



NBMESM

National Board of Medical Examiners

**Subject
Examination
Program**

Information Guide

<http://www.nbme.org>

Table of Contents

| | |
|--|----|
| Mission of the Program | 3 |
| Subject Examination Program Goals | 3 |
| Policy on Use of Subject Examinations | 3 |
| Regulations for Use | 3 |
| Security of Subject Examinations | 4 |
| Description of Subject Examinations | 4 |
| Basic Science Disciplines | 4 |
| Clinical Science Disciplines | 5 |
| Introduction to Clinical Diagnosis | 5 |
| Comprehensive Examinations | 5 |
| Item Formats | 5 |
| Subject Examination Services Ordering | 5 |
| Placing New Orders | 5 |
| Revising Existing Orders | 6 |
| Canceling Existing Orders | 6 |
| Rush Score Reporting | 6 |
| Access to the Online Ordering System | 6 |
| ECP Designees | 6 |
| Department Users | 6 |
| Subject Examination Services Payment Procedures | 6 |
| Billing Accounts | 6 |
| Payment Options | 6 |
| Administering Subject Examinations | 7 |
| Examinees with Disabilities | 7 |
| Arranging for Enlarged-Print Examinations | 7 |
| Arranging for an Audio Version of a Subject Examination | 8 |
| Web-Based Score and Analytical Reports | 8 |
| Roster of Scores | 8 |
| Frequency Distribution of Scores | 8 |
| Norms for Examinee Performance | 9 |
| Keyword Phrase Item Analysis | 9 |
| Grading Guidelines for the Clinical Science Subject Examinations | 9 |
| Score Conversion Tables for the Basic Science Subject Examinations | 9 |
| USMLE Equivalentents for the Comprehensive Examinations | 9 |
| Performance Profiles for the Comprehensive Examinations | 9 |
| Year-End Reports | 10 |
| Agreement Analysis for Irregular Testing Behavior | 10 |
| Score Recheck Service | 10 |
| Research | 11 |
| Faculty Review of Subject Examinations | 11 |

This guide provides general information about the Subject Examination Program offered by the National Board of Medical Examiners (NBME®).

If you need additional information or have questions, please contact the Office of Medical School Services at (215) 590-9259.

Mission of the Program

The primary mission of the NBME Subject Examination Program is to serve medical education by providing high-quality assessment tools as well as information and assistance to medical educators. NBME subject examinations are achievement tests in a broad sense, requiring medical students to solve scientific and clinical problems. Although students' performance on the examinations will reflect the learning specific to their course and clerkship experiences, their test scores will also reflect educational development resulting from their overall medical school experiences. These examinations are constructed to be appropriate for a broad range of curricular approaches.

NBME subject examinations have at least four distinct advantages over locally constructed examinations in the assessment of student achievement. First, the examinations provide national norms and relevant descriptive information. Second, considerable care is taken in preparing these materials, with items selected only after extensive review and pretesting. Third, these examinations concentrate heavily on application and integration of knowledge rather than recall of isolated facts. Finally, they attain better accuracy of measurement.

NBME subject examinations are intended to complement other sources of information about the educational progress of medical students. The examination results should be interpreted in light of other available information. Likewise, curriculum evaluation cannot be based on examination results alone. The quality of teaching can and should be evaluated by frequent peer observation and student feedback, not inferred solely from the level of test scores. Medical school faculty and administration should not view the results of NBME subject examinations as the beginning and end of evaluation.

Subject Examination Program Goals

Our multifaceted program goals are:

- to provide high-quality assessments that are efficient and cost effective
- to provide new forms of assessment that promote improvements in learning and instruction
- to conduct and disseminate research that informs medical school faculty and policymakers and promotes their understanding of assessment
- to provide information on student educational accomplishments to help advance educational improvement and equity
- to furnish support services for a range of assessment and educational programs

Policy on Use of Subject Examinations

The NBME provides subject examinations in the basic and clinical sciences for the purpose of assessing the educational achievement of individuals in specific subject areas. These examinations may be provided to medical schools and other institutions with a legitimate interest in the education of physicians or other health professionals. All institutions using these examinations must comply with test administration standards, including security provisions.

Subject examinations are primarily designed for use as final examinations after courses, clerkships, or other units of instruction. Scores achieved on NBME subject examinations *cannot* be used by examinees for credit toward the examination requirements for medical licensure in the United States.

Regulations for Use

At each medical school, an Executive Chief Proctor (ECP) is nominated by the dean and approved by the NBME to coordinate the Subject Examination Program.

Security of Subject Examinations

To ensure the integrity of the NBME Subject Examination Program and the validity of the scores reported, it is essential that test materials be kept confidential and secure at all times.

The ECP has institutional responsibility for the security of all subject examinations while the examinations are at the medical school. The ECP is responsible for maintaining the security of all subject examination test material from the date of receipt to the date of return to the NBME. If subject examinations are administered at locations other than the main campus, the ECP must designate an Associate Executive Chief Proctor to receive and return the test materials for each location.

To maintain the security of the test materials, specific procedures for test administration have been established by the NBME. Individuals authorized to have custody of subject examinations (the ECP, AECP or department staff authorized to administer the tests) are expected to be familiar with NBME regulations governing use of this material and to abide by and enforce these regulations. These are provided in the *Test Administration Handbook* and the *Chief Proctor's Manual*. The Test Administration Handbook is a general guide of best practices for administration of NBME subject examinations and can be found on the NBME website. A *Chief Manual Proctor's* is included with each shipment of test materials. The examinations must be administered in accordance with the procedures in both publications.

For security reasons, subject examination administrations should take place on the date originally requested and acknowledged by the NBME. Test books should not be held for delayed administration to students who could not be tested on the scheduled date. This practice only increases the risk of a breach in the security of the test materials and could compromise the validity of scores reported for the delayed administration.

While your institution may allow students to retain test materials from faculty-developed examinations, your students should understand that this is *not* the case with NBME subject examinations. Test books must be collected from every examinee

at the conclusion of each test administration.

All of the test items used in NBME subject examinations are owned and copyrighted by the NBME. Any reproduction of these materials or any part of them, through means including, but not limited to, photocopying, dictation, or reconstruction through memorization, and/or dissemination of these materials or any part of them is strictly prohibited. This statement also appears in the Examinee Acknowledgment Statement on the top portion of the answer sheet and must be signed by every examinee prior to beginning the test. Any unsigned statements will cause a delay in reporting scores.

Appropriate action, which may include institution of legal proceedings, will be taken when copyright infringement occurs. In addition, use of subject examination services may be discontinued for a medical school if there is any indication that there has been a breach in the security of the test material.

Description of Subject Examinations

Subject Examinations are currently available in the following areas:

Basic Science Disciplines

Behavioral Sciences (2 hrs 30 min)

Biochemistry (2 hrs 30 min)

*Gross Anatomy (2 hrs 30 min)

Embryology (2 hrs 55 min)

Embryology and Human Developmental

Biology (3 hrs)

Histology and Cell Biology (2 hrs 30 min)

*Microbiology (2 hrs 30 min)

Immunology (3 hrs)

*Neuroscience (2 hrs 30 min)

Neuropathology (3 hrs)

Psychopathology/Psychopharmacology (3 hrs)

Neuroscience plus both modules (3 hrs 30 min)

Pathology (2 hrs 30 min)

Pharmacology (2 hrs 30 min)

*Physiology (2 hrs 30 min)

Neurophysiology (3 hrs)

* Denotes modular examination, which may be administered with or without the module(s) listed below it.

Clinical Science Disciplines

Clinical Neurology (2 hrs 10 min)

Family Medicine (2 hrs 10 min)

Medicine (2 hrs 10 min)

Obstetrics and Gynecology (2 hrs 10 min)

Pediatrics (2 hrs 10 min)

Psychiatry (2 hrs 10 min)

Surgery (2 hrs 10 min)

Introduction to Clinical Diagnosis

(2 hrs 30 min)

Comprehensive Examinations

Basic Science (4 hrs)

Clinical Science (4 hrs)

The *Basic Science Discipline-Based Examinations* are designed to be administered in two and one-half hours, with the exception of the additional modules listed with the modular examinations. These examinations are designed to be administered at the end of a course or unit of instruction.

The *Clinical Science Discipline-Based Examinations* are two-hour and ten minute examinations to be administered at the end of the clerkship or unit of instruction.

The *Introduction to Clinical Diagnosis Examination* is a two and one-half hour examination designed to assess student performance at the end of history-taking and physical diagnosis courses.

The *Comprehensive Basic Science Examination* and the *Comprehensive Clinical Science Examination* are four-hour examinations. These examinations are achievement tests covering material typically learned during basic science education and core clinical clerkships. They reflect the content of the United States Medical Licensing Examination™ (USMLE™) Step 1 and Step 2 Clinical Knowledge (CK), respectively.

Item Formats

One-best-answer item formats are used on all examinations. One-best-answer (A-type) questions make explicit the number of options to be selected and are the most widely used multiple-choice-item format. Each item consists of a focused item-stem (e.g., a clinical vignette) and a

lead-in question, followed by a series of options with one correct answer for each item.

Extended-matching (R-Type) items are also used in the Clinical Science Examinations and in the Comprehensive Clinical Science Examination. Extended-matching items are organized into sets that use one list of options for all items in the set. Examinees are instructed to select the one best answer.

In keeping with USMLE practice, test designers have increased emphasis on application of knowledge rather than recall of isolated facts. Clinical science items are framed in the context of clinical vignettes, and this is increasingly true for the basic science disciplines.

Subject examination outlines developed by NBME committees of content experts are used to construct each test. Items are selected from item pools based on content and performance statistics. The final form of each examination is reviewed and approved by the appropriate committee chair prior to release. Multiple forms of each examination are typically available at any time so that alternate forms may be used for successive courses and clerkships.

Subject Examination Services Ordering

Subject examination services are requested through a web-based ordering system. The system allows the user to enter order information, select one of four different payment methods, review the status of orders and receive e-mail notifications at specific points during the ordering cycle. Orders can be placed only by the ECP or individuals authorized by the ECP.

Placing New Orders

New orders must be submitted at least 22 calendar days prior to the test date to allow sufficient time to process the order and ship the test material. Orders may be placed through the system 15-21 days prior to the test date, but will incur an expedited order fee. Orders cannot be placed online within 14 days of the test date - the NBME must be contacted at subjectexams@nbme.org or

(215) 590-9258 to determine if the late request can be accommodated. *New order requests within five calendar days of the test date cannot be honored.*

The following fee services are available through the online ordering process:

- subject examination test books for administration
- enlarged print test books for examinees with visual impairments
- 48-hour score reporting service

Subject examinations are primarily used as an end-of-course or end-of-clerkship assessment, but may also be used as “make-up” exams. A limited number of versions of each examination are available for this purpose. When ordering a make-up exam, indicate the examinee’s previous test date(s) so that the NBME can assign an alternate form if available.

Revising Existing Orders

The system provides the ability to view and change existing orders. Orders will “lock” 21 calendar days prior to the test date. Changes may be made at any time prior to the lock date. An e-mail “lock warning” will be sent three business days prior to the lock date to prompt the user to make changes if necessary.

Canceling Existing Orders

Orders can be canceled in the system at any time prior to the lock date. After that time, the NBME must be contacted to process the cancellation. An expedited order fee will be assessed for orders canceled after the lock date. If the test material has been shipped and received by the ECP, it must be returned to the NBME immediately according to the instructions provided in the *Chief Proctor’s Manual*.

Rush Score Reporting

The NBME can provide score reports within two business days after receipt of the answer sheets.

Access to the Online Ordering System

The ECP authorizes two levels of users to access the NBME Online Ordering System.

ECP Designees

The ECP may designate up to two individuals to have the same access privileges as the ECP. Users at this level may enter new orders, edit existing orders, view the status of all orders submitted by the institution, and add/edit/delete department users.

Department Users

The ECP or ECP Designee has the option to also authorize up to two individuals for each department using subject examinations. Users at this level may enter orders, edit existing orders and view the status of orders submitted for that department only.

Subject Examination Services Payment Procedures

Billing Accounts

The NBME requires that accounts be set up for the purpose of applying fees received, and for computing any credit or payment due after scores have been reported.

There are two types of accounts: an institutional or “ECP Account”, which is required, and “department accounts”, which are optional. Typically these accounts reflect funding sources at an institution. Accounts carry credits only, which may be used as payment for new orders. No refunds are provided.

Payment Options

Payment for examination services may be made by:

- Credit card (Visa or MasterCard only)
- Check or money order
- Wire transfer
- School credit account

Users must select a payment option during the order entry process. The system will generate an Order ID and printable order confirmation which

may be used to support institutional requirements for financial transactions. Payment must be in US currency only. Checks and/or money orders from students will not be accepted. *Prepayment is required.*

Administering Subject Examinations

Test materials are shipped to the ECP or to the AECF to arrive several days prior to the scheduled test date. Upon receipt of a shipment, the ECP, AECF or designated staff should open the box (es) as soon as possible to verify that the shipment is complete and then reseal and store the materials in a secure location until the test date.

The NBME must be notified immediately if a discrepancy in the number of test books is found at any time before, during, or after test administration or if any breach in security is suspected.

The ECP/AECF may personally direct the test administration or release the examinations to the department for administration. The ECP/AECF must assure that department staff administers the examination according to the procedures specified in the *Test Administration Handbook* and the *Chief Proctor's Manual*.

The *Chief Proctor's Manual* included with each shipment provides the information necessary to administer a subject examination according to standardized procedures that will maintain security, and ensure that all examinees have the same opportunity to demonstrate their understanding of the topics covered by the examination. Strict compliance with these instructions is required.

Test books are to be opened only by the examinee at the time of the administration. Faculty is not permitted to review used or unopened test books. An answer sheet is enclosed in each test book. Examinees must grid their name, social security number, birth date, and test book number on the answer sheet. This information is needed to ensure accurate score reporting and to provide data for psychometric analyses. They must also sign the *Examinee Acknowledgement Statement* at the top of the answer sheet. Any unsigned statements will cause a delay in reporting scores.

Examinees with Disabilities

The American with Disabilities Act (ADA) mandates that accommodations be provided for testing examinees with disabilities. Because subject examinations are administered by a school for intramural assessment, the institution must develop its own protocol for evaluating requests for accommodations and for providing accommodations to students qualified under the ADA.

These accommodations vary widely. Those most commonly requested are enlarged-print test books, use of a reader, audio version of the test book, and increased testing time (most commonly double time). Any examinee granted accommodations should be tested in a separate room with a dedicated proctor.

The provision of accommodations always poses concerns about unauthorized access to test materials. The institution must make arrangements to ensure the security of the examination and the integrity of the testing process. Please note that the administration of an examination with accommodations may raise questions about the comparability of the scores to those received by students tested under standard conditions.

Under the ADA, the costs associated with providing test accommodations are the responsibility of the institution and cannot be passed onto the examinee.

The ECP should contact the Office of Testing Services for Subject Examinations at (215) 590-9718 for consultation and information regarding accommodations for testing examinees with disabilities.

Arranging for Enlarged-Print Examinations

The request for an enlarged-print test book should be made at the time the order is placed. The request can be made through the online ordering system.

The enlarged-print test book will be shrink-wrapped with a regular test book (to be used for interpretation of pictorial items) and shipped to the ECP separately.

There is a separate fee for each enlarged-print test book produced by the NBME. This fee is *in addition* to the fee for the examinee.

Arranging for an Audio Version of a Subject Examination

The request for an audio version of a subject examination should be made at the time the order is placed. The request should be noted in the comments section of the online order. Two test books will be sent to the school; one for the person doing the oral rendering and one for the student. The school must follow the Protocol for Oral Rendering of Subject Examinations as set forth by the NBME. The person selected to record and/or read the subject examination must sign a non-disclosure form. The audio version of the subject examination (e.g., tape or CD) must be returned to the NBME immediately after the examination.

Web-Based Score and Analytical Reports

Medical schools and other institutions that use subject examinations are able to download scores and analytical reports. The schools have direct access to the scores and reports on the *NBME Medical School Resource Site*, which assists schools in processing and disseminating scores and reports to faculty and departments. Access is restricted to a maximum of three individuals at each medical school. Score reports are posted twice daily, Monday through Friday. The NBME provides analytic reports for the Subject Examination Program to support the educational assessment needs of medical schools.

Score reports and the analytical reports provided for each test administration are usually posted within five business days after the NBME receives the completed answer sheets. However, during peak scoring periods (May through June and December through January), the reporting time may be extended. If this will not allow you to meet grading deadlines, the NBME offers a 48-hour score reporting service for an additional fee. *This service must be requested in advance through the online order.* You will be given specific instructions for the return of answer sheets and score reports will be posted within two business days of receipt of the answer sheets.

Subject examination scores will not be faxed or reported by telephone. Score reports will not be posted until payment has been received.

Score reports for a specific academic year remain on the website for approximately three years. Users will be notified about a month in advance before information is removed to allow time for final download of reports, if necessary.

NBME Subject Examination Program score and analytical reports include the following:

Roster of Scores

An alphabetic roster of examinees with corresponding scores along with the number of examinees tested and the number of items scored is provided for each test administration. If at least two examinees were tested, summary information, including the mean score, standard deviation, and the highest and lowest scores for the examinees tested is also provided. Information on measurement error, which is present on all tests, is also provided in the form of the standard error of measurement, an index of the (im)precision of scores.

Subject Examination scores are provided on a scale that has been developed individually for each test and are statistically equated across test administrations to a common score scale. Scores are statistically adjusted for shifts in test difficulty and consequently, can be used to track school and student performance over time. For the basic science disciplines, the subject examination score is scaled to have a *mean of 500 and a standard deviation of 100* for a specific group of first-time takers who took the examination as an end-of-course or end-of-year assessment. For the clinical science disciplines, the subject examination scores are scaled to have a *mean of 70 and a standard deviation of 8* for a specific group of first-time takers who took the examination as an end-of-clerkship examination. *It is important to note that although the subject examination scores for the clinical science examinations have the "look and feel" of percent-correct scores, they are not.*

Frequency Distribution of Scores

If two or more students were tested, a frequency distribution is provided. The distribution shows the number and percent of students at each score

level together with the cumulative frequency and percent.

Norms for Examinee Performance

Norms are provided to help aid in the interpretation of student performance. These norms enable you to compare your students' performance with a nationally representative group of students at the same stage of training. Norms for the basic science examinations are based on the performance of students who took the subject test for the first time as an end-of-course assessment over several academic years. Scores in certain clinical science exams are progressively higher for students of ability who take the relevant rotation later in the academic year. Therefore, total year and quarterly national norms are provided for the two most recent academic years for the clinical science examinations. These norms are based on the performance of students who took the subject test for the first time as a final clerkship examination across an entire academic year. Norms for the clinical science examinations are updated yearly.

Keyword Phrase Item Analysis

A keyword phrase item analysis report is available for any subject test with 10 or more examinees. This report provides a keyword phrase describing the content of each item on the examination along with the percentage of examinees from your school and the projected percentage of norm group examinees nationally that answered each item correctly. The report is sorted from easy to difficult items according to the percentage of examinees at your school answering the item correctly. Item analysis data and keyword phrase descriptors of the items, when reviewed together, provide an opportunity to study the extent to which examinees know the content of individual items.

Keyword phrase item analysis reports are considered confidential and overall responsibility for maintaining confidentiality resides with the ECP.

These reports are provided for institutional use in assessing the performance of examinees. The written authorization of the NBME must be obtained prior to any additional use of the data (e.g., in research papers).

Grading Guidelines for the Clinical Science Subject Examinations

The NBME provides schools that administer the clinical science subject examinations with guidelines for analyzing student performance. These guidelines assist clerkship directors in determining passing and honor grades for their students. Periodically, the NBME facilitates a review of the guidelines with faculty members and updates them to assure their continued appropriateness. Grading guidelines for the clinical science subject examinations are included with the score reports.

Score Conversion Tables for the Basic Science Subject Examinations

In response to faculty requests, the NBME provides tables for converting standard scores to percent-correct scores for the basic science subject examination through their secured website. The NBME generates standard scores for basic science subject examinations with a mean of 500 and a standard deviation of 100. *Standard scores continue to be the primary score scale for these examinations.* Standard scores provide a consistent way to measure performance on multiple exam forms administered at the same or different times. All exam performance is equated to a common standard score scale. These equating practices and use of the standard score ensure that all scores have the same meaning even though the exams may differ in difficulty. *Percent-correct scores, by themselves, can be misleading,* especially when used to compare performance across time or different exam forms. Only standard scores are interchangeable for these purposes.

USMLE Equivalents for the Comprehensive Examinations

The NBME Score Reports for the comprehensive examinations provide approximate performance equivalents for the USMLE Step 1 and Step 2 CK Examinations. Subject Examination Scores on the Comprehensive Basic Science and Comprehensive Clinical Science Examinations can be translated to the scale used for USMLE Step 1 and Step 2 CK.

Performance Profiles for the Comprehensive Examinations

The NBME provides medical schools with school summary and individual performance profiles for the Comprehensive Basic Science and

Comprehensive Clinical Science Examinations. For each content area on the examination, feedback is given in the form of a performance band along with a defined area indicating borderline level of performance. Borderline performance is comparable to a HIGH FAIL/LOW PASS on the total test of the associated USMLE Step 1 or Step 2 CK examination.

Medical schools receive a school summary performance profile which is an aggregate report on student performance for the major content areas of the Comprehensive Examinations. This report is provided to schools when the examination is administered to 10 or more students. Individual performance profiles are provided to medical schools to distribute to their students as an aid in self-assessment and is similar to the score reports that students receive for USMLE Step 1 and Step 2 CK.

Year-End Reports

Medical schools are provided with year-end reports containing information on performance for the major content categories in each clinical science subject exam. These reports are posted in November and are available on the *NBME Medical School Resource Site*. Summary performance information is included for all examinees from the current academic year.

National norms are provided for each quarter as well as the entire academic year. The report also provides information regarding the performance of comparison group examinees by the most common clerkship lengths among the students taking the test. This information is helpful in evaluation of curriculum and other relevant educational issues.

Agreement Analysis for Irregular Testing Behavior

Medical schools can request that an agreement analysis be conducted for a pair(s) of examinees suspected of irregular testing behavior, such as copying or collaboration. Agreement analysis is a statistical tool that can provide helpful, supporting information for the investigation of observed behaviors that may compromise the validity of examinees' test scores. The agreement analysis

compares the degree of agreement that is observed between the incorrect responses of two examinees (pair) with the degree of agreement that would be expected to occur between two randomly chosen examinees taking the same test independently. Agreement Analysis uses only those test items that both examinees in the pair answered incorrectly.

When the NBME carries out these analyses at the request of a medical school, it is with the understanding that any actions taken by the medical school on the basis of the results of the statistical analyses are completely the responsibility of the medical school. Caution is advised when interpreting the results of these analyses, since there is always some probability that the observed agreement did in fact occur by chance.

Score Recheck Service

The NBME is confident that each reported subject test score is an accurate reflection of the responses that an examinee marked on the answer sheet. This is based on reliable scoring and reporting techniques backed by a variety of quality control and verification procedures. However, if you believe a score is in error, you may request manual scoring of the answer sheet.

Requests for score rechecks must be initiated by the medical school, either by the ECP or appropriate staff in the department (e.g., course or clerkship director) administering the test. Examinees must direct requests for score rechecks through these individuals. A Score Recheck Request Form is available to download from the NBME website www.nbme.org. The fee for each score recheck is \$25. *Since the Subject Examination Program is a service provided to the medical school, the NBME will only accept checks or money orders from the medical schools. Requests will not be processed if the check or money order is provided by the student.* Results are mailed approximately two weeks after receipt of the request.

It should be noted that the sole purpose of the score recheck service is to verify that the score originally reported is correct. Score rechecks *cannot* be requested to investigate the possibility that

an examinee may have recorded responses out of sequence. Subject test answer sheets are retained for six months after their receipt by the NBME. Score recheck requests received after that time cannot be accommodated.

Research

Faculty may use performance data for curricular evaluation and medical education research. For information contact Agata Butler, PhD, Associate Vice President of Medical School Services at (215) 590-9259.

Faculty Review of Subject Examinations

Subject exams are available for review by faculty who want to determine if an examination is appropriate for use.

For information on how to arrange for a faculty review session, call (215) 590-9259 or e-mail the NBME at medicalschoolservices@nbme.org.