



NATIONAL BOARD OF MEDICAL EXAMINERS® Subject Examination Program

Advanced Clinical Examination

Score Interpretation Guide

NBME® Advanced Clinical examinations provide medical schools with a tool for measuring examinees' understanding of the clinical sciences. Items on this examination were written and reviewed by national test committees. Prior to publication, test forms are reviewed by a panel of course directors from this discipline. Although these examinations are designed to be broadly appropriate as part of overall examinee assessment, course objectives vary across schools, and the congruence between subject examination content and course objectives should be considered when interpreting test scores and determining grading standards. Specifically, subject examination scores should not be used alone, but rather in conjunction with other indicators of examinee performance in determination of grades.

Subject Examination Scores

The subject examination score is scaled to have a mean of 70 and a standard deviation of 8 for a group of 1,070 fourth-year first-time taker examinees from 40 LCME-accredited medical schools who took the Emergency Medicine Advanced Clinical Examination during 2013. As a result, the vast majority of scores range from 45 to 95, and although the scores have the “look and feel” of percent-correct scores, they are not. The subject examination scores are statistically equated across test administrations and are statistically adjusted for shifts in test difficulty. Consequently, these scores can be used to track school and examinee performance over time.

This scale provides a useful tool for comparing the scores of your examinees with those of a large, nationally representative group taking the examination as an end-of-course or end-of-clerkship examination.

Precision of Scores

Measurement error is present on all tests, and the standard error of measurement (SEM) provides an index of the (im)precision of scores. The SEM indicates how far an examinee's score on the examination might stray from his/her “true” proficiency level across repeated testing using different sets of items covering the same content. Using the SEM, it is possible to calculate a score interval that will encompass about two thirds of the observed scores for a given true score by adding and subtracting the SEM from that score. For this examination, the SEM is approximately 4 points. If an examinee's true proficiency on the examination is 60, the score he/she achieved on the examination will usually (two times out of three) fall between 56 and 64 ($60 - 4$ and $60 + 4$).

Score and Performance Feedback

Summary information on the examinee group tested, examination purpose and number of items scored is provided on each page of the feedback. The *Roster of Scaled Scores* reports a total test scaled score for each examinee. Reported scores also appear in a comma separated text file that can be downloaded. An *Examinee Performance Profile*, which graphically displays content areas of strength and weakness, is provided for each examinee.

If there were at least 2 examinees, *Scaled Score Descriptive Statistics* for reported scores are provided along with a *Frequency Distribution* of the total test scaled score. If there were at least 10 examinees for a single form administration, a detailed *Content Area Item Analysis Report* summarizing the general content of each item on the exam along with group item performance is provided. Content area item descriptors and group item performance also appear in a file that can be downloaded. If there were at least 10 examinees for a single form administration or 20 examinees for a multiple form administration, a *Summary Content Area Item Analysis Report* is provided.

If examinees were tested at your school in the previous academic year, a *Year-End Report* is provided. The report summarizes the performance of first-time takers and is posted annually in November to the *NBME Services Portal (NSP)*.

Grading Guidelines

Grading guidelines for this exam have been developed by a nationally representative group of clerkship directors to assist schools and institutions in setting fair and valid passing and honors standards for students taking this exam. An abbreviated summary of the grading guidelines is provided and the full study with a list of participating schools is reported on NSP.



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Norms

Norms are provided to help aid in the interpretation of examinee performance. The norms reflect the performance of first-time taker examinees who took a form of this examination. The most recent sets of norms that have been developed for this examination are provided for your convenience. If sufficient data is available, norms will be updated after the end of the reported academic year (June 1st - May 31st) to reflect the most recent year of data. Norms can also be found on NSP.

Advanced Clinical Examination
Grading Guidelines
(Reported as a Scaled Score)

In 2015, the NBME conducted a webcast standard setting study for the Emergency Medicine Advanced Clinical Examination (ACE) with medical school faculty from across the United States. For the study, medical school faculty who were past or present clerkship directors (100%) in Emergency Medicine participated as expert judges in webcast sessions that utilized the internet and conference calling to train participants in the standard setting procedure. Judges reviewed the content and rated the difficulty of each item on a current form of the examination. The study employed both a Modified Angoff content-based procedure and the Hofstee Compromise standard setting method. These two procedures together provide proposed passing standards that are based on an in-depth item-by-item analysis of the examination content, as well as, a more global analysis of the content. The results were summarized for the examination components administered and the proposed standards were expressed as the proportion of the content required for a candidate to pass and to receive honors status. Table 1 provides a summary of the medical school faculty who served as expert judges and their school information for the webcast study conducted by the NBME.

Table 1 – Demographics of Expert Judges and Schools Participating in the Webcast Study

Standard Setting Study	Number of Judges	Years of Experience	Number of Schools	Use CDEM National Curriculum	Pre-clinical School Curriculum		School Clerkship Length
					Traditional	Integrated	
2015	27	1 – 20	27	92%	23%	54%	2 - 4 weeks

The data shown below represent a compilation of the opinions of the medical school faculty who participated in the webcast studies. Although the study results were computed on a percent correct score scale, the results reported below have been converted to the subject exam score scale reported on the *Roster of Scaled Scores*, with a mean of 70 and a standard deviation of 8 for the scaling group. This scale is used because it is an equated score; scores from one form of the test are comparable to scores on other forms of the test. The study results are provided to assist you in setting fair and valid standards for this examination.

Table 2 provides a summary of the results for passing scores from the Modified Angoff and Hofstee Compromise procedures. The recommended minimum passing score based on the Angoff results is a scaled score of 57. This score fell well within the acceptable range of minimum passing scores (53 to 62) computed from the Hofstee results, which suggest that any standard selected within this range would be reasonable. The recommended minimum passing score based on the Hofstee results is a subject exam score of 59.

Table 2 – Grading Guidelines for Passing (Mean Scaled Scores)

Standard Setting Study	Number of Judges	Modified Angoff	Hofstee Compromise	
		Recommended Passing Score	Range of Acceptable Minimum Passing Scores	Recommended Passing Score
2015	27	57	53 to 62	59

Table 3 provides a summary of the Hofstee results for honors. The study results indicate that the minimum acceptable score for honors should fall between a score of 74 and 91.

Table 3 – Grading Guidelines for Honors (Mean Scaled Scores)

Standard Setting Study	Number of Judges	Hofstee Compromise
		Range of Acceptable Minimum Honors Scores
2015	27	74 to 91



NATIONAL BOARD OF MEDICAL EXAMINERS®
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Advanced Clinical Examination
YYY1-YYY2 Academic Year Norms

The table below provides norms to aid in the interpretation of examinee performance. These norms enable you to compare your examinees' scores with the performance of a nationally representative group of examinees taking the examination at a similar stage of training. The norms reflect the performance of fourth-year students from LCME-accredited medical schools who took this examination for the first time as an end-of-course examination during the 2013-2014 academic year. The academic year is defined for this exam as test dates between June 1st and May 31st.

The sample size (N), mean, standard deviation (SD), and standard error of measurement (SEM) of the norm group for each examination score computed are listed below.

Examination	N	Mean	SD	SEM
Advanced Clinical Examination	3,066	68.2	8.4	4

To use the norm table, locate an examinee's score in the column labeled "Score" and note the entry in the adjacent column labeled "Percentile Ranks". For example, if an examinee's score is 70, the corresponding percentile rank entry of 61 indicates that 61% of the national group of examinees taking the examination as a final clerkship examination had scores at or below 70.

Percentile Rank			
Score	(N=3,066)	Score	(N=3,066)
93 or above	100	73	75
92	100	72	70
91	100	71	66
90	100	70	61
89	100	69	55
88	99	68	51
87	99	67	46
86	98	66	41
85	98	65	37
84	97	64	33
83	97	63	29
82	96	62	22
81	94	61	20
80	94	60	17
79	92	59	14
78	89	58	10
77	86	57	9
76	86	56	7
75	83	55	6
74	79	54 and below	4



Advanced Clinical Examination

YYY2-YYY3 Academic Year Norms

The table provides norms to aid in the interpretation of examinee performance. These norms enable you to compare your examinees' scores with the performance of a nationally representative group of examinees taking the examination for the first time at a similar stage of training.

These norms reflect the performance of students from LCME-accredited medical schools who took this examination for the first-time as an end-of-course or end-of-clerkship examination during the academic year. The academic year is defined for this exam as test dates between June 1st and May 31st.

To use the table, locate an examinee's score in the column labeled "Scaled Score" and note the entry in the adjacent column labeled "Percentile Ranks" for the examinee group of interest. This number indicates the percentage of examinees that scored at or below the examinee's scaled score.

The mean and standard deviation of the scores for each norm group reported are listed below.

	Scaled Scores	
	Third Year Students	Fourth Year Students
N	580	3,770
Mean	65.1	70.9
SD	8.8	7.7

Scaled Score	Percentile Ranks	
	Third Year Students (n=580)	Fourth Year Students (n=3,770)
93 or above	100	100
92	100	100
91	100	100
90	100	99
89	100	99
88	100	98
87	100	98
86	99	97
85	99	97
84	99	95
83	98	95
82	97	93
81	96	90
80	96	90
79	95	88
78	93	84
77	90	80
76	90	79
75	87	75
74	85	70
73	82	65
72	79	60
71	76	54
70	72	48
69	68	43
68	66	38
67	62	34
66	57	29
65	54	25
64	49	21
63	46	18
62	39	12
61	36	10
60	34	8
59	29	6
58	22	3
57	20	2
56	17	2
55	14	1
54 and below	12	1