

5.10 THE INTERNAL MEDICINE IN-TRAINING EXAMINATION (IM-ITE)

CHAPTER OVERVIEW:

- Become familiar with the development and scoring of IM-ITE.
- Explain the administration of IM-ITE.
- Interpret the type of feedback provided to program directors and residents after completion of IM-ITE.
- Support and counsel a resident who achieves low scores on IM-ITE.

Developed by the American College of Physicians (ACP), and the Alliance for Academic Internal Medicine (AAIM), the Internal Medicine In-Training Examination (IM-ITE) is a well-validated and reliable self-assessment instrument for residents in internal medicine at all levels of training. The examination was first offered in 1988, and it is now administered annually to approximately 98% of internal medicine residents in the United States as well as internal medicine residents in the Bahamas, Canada, the Dominican Republic, Guyana, Iceland, Japan, Kuwait, Lebanon, Mexico, Oman, Qatar, Saudi Arabia, Singapore, and the United Arab Emirates. In 2014, IM-ITE was administered for the first time as a Web-based examination; the paper-and-pencil format is no longer available.

GOALS OF IM-ITE

IM-ITE is a low-stakes examination that allows residents to assess their cognitive knowledge of internal medicine compared with a cohort of their peers. IM-ITE does not assess technical or procedural skills, humanistic qualities, or professionalism. The examination is targeted to post-graduate year (PGY)-2 residents, but most program directors encourage PGY-1 and PGY-3 residents to participate in the exam, both to identify gaps in medical knowledge and to measure their progress from year to year. Practicing physicians who wish to assess their current knowledge base (e.g., in preparation for the American Board of Internal Medicine [ABIM] Recertifying Examination) may also take IM-ITE.

Examination results also allow program directors to evaluate the relative standing of their residents as a group compared with groups of residents from other programs. Program directors may also gain insight into strengths and deficiencies in their programs and identify areas

that may benefit from curricular change. Since 2009, IM-ITE has been used by many residency programs to meet the mandate included in the Accreditation Council for Graduate Medical Education (ACGME) Program Requirements for Graduate Medical Education in Internal Medicine that requires programs to use “an objective validated formative assessment method (e.g., in-service training examination, chart stimulated recall). (V.A.1.b).(1)(b).”

Program directors are encouraged to include IM-ITE results in semiannual reviews of resident performance and reporting on attributes of the Medical Knowledge competency. As part of the Internal Medicine Milestone Project, IM-ITE may contribute to a residency program’s participation in the Next Accreditation System (NAS) to determine the overall progress of residents. IM-ITE is neither a qualifying nor a certifying examination. Results are confidential and may not be viewed by fellowship programs or potential employers. Scores should never be used to assign rewards or penalties, to determine eligibility for fellowship programs or certifying examinations, to establish clinical competency, or to provide data to accrediting and review organizations or licensing bodies.

IM-ITE COMMITTEES

IM-ITE is written by members of a question-writing committee from ACP and AAIM, many of whom are internal medicine residency program directors. In addition to having achieved expertise in general internal medicine, each member is usually a subspecialist in one of the primary content areas tested on the examination. Committee members serve staggered four-year terms to maintain a high level of continuity in the year-to-year development of the examination.

FIGURE. Content Blueprint

Primary Content Area	Percentage
Cardiology	13.5
Endocrinology	6.5
Gastroenterology	9.5
General Internal Medicine	15.0
Geriatrics	6.0
Hematology/Oncology	11.5
Infectious Diseases	9.0
Nephrology	6.0
Neurology	4.0
Pulmonology/Critical Care Medicine	10.0
Rheumatology	9.0

CONTENT OF IM-ITE

IM-ITE consists of 300 single-best-answer, multiple-choice questions. It is a secure, proctored, Web-based examination that takes seven hours to complete (plus an additional two hours for short breaks and lunch) and is divided into six sections of equal length. Test takers must complete the entire examination on the same day.

As with the ABIM Certifying Examination, most of the questions on IM-ITE involve patient-based clinical scenarios that require test takers to use higher-order skills of data synthesis and clinical reasoning rather than simple recall of isolated facts. A minority of questions assess competence in specific areas, such as performing biostatistical calculations or interpreting medical literature. Questions are developed according to a blueprint (Figure).

Each year's IM-ITE includes scored and pretest items. Scored items are from previous web-based examinations and have statistics, and pretest items—which do not count toward an examinee's score—are newly written or banked items without statistics. All tested items are reviewed for performance characteristics and ability to discriminate high-scoring from low-scoring test takers. The most appropriate questions with statistics are available for reuse in subsequent examinations. All questions are reviewed at one of the three annual meetings to ascertain whether they are accurate, relevant, and current. In addition, an ACP senior editor ensures that the questions adhere to rigorous principles of test development.

ADMINISTRATION OF IM-ITE

IM-ITE is offered annually at more than 455 test locations (training sites) for 19 days in August and September. Program directors select the most convenient day or days within this window for test administration. Almost all internal medicine training programs in the United States participate. The number of test takers has increased steadily over the years, from 7,537 in 1988 to 26,047 in 2015.

Program directors are responsible for the security of the testing room, which must be maintained so that accurate scores and norms for evaluating residents and programs can be provided. The web-based examination is transmitted over a secure browser to computers that have been precertified to meet basic technologic and security requirements. IM-ITE is copyrighted intellectual property owned by ACP; duplication of or providing information about questions is strictly forbidden.

SCORING IM-ITE

The National Board of Medical Examiners (NBME) scores and provides psychometric analysis of the results of IM-ITE. Validity and reliability of IM-ITE are very high and are similar to high-stakes certifying examinations.

Statistics for the breakdown of answers chosen for questions are based on the responses of all PGY-2 residents who took the examination that year. A total test score and subtest scores for each of the 11 primary content areas are then developed. Test takers with a high subtest score in one primary content area generally have high subtest scores in all primary content areas.

As anticipated, average scores are consistently higher for residents at higher levels of training. The annual average growth rate experienced on IM-ITE was measured to be 5.1% per year of training (1). For the past several years, scores of international medical school graduates have been similar to those of graduates from US and Canadian medical schools. Mean scores for graduates with MD, DO, MBBS, or other degrees are also similar.

Studies have shown a strong correlation between a test taker's performance on different multiple-choice examinations. For example, performance on the United States Medical Licensure Examination (USMLE) is highly correlated with performance on ABIM Certifying Examination (2). Published results from clusters of internal medicine residency programs have shown that results on IM-ITE are also highly predictive

of results on the ABIM examination (3–6). Specifically, there is a documented association between poor IM-ITE performance (identified as a score of less than or equal to the 35th percentile, and in some studies as low as the 20th percentile) and failure on the ABIM Certifying Examination (3,4).

There is some concern that the relatively small number of questions in a given specialty section may be a limitation to the validity of IM-ITE. Indeed, in some specialties such as neurology, nephrology, and endocrinology, there may be a total of 10 to 18 scored questions. One method of addressing this concern is to ensure that residents take the exam in all three years of training. A resident's consistently strong or poor performance in a given content area over a three-year period is unlikely to be due to chance. Furthermore, it has been shown that a resident's individual specialty scores on IM-ITE significantly correlate with scores in that specialty on the ABIM Certifying Examination (3). In general, however, residents should be counseled about the possibility of falsely low or high scores on individual sections of IM-ITE, and therefore comprehensive preparation when studying for the ABIM examination is imperative.

FEEDBACK TO RESIDENTS AND PROGRAM DIRECTORS

NBME includes various feedback materials in the score reports for program directors and test takers. The reports are delivered via secure, password-protected access on the Internet. IM-ITE's web-based format now allows programs to receive score reports and related materials by mid-October of the testing year and will soon make available individual residents' overall performance (i.e., "raw scores") within approximately one week of the final day of the exam administration window. The most confidential information is available to a program director or designated staff member only if a program-specific username and password are entered at the appropriate website. Less confidential norm tables, histograms, and program performance interpretation guidelines for a program and for residents are included in the same program-specific, password-protected area of the website. Score reports and performance interpretation guidelines for faculty taking the examination are mailed directly to faculty test takers. This report includes total IM-ITE score and subscores for each test taker enrolled in a program (including individuals who tested at other sites and excluding faculty test takers). This roster is available in printable (PDF) and downloadable (ASCII) formats to allow program directors to export data for program-specific analysis.

Each program director's online score report includes:

- » A program roster showing the total percentage of correct scores and percentile ranking for each resident in the training program.
- » Total percentage of correct scores and percentiles for all training programs and for the individual training program.
- » Mean percentage correct scores and percentiles for each primary content category for all training programs and for the individual training program.
- » Mean percentage correct scores and percentiles for the last three IM-ITE examinations.
- » Guidelines for interpreting performance statistics.
- » Educational objectives for each question in the examination, available at a website provided on the test taker score reports.
- » Percentile rankings that allow a program director to compare an individual resident's score with that of all residents who took the current examination.

Program directors distribute test taker score reports to residents after the reports have been made available online. Each resident receives an individual performance report that includes:

- » An individual performance report that includes:
- » Total percentage correct score and percentile rank by PGY level.
- » Mean percentage correct scores and percentiles by primary content area.
- » The educational objectives, but not the actual questions or answers, of items answered incorrectly.
- » Access to the online educational objectives and guidelines for interpreting performance statistics.

PROGRAM DIRECTOR SURVEYS AND RESIDENT QUESTIONNAIRES

ACP collaboratively develops a survey to learn how program directors use IM-ITE results and score reports. Surveys have consistently shown that approximately 95% of program directors find IM-ITE helpful in mentoring and counseling residents and preparing them for the ABIM Certifying Examination. Program directors are also asked about other issues, such as how new duty hours regulation has affected their training programs.

Immediately after taking IM-ITE, residents are asked to complete a brief questionnaire to provide feedback about the examination experience. Each year, questions are included about the length, difficulty, and value of the examination. Residents are asked about other

issues, such as career plans, duty hour regulation, curricular impact, moonlighting, sleep deprivation, and educational debt. These survey results are later reviewed by the question-writing committee. Furthermore, data from these survey results have been used to examine resident perceptions of duty hour changes (7). Overall, residents have consistently reported that IM-ITE is a valuable experience and that examination results help them identify weak areas in their knowledge base.

COUNSELING THE RESIDENT WITH A LOW IM-ITE SCORE

A major challenge for program directors is to offer guidance and remediation for residents who do not perform well on IM-ITE. Although a low score most likely reflects gaps in residents' knowledge base, other factors that can result in a low score should be examined, such as poor test-taking skills. Residents experience high levels of burnout, depression, and substance abuse during training (8,9), and program directors should use a resident's low score on IM-ITE as a reminder to both consider and, if found, help address these issues among their residents.

The program director should also review the resident's performance on other standardized examinations. Specifically, USMLE scores are significantly associated with IM-ITE scores (10). A low score on both USMLE and IM-ITE may indicate that the resident had a poor knowledge base from the start of residency or that he or she has not developed effective test-taking skills. However, if the resident performed acceptably on USMLE, then he or she may have developed inconsistent reading habits during residency. It is also possible that a resident had been able to compensate for poor test-taking skills with studying while in medical school but struggles in residency to find time and motivation for test preparation, given the stress and time constraints. It is also imperative to investigate whether a resident may have been experiencing an extenuating circumstance, such as illness or another life stressor, at the time of IM-ITE.

DEVELOPING A STRUCTURED READING PROGRAM

The program director should help develop a structured reading plan for residents who score poorly on IM-ITE as a whole. First, the resident should be strongly encouraged to review the educational objectives of those questions that he or she answered incorrectly. Another important resource to address knowledge gaps is ACP's Medical Knowledge Self-Assessment Program (MKSAP). Whatever study plan is decided upon, the residents should have regular follow-up

sessions with the program director or faculty mentor to ensure progress. For example, programs have shown that implementation of structured reading plans for residents scoring less than the 35th percentile is associated with 20-point increases in residents' mean percentile score (11). Additionally, clinical rotations that provide knowledge assessments at the beginning and end of the rotation are particularly useful for providing feedback to the resident and program director or faculty mentor. Residents may request time to attend a board review course. Board review courses that combine content with practice review questions provide an optimal learning model. Although it is likely to be beneficial to most residents, they must understand that such a course cannot substitute for a consistent reading program.

IMPROVING TEST-TAKING SKILLS

The program director or faculty mentor should also be encouraged to direct residents toward resources to improve test-taking skills. Many institutions have local test-taking experts who can help identify a resident's individual deficits and strategize a learner-centered plan for skill development. If a learning disability is suspected, then the resident should be referred for formal evaluation with a neuropsychologist. At a minimum, faculty mentors should encourage all residents who score poorly to approach questions in a logical, widely validated manner:

1. Read the clinical scenario (the "stem" of the question).
2. Read the question line at the end of the clinical scenario (understand what the question is asking).
3. Select an answer before reading the answer choices, if possible.
4. Read the choices and select the answer that provides the best fit.

Although helping residents to implement a structured reading program will often be the most high-yield intervention, IM-ITE results can help program directors have an enormous impact on residents' futures if poor test-taking is identified and successfully remediated.

UTILIZING IM-ITE RESULTS TO GUIDE CURRICULAR CHANGE

There are currently no published data addressing whether programs have formally used IM-ITE results to enact curricular change. Yet IM-ITE does offer program directors significant insight into the medical knowledge of their residents as a cohort. These results

can be viewed as an opportunity to improve aspects of a curriculum that may not be meeting goals, in part by increasing collaboration with those subspecialists invested in residency education. For example, programs directors can increase the number of structured didactics in a certain content area, develop web-based modules that residents may be required to complete, and work closely with members of their subspecialty education coordinator's office to increase the quality and frequency of teaching opportunities in both required and elective subspecialty rotations.

CONCLUSION

Although IM-ITE has been offered for 27 years, examination development is not a static process. The blueprint is revised as needed and question formats are changed in accordance with changes on USMLE and certifying examination. Overall, IM-ITE is a well validated and widely utilized tool for internal medicine resident self-assessment, and for program directors to gauge the strengths and weaknesses of both individual residents and their program as a whole. IM-ITE has gained international acceptance as a valuable asset to internal medicine training programs.

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