, D. This question is about average in difficulty.
- Option A attracted most candidates who answered incorrectly (15%). Very few candidates chose B or C.
- Those choosing D had the highest average score on the test, while those choosing other options had lower scores.
- As a whole, this item does a good job of differentiating those who scored well on the exam from those who did less well.
- If it had been found that the average score was higher for A, B, or C than for D, the item would be flagged for careful review.
- Or, if many candidates had selected A, B, or C, the item would be flagged for careful review.

ARRT certifies and registers more than 300,000 radiologic technologists in a range of disciplines:

PRIMARY

Radiography
Nuclear Medicine Technology
Radiation Therapy
Magnetic Resonance Imaging
Sonography

POST-PRIMARY

Mammography
Computed Tomography
Magnetic Resonance Imaging
Quality Management
Bone Densitometry
Cardiac-Interventional Radiography (CI)
Vascular-Interventional Radiography (VI)
Cardiovascular-Interventional Radiography
(test replaced 1/03 with CI and VI)
Sonography
Vascular Sonography
Breast Sonography

PHYSICIAN EXTENDER

Registered Radiologist Assistant



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How ARRT Develops Exams and Assessments

ARRT examinations and Continuing Qualifications Requirements (CQR) assessments are designed to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required for practice within the respective disciplines at entry level.

Developing exams and assessments that are comprehensive, fair, and valid requires attention to numerous details. This brochure summarizes some of the more significant activities.

Over the years, hundreds of professionals have dedicated their talents by serving as committee members and item writers. ARRT remains grateful for their service to the profession.

Committee Appointments

ARRT relies on numerous volunteers during exam and assessment development, and each discipline requires its own committees of experts.

The Board of Trustees appoints two types of committees for exam and assessment development purposes:

- Practice analysis CQR advisory committees develop content specifications and clinical competency (or experience) requirements. Members typically attend four to six meetings within a three year period.
- Examination committees oversee the assembly, review, and evaluation of all exams. Members usually attend one to two meetings per year for a total of four years.

Committees represent a diverse range of interests and experience. Most include an educator, an administrator, a lead technologist, a staff technologist, a medical physicist, and a physician. ARRT Psychometric staff coordinates the committee meetings and an ARRT Trustee may participate.

Practice Analysis

ARRT periodically conducts a practice analysis — a nationwide survey that identifies activities performed in the professional setting — for each discipline to ensure that all certification requirements are up-to-date and related to practice.

Practice analysis results serve as the basis for clinical competency/experience requirements, examination and CQR assessments, and the content specifications.

Clinical requirements list the skills a candidate must demonstrate to establish eligibility for certification. Content specifications indicate the topics to be covered on the exam or assessment, the number of questions allocated to each topic, and reflect the knowledge required to perform the work tasks identified in the survey.

Item Writing

Examinations and assessments consist primarily of multiple-choice questions, also referred to as test items. Although multiple-choice test items have certain limitations (e.g., susceptible to guessing), they have several positive features; for example, they permit an exam to cover many topics in a relatively brief time. They also provide an efficient means for testing large numbers of people.

ARRT contracts with technologists who write test items and submit them for review by the examination committee. Item writers receive training by attending a workshop conducted by ARRT.

For any given discipline, ARRT develops multiple forms of an exam, and each form consists of a different set of test items. This requires a large number of items. ARRT stores test items in a secure computerized database — called an item bank — along with information about each item's historical performance.

New Item Review and Pilot

ARRT examination committees and staff also review and revise test items. They evaluate each item for technical accuracy, relevance to practice, conformance with item-writing guidelines and editorial consistency.

To ensure that new items function as intended, ARRT uses new items on an exam as unscored (pilot) questions. About 10 percent to 20 percent of an exam form is comprised of pilot items, permitting large amounts of data to be collected and analyzed. During actual exams, candidates are given the opportunity to comment on test items, and staff and exam committees review those comments as well.

To assist with evaluation of pilot items, ARRT performs empirical item analysis. A sample test item in the box on the reverse side demonstrates some of the statistics computed and illustrates how those statistics assist with item review. Several other types of diagnostic statistics are also routinely computed and maintained in the item banks.

Exam Form Review Meetings

Although there are different ways to assemble an exam, the process always entails an extensive review. Many examination committees follow this process:

- Draft #1: Building on the content specifications, an exam development coordinator assembles a first draft prior to the committee meeting. On the first day of the meeting, committee members individually evaluate the first draft to verify the accuracy and relevance of each test item, and to consider the item's usage history, past statistics, and any comments from previous examinees. Committee members also review the items in relation to other items to see that they do not give away answers to other items. Staff collects the noted concerns and collates them into a master list. The committee later reviews the list of comments and, as a group, determines what revisions to make to the draft exam.
- Draft #2 and subsequent drafts: Staff incorporates all revisions into another draft of the exam which is again reviewed by the committee, after which changes are finalized and verified.

Production and Administration

Examination committee meetings usually last two to three days. Given that a single form of an exam typically requires eight to 12 hours to review and revise, committees often have time to review two forms during a meeting. Other meeting activities include reviewing new items, evaluating existing items, and reviewing content specifications.

ARRT exams are administered by computer at over 200 test centers across the U.S., as well as Canada, Europe, and Asia. Computer-based testing (CBT) is managed by Pearson/VUE, a company that administers exams for many certification boards and testing companies.

Preparing an exam or assessment for CBT administration generally requires two months of formatting, file conversion, proofing, and software testing before it is finally ready for administration.

For security reasons, multiple forms of an exam are available for administration at any point in time.