AAMC

Medical College Admission Test®

MCAT® Validity Data Report

Updated Findings About Predicting Medical Students' Performance From Entry to Graduation

November 2020

MCAT® is a program of the Association of American Medical Colleges

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Introduction

The Association of American Medical Colleges (AAMC) is conducting a 10-year, multi-site study to determine how well scores from the Medical College Admission Test (MCAT®) predict students' performance in medical school.

Institutional Members of the AAMC MCAT Validity Committee

This report describes the most recent validity findings from this study, led by AAMC's MCAT Validity Committee (MVC). The MVC is a group of educators, admissions officers, researchers, and pre-health advisors from medical schools and undergraduate institutions in the United States and Canada charged with investigating the fairness, use, and predictive validity of the MCAT exam that was introduced in 2015.

The MCAT predictive validity study examines how well MCAT scores, together with other academic metrics, predict students' performance throughout medical school. This study examines national medical student performance outcomes, such as students' progression through medical school, their performance on the United States Medical Licensing Examination (USMLE) Step exams, and graduation from medical school. It also examines locally defined outcomes tied to the curriculum, academic support, and learning environment of each school in the study.

Seventeen schools across North America are partnering with the AAMC on this research. They were selected from 65 schools that applied to participate in this study. The schools are diverse geographically and include public and private institutions with different missions, goals, and curricula that represent AAMC member institutions. Each school recruited several cohorts of medical students to participate in the study.

New! *This report shows for the first time the validity of MCAT scores in predicting medical students' Step 2 CK performance and graduation in four years.*

The updated findings in this report show that:

- MCAT scores strongly predict medical student performance in preclerkship and clerkship courses, as well as on USMLE licensure exams (Step 1 and Step 2 CK).
- Some students perform better in medical school than their MCAT scores predict, and others perform less well.
- MCAT scores predict students' performance better than undergraduate GPAs. Together, they provide better prediction than either academic metric alone.
- Using MCAT scores and undergraduate GPAs together provides a better signal about students' likely success in medical school, on the Step 1 and Step 2 CK exams, as well as graduating within four years.

The information in this report will support schools' holistic review of applicants, which encompasses all the information gathered during the admissions process. Putting MCAT scores in the context of applicants' experiences, attributes, and other academic data enables admissions officers and their committees to select the students who will contribute to their institutions' unique missions, goals, and diversity interests. Using MCAT scores in the context of the full range of information is a cornerstone of holistic review and a tenet of sound score use advocated by educational testing standards (AERA, APA, & NCME, 2014).

MCAT scores strongly predict medical student performance in preclerkship and clerkship courses, as well as on USMLE licensure exams.

MCAT scores strongly predict a wide range of medical student performance outcomes throughout undergraduate medical education. A description of all the medical student performance outcomes included in this report can be found on pg. 11.

- MCAT scores predict how well students do in preclerkship courses, such as biochemistry, cellular and molecular biology, cardiovascular and pulmonary systems, and behavioral health.
- MCAT scores predict how well students do in their clerkship courses – on clinical science subject exams and clerkship grades.
- Higher MCAT scores are correlated with higher scores on the Step 1 exam.
- New analysis shows that MCAT scores also strongly predict Step 2 CK scores.

Figure 1. Correlations of MCAT total scores with medical students' academic outcomes: median and interquartile ranges across schools.[1, 2, 3, 4]

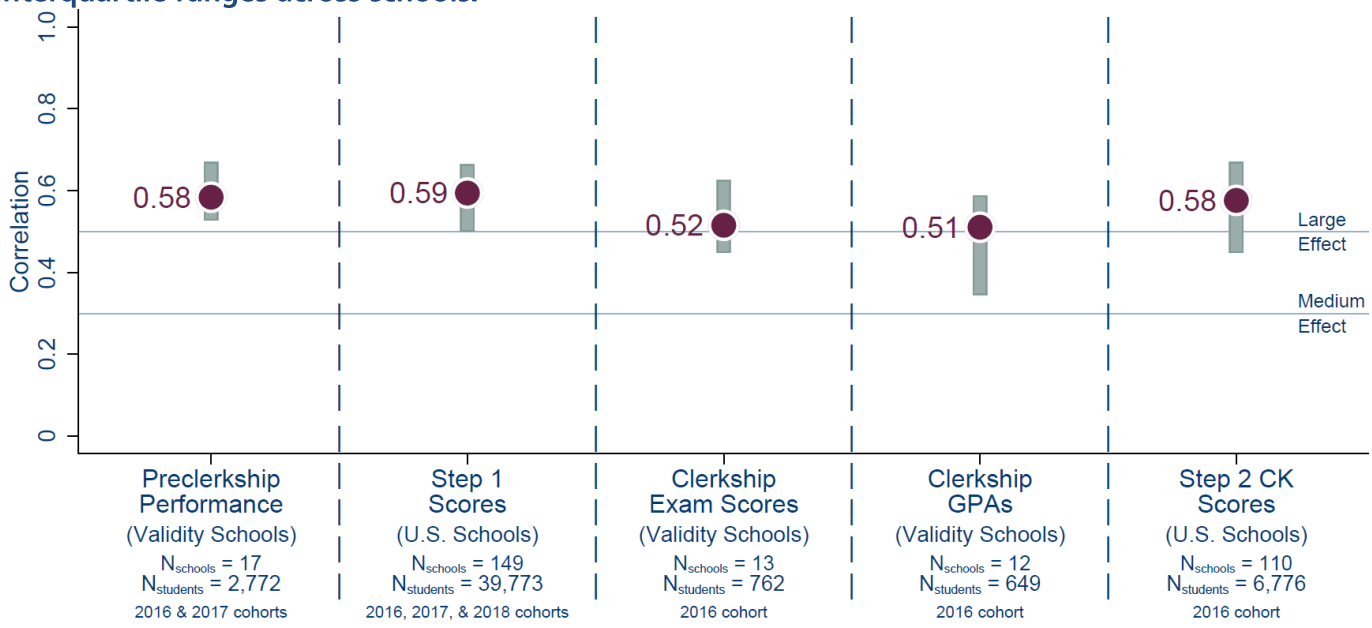

Figure 1 shows how well MCAT total scores predict students' preclerkship performance, Step 1 scores from the first attempt, clerkship exam scores and GPAs, and Step 2 CK scores from the first attempt. Correlational analyses were done separately for each school on each of the five performance outcomes. Then, the correlations for each outcome were grouped together to show the midpoint and range of these correlations. The median correlation is shown with a circle, and the two ends of the gray bar show the correlations at the 25th and 75th percentiles.

The median correlations of MCAT scores with preclerkship, Step 1, clerkship, and Step 2 CK performance shown in this figure are large. That means MCAT scores provide an important signal of students' readiness for the heavy knowledge acquisition in the first two years of medical school (i.e., preclerkship and Step 1) and in their application of knowledge in their clinical years (i.e., clerkships and Step 2 CK).

The interquartile ranges of correlations across schools shown in this figure indicate that the strength of prediction varies across medical schools. Many factors may contribute to this variability. Medical schools vary in their approaches to teaching and to supporting and evaluating student learning. The variability across schools in the relationship between MCAT scores and students' performance highlights the importance of studying local validity data so schools can draw conclusions about the ways MCAT scores predict their students' performance in their local environment.

Some students perform better in medical school than their MCAT scores predict, and others perform less well.

The next two figures provide more details to illustrate data patterns underlying the correlations between MCAT scores and medical student outcomes. They show that, although MCAT scores do a good job of predicting medical students' performance, there is variability in medical student performance, only some of which is predicted by MCAT scores. Figure 2 shows how well MCAT scores predict the clerkship performance of students at a single medical school. Figure 3 expands to the national population and shows the variability in medical students' performance on the Step 2 CK exam at different MCAT total scores.

Figure 2. Scatter plot of clerkship exam scores by MCAT total score for students at one validity school.[1]

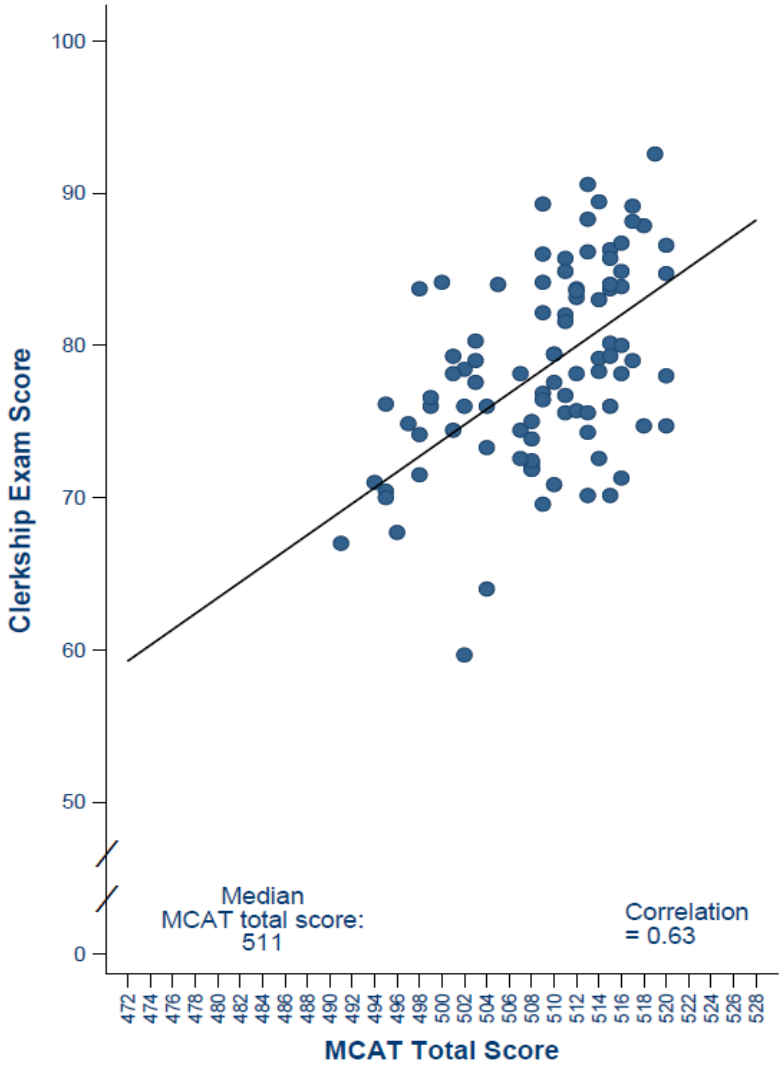

Figure 2 shows how well MCAT total scores predict the clerkship performance of students at a single medical school in the validity study. These data show the association of MCAT scores with students' performance on outcomes tied to the school's curriculum, grading practices, and student support services.

This scatter plot shows the 2016-entering students' MCAT scores against their clerkship exam scores at one of the validity schools. The x-axis shows MCAT total scores from low to high (left to right). The y-axis shows students' clerkship exam scores on a scale from 0 to 100. Each dot represents an individual student's data—the MCAT score he or she was admitted with and his or her average clerkship exam score. The diagonal line shows the estimated relationship of MCAT scores with clerkship exam scores. At this validity school, the correlation of the 2016-entering validity students' MCAT scores with their performance on clerkship exams is **0.63**.

The patterns of dots in Figure 2 show three important findings. First, this validity school accepts students with a wide range of MCAT scores. Second, on average, participants admitted with higher MCAT total scores show higher clerkship performance. Third, there is substantial variability in individual medical student performance. Some students show higher performance in clerkships than others admitted with the same MCAT score, while others show lower performance. Some students admitted with lower MCAT scores outperformed students with higher scores.

Some students perform better on licensure exams than their MCAT scores predict, and others perform less well.

The next figure demonstrates similar patterns with national data. Figure 3 shows the distribution of Step 2 CK scores from the first attempt by MCAT total score for the nearly 7,500 students who entered medical school in 2016 and took the Step 2 CK exam by summer 2020.

Figure 3. Distribution of Step 2 CK scores by MCAT total score for U.S. medical students.[1, 5]

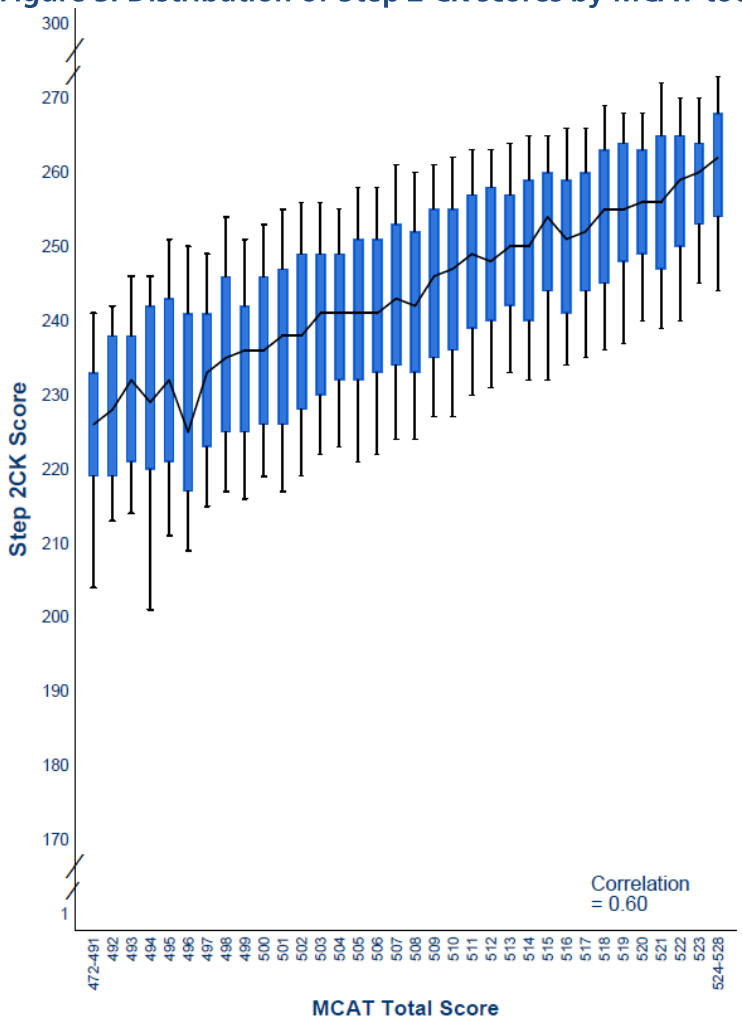

Figure 3 shows the relationship between students' MCAT scores and their Step 2 CK scores with a single correlation for the national population, in comparison to Figure 1 on pg. 2, where the same analysis was conducted for each of the 149 medical schools to show the median and interquartile range of all the school-level correlations.

The x-axis in this figure shows the MCAT total scores, and the y-axis shows the Step 2 CK scores. The jagged diagonal line shows the median Step 2 CK score for students admitted with each MCAT total score. The blue vertical boxes show the Step 2 CK scores at the 25th to the 75th percentiles for students admitted with each MCAT total score, and the black vertical lines show the Step 2 CK scores at the 10th to 25th and 75th to 90th percentiles. The slope of the jagged line shows that MCAT total scores are closely correlated with Step 2 CK scores. The correlation of MCAT total scores with Step 2 CK scores for the national population is **0.60**, which is nearly identical to the median school-level correlation between MCAT total scores and Step 2 CK scores shown in Figure 1 on pg. 2.

The data in Figure 3 reveal two important findings. First, nationally and on average, 2016 entrants with higher MCAT scores obtain higher scores from their first attempt on the Step 2 CK exam. This finding suggests that MCAT scores, which reflect students' foundational preparation in scientific concepts and reasoning skills taught in college, do a good job of predicting performance on a test that measures students' ability to apply medical knowledge, skills, and understanding of clinical science acquired from the first three years of medical school. Second, like the data in Figure 2, there is variability in students' performance at every point of the MCAT score scale. This finding indicates that, in addition to premedical preparation, other factors also contribute to performance on licensure exams. Students have acquired significant learning during the first three years of medical school. They learn at different rates and resonate with curricular and instructional approaches in different ways, and their rank orders change over time.

MCAT scores predict students' performance better than undergraduate GPAs. Together, they provide better prediction than either academic metric alone.

MCAT scores consistently predict students' performance in medical school better than undergraduate GPAs, although both MCAT scores and undergraduate GPAs show strong relationships with medical students' performance. Using MCAT scores and undergraduate GPAs together to assess academic readiness provides a better prediction of future performance in medical school and on licensure exams than using either academic metric alone.

Figure 4. Correlations of MCAT total scores and undergraduate GPAs alone and together with medical students' academic outcomes: medians across schools.[1, 2, 3, 4, 6]

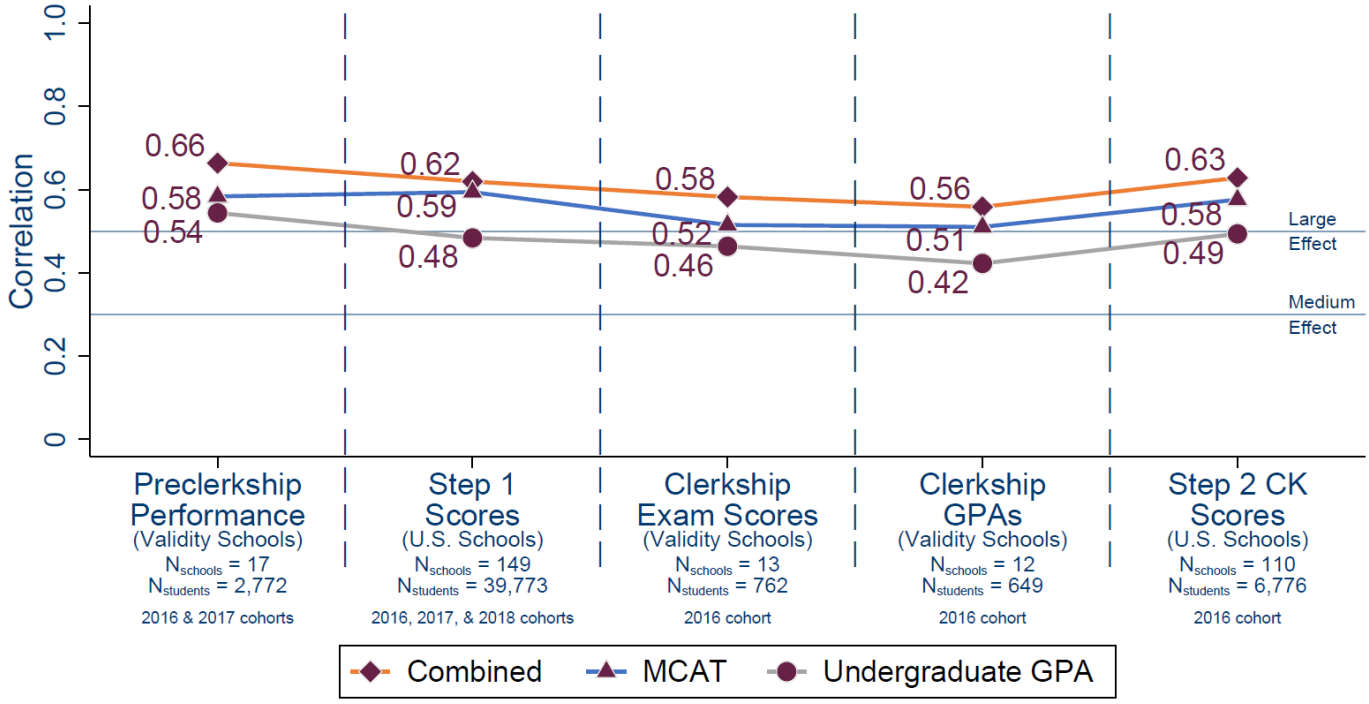

Figure 4 shows how MCAT scores and undergraduate GPAs together provide more information about applicants' likely performance in medical school than either metric alone. Three correlational analyses were performed at each school to examine the associations of MCAT scores and undergraduate GPAs with medical student outcomes — one for MCAT total scores alone as the predictor, one for total undergraduate GPAs alone as the predictor, and one to examine the joint contribution of MCAT scores and undergraduate GPAs in predicting students' performance. Conducting these correlational analyses by school allows us to see how the correlations of academic metrics and student performance outcomes vary across schools, each of which has its own approach to teaching, evaluating, and supporting students. Information about undergraduate GPAs also helps explain why some students perform better than their MCAT scores predict, and others perform less well.

Medical schools use MCAT scores in different ways, and scores do much more than provide admissions officers with information about their students' likely performance in coursework and on Step exams. MCAT scores enable admissions officers to evaluate students with more modest GPAs and identify which students may need academic support in medical school. When evaluating students' academic readiness for medical school, MCAT scores should always be used in the context of other important information related to applicants' coursework, GPAs, and other academic experiences. This practice is foundational to holistic review and is a recommended best practice by the AAMC and the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014).

Data not shown in this report also reveal that MCAT scores provide comparable prediction for students from different racial/ethnic minority and majority groups, for those from lower- and higher-socioeconomic backgrounds, and for male and female students. Students from different backgrounds with the same MCAT score, on average, have similar levels of performance on the various medical school outcomes.

Using MCAT scores and undergraduate GPAs together provides a better signal about students' likely success in passing Step 1.

Like Figure 4, the remaining figures in this report demonstrate the value of using MCAT scores together with undergraduate GPAs when making admissions decisions. Both undergraduate GPAs and MCAT scores provide important information about applicants' academic strengths and weaknesses. Omitting either one can result in capable applicants being overlooked or challenges in schools' ability to provide students with the academic support they need.

Figure 5. Median Step 1 pass rates at medical schools by different MCAT total score and undergraduate GPA ranges.[1]

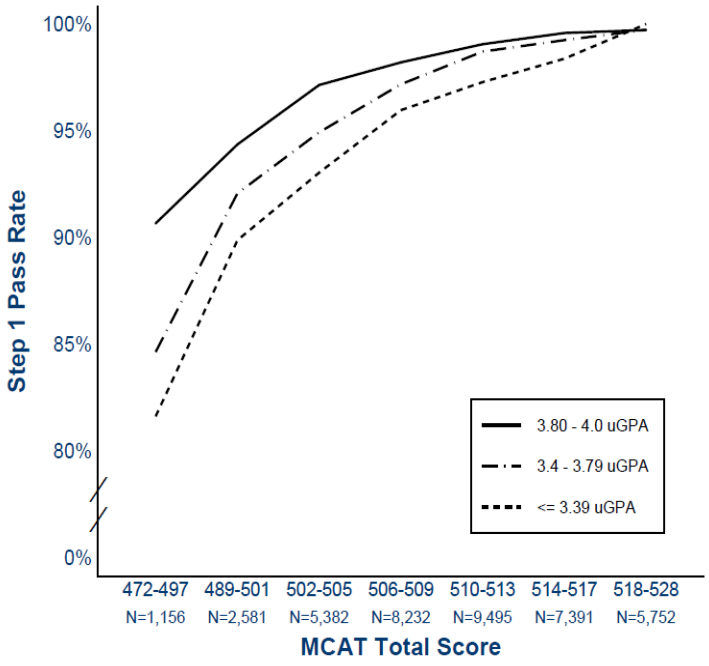

Figure 5 shows how the percentages of 2016-2018-entering students passing Step 1 on the first attempt vary by median MCAT total score and undergraduate GPA ranges at medical schools. The x-axis in this figure shows MCAT total score ranges from low to high, and the y-axis shows medical school Step 1 pass rate from low to high. The lines show the median Step 1 pass rates for three undergraduate GPA ranges.

Figure 6 presents the same data in a different display to show the national percentages of medical students passing Step 1 on the first attempt by MCAT total score and undergraduate GPA ranges and the success of students with different combinations of academic metrics. Overall, **98%** of 2016-2018 entrants who took the Step 1 exam passed it on the first attempt.

As shown in these two figures, the percentages of medical students passing Step 1 increase incrementally with higher MCAT score and undergraduate GPA ranges. However, the overall Step 1 pass rate is very high, which means most students—across all ranges of MCAT scores and undergraduate GPAs—pass the Step 1 exam on the first attempt.

Figure 6. Percentage and number of students who passed the Step 1 exam on the first attempt by MCAT total score and undergraduate GPA ranges.[1,7]

	MCAT Total										
GPA Total	**472-485**	**486-489**	**490-493**	**494-497**	**498-501**	**502-505**	**506-509**	**510-513**	**514-517**	**518-528**	**All**
3.80-4.00	--	--	90% 47/52	91% 216/238	94% 753/798	97% 1,941/1,998	98% 3,341/3,402	>99% 4,213/4,253	>99% 3,817/3,833	>99% 3,636/3,646	99% 17,973/18,230
3.60-3.79	--	--	85% 46/54	87% 225/258	92% 709/771	96% 1,532/1,603	97% 2,565/2,634	99% 2,980/3,017	>99% 2,094/2,111	>99% 1,348/1,352	97% 11,505/11,806
3.40-3.59	--	--	84% 42/50	82% 160/196	92% 487/528	94% 903/962	97% 1,261/1,303	99% 1,395/1,415	>99% 947/953	>99% 519/520	96% 5,720/5,936
3.20-3.39	--	--	79% 22/28	90% 104/115	92% 260/284	93% 449/481	96% 536/557	97% 518/535	>99% 346/349	100% 155/155	95% 2,392/2,512
3.00-3.19		--	85% 11/13	87% 47/54	88% 112/128	93% 210/227	96% 224/233	99% 202/205	96% 95/99	100% 56/56	94% 959/1,020
2.80-2.99	--	--	--	83% 15/18	87% 41/47	97% 66/68	96% 65/68	96% 45/47	96% 25/26	100% 11/11	93% 278/299
2.60-2.79	--	--	--	69% 9/13	88% 14/16	85% 23/27	86% 19/22	100% 12/12	100% 16/16	--	87% 104/119
2.40-2.59		--	--	--	--	--	100% 12/12	--	--	--	89% 42/47
2.20-2.39				--	--	--	--	--	--	--	89% 16/18
2.00-2.19										--	--
less than 2.00			--								--
All	50% 7/14	67% 24/36	85% 177/208	87% 780/898	92% 2,384/2,581	95% 5,138/5,382	97% 8,024/8,232	99% 9,376/9,495	>99% 7,344/7,391	>99% 5,737/5,752	98% 38,991/39,989

Blue shading = Pass rates of 90-100%; green shading = Pass rates of 80-89%; orange shading = Pass rates of 70-79%.

Using MCAT scores and undergraduate GPAs together provides a better signal about students' likely success in passing Step 2 CK.

Figures 7 and 8 use the same formats to demonstrate the relationships of MCAT scores and undergraduate GPAs with medical students' performance on passing Step 2 CK as Figures 5 and 6 do with their success in passing Step 1. These next two figures show that, while the percentages of students passing Step 2 CK on the first attempt are still the highest at the upper ranges of MCAT scores and undergraduate GPAs, the overall pass rates are so high that the pass rates are very similar and high for many MCAT score and GPA ranges. In other words, students with a wide range of MCAT total scores and undergraduate GPAs pass Step 2 CK on the first attempt.

Figure 7. Median Step 2 CK pass rates at medical schools by different MCAT total score and undergraduate GPA ranges.[1]

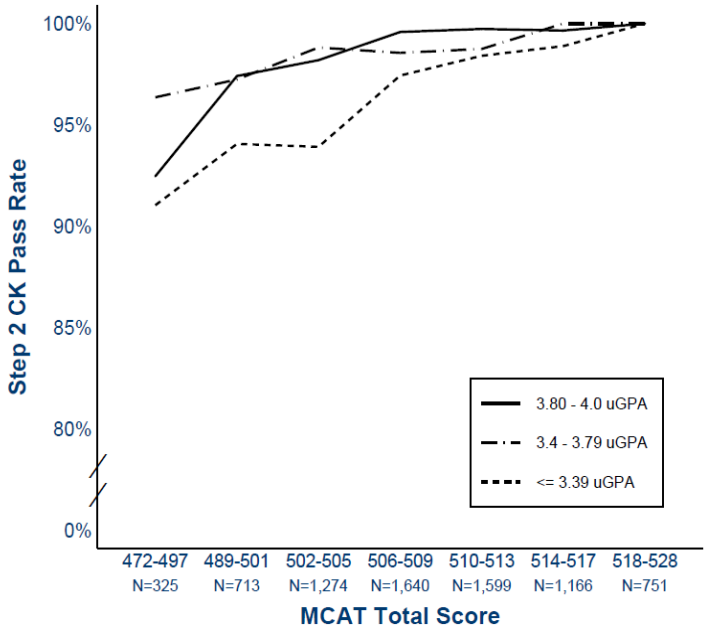

Figure 7 shows how the percentages of 2016-entering students passing Step 2 CK on the first attempt vary by median MCAT total score and undergraduate GPA ranges at medical schools. The x-axis in this figure shows MCAT total score ranges from low to high, and the y-axis shows medical school Step 2 CK pass rate from low to high. The lines show the median Step 2 CK pass rates for undergraduate GPAs less than 3.4, ranging from 3.4 to 3.79, and at or above 3.8.

Figure 8 presents the same data in a different display to show the national percentages of medical students passing Step 2 CK on the first attempt by MCAT total score and undergraduate GPA ranges and provides more information about the success of students with different combinations of academic metrics. Overall, **99%** of entrants from 2016 who took the Step 2 CK exam passed it on the first attempt.

Figure 8. Percentage and number of students who passed the Step 2 CK exam on the first attempt by MCAT total score and undergraduate GPA ranges.[1,7]

	MCAT Total										
GPA Total	472-485	486-489	490-493	494-497	498-501	502-505	506-509	510-513	514-517	518-528	All
3.80-4.00		--	95% 21/22	91% 64/70	97% 226/232	98% 490/499	>99% 720/723	>99% 752/754	>99% 580/582	100% 479/479	>99% 3,333/3,362
3.60-3.79	--	--	88% 21/24	97% 70/72	97% 202/208	>99% 369/372	99% 519/525	99% 472/479	100% 351/351	100% 170/170	99% 2,177/2,204
3.40-3.59		--	100% 18/18	98% 46/47	97% 151/155	98% 218/222	98% 231/236	>99% 238/240	100% 143/143	100% 66/66	99% 1,112/1,128
3.20-3.39		--	--	100% 31/31	94% 62/66	95% 99/104	97% 104/107	99% 85/86	100% 62/62	100% 22/22	97% 474/487
3.00-3.19		--		83% 10/12	97% 30/31	92% 47/51	97% 35/36	100% 29/29	95% 20/21	--	95% 180/190
2.80-2.99			--	--	93% 14/15	90% 18/20	--	--	--	--	93% 57/61
2.60-2.79			--	--	--	--	--	--	--	--	87% 20/23
2.40-2.59		--		--	--	--	--		--		91% 10/11
2.20-2.39								--			--
2.00-2.19										--	--
less than 2.00											
All	--	--	95% 71/75	94% 228/242	97% 690/713	98% 1,247/1,274	99% 1,622/1,640	>99% 1,586/1,599	>99% 1,163/1,166	100% 751/751	99% 7,365/7,468

Blue shading = Pass rates of 90-100%; green shading = Pass rates of 80-89%; orange shading = Pass rates of 70-79%.

Using MCAT scores and undergraduate GPAs together provides a better signal about students' likely success in graduating within four years.

The next two figures show the relationship of MCAT scores and undergraduate GPAs with graduating within four years.

Figure 9. Median four-year graduation rates at medical schools by different MCAT total score and undergraduate GPA ranges.[1]

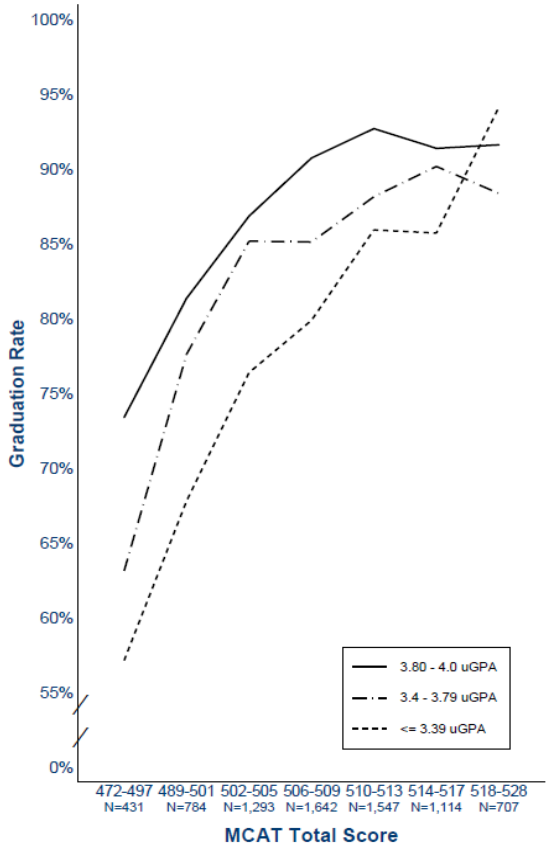

Figure 9 shows how the percentages of 2016-entering students graduating within four years vary by median MCAT total score and undergraduate GPA ranges at medical schools. The x-axis in this figure shows MCAT total score ranges from low to high, and the y-axis shows medical school four-year graduation rate from low to high. The lines show the median graduation rates for three undergraduate GPA ranges.

Figure 10 presents the same data in a different display to show the national percentages of medical students graduating within four years by MCAT total score and undergraduate GPA ranges and the success of students with different combinations of academic metrics. Overall, **86%** of 2016 entrants graduated in four years.

Compared to medical students' performance on passing the licensure exams, there is more variability in their success on four-year graduation by MCAT score and undergraduate GPA ranges. Figure 8 reveals the general pattern in the data that the percentages of students graduating within four years increase with higher ranges of both MCAT scores and undergraduate GPAs. As shown in the last row of the table in Figure 10, for the lowest MCAT score ranges (i.e., 497 and below), four-year graduation rates fall below 70%. However, as reported in a recent *AAMC Data Snapshot* (AAMC, 2018), five-year graduation rates have consistently remained at 95% for more than two decades. If this trend continues, most of these 2016 entrants are expected to graduate within five years.

Figure 10. Percentage and number of students who graduate in four years by MCAT total score and undergraduate GPA ranges.[1,8]

	MCAT Total										
GPA Total	**472-485**	**486-489**	**490-493**	**494-497**	**498-501**	**502-505**	**506-509**	**510-513**	**514-517**	**518-528**	**All**
3.80-4.00		--	64% 18/28	76% 61/80	81% 192/236	87% 429/494	91% 646/712	93% 660/712	91% 498/545	92% 404/441	90% 2,909/3,249
3.60-3.79		--	59% 19/32	70% 61/87	78% 178/227	86% 320/371	87% 448/514	87% 407/466	91% 306/337	89% 147/166	86% 1,887/2,204
3.40-3.59	--	--	68% 15/22	58% 40/69	77% 134/175	83% 191/229	81% 204/252	90% 210/234	89% 125/141	88% 58/66	82% 978/1,191
3.20-3.39	--	--	43% 6/14	64% 27/42	72% 58/80	77% 86/111	83% 90/109	90% 80/89	87% 53/61	95% 19/20	79% 420/533
3.00-3.19	--		--	79% 11/14	58% 22/38	79% 44/56	80% 33/41	76% 26/34	82% 18/22	--	76% 167/221
2.80-2.99	--	--	--	--	70% 14/20	70% 16/23	--	--	--	--	70% 51/73
2.60-2.79	--		--	--	--	--	--	--	--	--	60% 18/30
2.40-2.59		--		--	--	--	--		--		71% 10/14
2.20-2.39						--		--			--
2.00-2.19										--	--
less than 2.00											
All	20% 2/10	38% 5/13	61% 63/104	68% 207/304	77% 603/784	84% 1,092/1,293	87% 1,429/1,642	90% 1,393/1,547	90% 1,007/1,114	91% 641/707	86% 6,442/7,518

Blue shading = Graduation rates of 90-100%; green shading = Graduation rates of 80-89%; orange shading = Graduation rates of 70-79%.

Many factors contribute to success in medical school.

MCAT scores strongly predict important academic outcomes in medical school, but many factors contribute to medical students' performance. Admissions officers are knowledgeable about the academic metrics, attributes, and experiences that students need to be successful at their medical schools, and they use MCAT scores and undergraduate GPAs in flexible ways, as the data in this report show. In their individualized, holistic review of applicants' qualifications, admissions officers carefully consider the rich and assorted information in students' applications to build classes that will support their institutions' mission and goals.

Fully understanding applicants' academic strengths and weaknesses can provide admissions officers flexibility in selecting applicants with more modest MCAT scores or undergraduate GPAs who have the capacity to do well at their schools. When admissions officers and their committees admit students with more modest MCAT scores or undergraduate GPAs, they do so because these applicants show certain experiences or characteristics that make them stand out as capable of succeeding and contributing to learning, practice, and teaching at their schools. Schools use their academic, social, and wellness support services and their curricula to provide resources that foster the success of their students, as shown by the high Step 1 and Step 2 CK pass rates and success in graduating in four years.

The data in this report support the use of MCAT scores with undergraduate GPAs and other application data that are important for admissions decisions. MCAT scores have high predictive value and provide strong signals about students' academic preparedness. Schools have the flexibility to weigh and balance the range of criteria needed in a class to achieve their institutional mission, as well as considerations for resources needed to support incoming students and help them succeed in medical school. When used flexibly, MCAT scores can provide admissions officers with important information to widen the applicant pool from which to select the best students for their programs and future physicians for the nation.

Future research

Upcoming reports from the MVC will summarize their research on the validity of MCAT scores in predicting performance in clerkships, on the Step 2-CK and Step 2-CS exams, and graduation within four or five years. They will include findings based on data from these and additional cohorts of medical students.

Updated findings will be published annually in the guide to *Using MCAT Data in Medical Student Selection* (www.aamc.org/newmcatguide) and, if accepted, in the scientific literature.

Read more about the MCAT validity in *Academic Medicine*

This year, the MVC published articles in *Academic Medicine* on their research to evaluate the fairness, use, and predictive validity of MCAT scores. Some of the findings described in this report expand upon the research in this collection of articles. New findings in this report will be published in next year's guide to *Using MCAT Data in 2022 Medical Student Selection*.

Busche K, Elks ML, Hanson JT, Jackson-Williams L, Manuel RS, Parsons WL, Wofsy D, Yuan K. The validity of scores from the new Medical College Admission Test (MCAT®) in predicting student performance: results from a multisite study. Acad Med. 2020;95:387-395.

Girotti JA, Chanatry JA, Clinchot DM, McClure SC, Swan-Sein A, Walker IW, Searcy CA. Investigating group differences in preparation and performance on the new Medical College Admission Test (MCAT®). Acad Med. 2020;95:365-374.

Terregino CA, Saguil A, Price-Johnson T, Anachebe NF, Goodell K. The diversity and success of medical school applicants with scores in the middle third of the MCAT score scale. Acad Med. 2020;95:344-350.

Lucey CR, Saguil A. The consequences of structural racism on MCAT scores and medical school admissions: the past is prologue. Acad Med. 2020;95:351-356.

Swan-Sein A, Cuffney F, Clinchot DM. How to help students strategically prepare for the MCAT® exam and learn the foundational knowledge needed for medical school. Acad Med. 2020;95:484.

Visit aamc.org/mvc2020articles to read the articles.

Summary of Medical Student Performance Outcomes

Performance Outcome	Description	Sample
Preclerkship performance	Preclerkship performance is based on each student's mean performance across preclerkship courses.[1]	2,772 students from 17 validity schools[2] who entered in 2016 or 2017
Step 1 score (first attempt)	The Step 1 score comes from each student's first attempt at the USMLE Step 1 exam.	39,733 students who entered in 2016 through 2018 and took the Step 1 exam by summer 2020
Clerkship exam score	The clerkship exam score is based on the mean score across the exams administered in clerkship rotations.[3]	762 students from 13 validity schools who entered in 2016[4]
Clerkship GPA	The clerkship GPA is based on the mean performance across core clerkship courses using each validity school's rating or grading scale.	766 students at 14 validity schools who entered in 2016[5]
Step 2 CK score (first attempt)	The Step 2 CK score comes from each student's first attempt at the USMLE Step 2 CK exam.	6,776 students who entered in 2016 and took the Step 2 CK exam by summer 2020
Passing Step 1 on the first attempt	The Step 1 pass/fail outcome comes from each students' first attempt at the USMLE Step 1 exam.	39,989 students who entered in 2016 through 2018 and took the Step 1 exam by summer 2020
Passing Step 2 CK on the first attempt	The Step 2 CK pass/fail outcome comes from each students' first attempt at the USMLE Step 2 CK exam.	7,468 students who entered in 2016 and took the Step 2 CK exam by summer 2020
Graduating in four years	Graduation is defined as graduation within the expected calendar year.	7,518 students who entered in 2016 and are enrolled in regular MD programs

Notes:

[1] Each school identified the preclerkship courses that have reliable performance measures. Examples of preclerkship courses are: Biochemistry, Cell and Molecular Biology, Cardiovascular and Pulmonary Systems, Behavioral Medicine and Health, Health Care Ethics, Introduction to Clinical Anatomy, and Community Engagement. Although the selected courses vary widely in the extent to which they relate to the knowledge and skills the MCAT exam tests, most teach natural sciences subjects. Because the sample of courses selected by each validity school made up the majority of the total preclerkship courses offered at the school, the measure of performance used here, which ranges from 0 to 100, correlated highly with the preclerkship GPAs calculated by the medical schools or with class ranks at each school.

[2] Students enrolled at 17 medical schools in the United States and Canada, referred to here as "validity schools," volunteered for validity research about locally defined medical student performance outcomes tied to their school's curriculum, academic support, and learning environment. These students' performance data were analyzed for relevant outcomes.

[3] The vast majority of the clerkship exam scores are from National Board of Medical Examiners (NBME) Clinical Science Subject Exams.

[4] Only 13 out of 17 validity schools provided available data for this outcome.

[5] Only 14 out of 17 validity schools provided available data for this outcome.

Technical Notes

1. Medical students' most recent MCAT scores at the time of matriculation were used in the analysis.
2. Sample correlations were corrected for range restriction on MCAT total scores and total undergraduate GPAs due to student selection in the admissions process (Betty, Barratt, Berry, & Sackett, 2014) but not for unreliability in MCAT total scores or medical student outcomes. Corrections for range restriction were made at the institution level. At each medical school, the applicants from an application cycle served as the reference population. Using established statistical methods, the observed correlations were adjusted to reflect what the correlations would be if there had been no selection — that is, if all applicants had been selected for admission.
3. According to Cohen (1992), a correlation coefficient of 0.10 is considered a small association in the social sciences; a correlation coefficient of 0.30 is considered a medium correlation; and a correlation of 0.50 or greater is considered a large correlation. The horizontal line at a correlation of 0.5 shows the threshold for a large effect size for correlation coefficients and the horizontal line at a correlation of 0.3 shows the threshold for a medium effect size.
4. The preclerkship and clerkship findings in this figure come from validity schools, where students volunteered for validity research about locally defined medical student performance outcomes tied to their school's curriculum, academic support, and learning environment. Step 1 and Step 2 CK findings are based on national data from U.S. medical schools. Additionally, the preclerkship and Step 1 findings are from students who entered medical school in 2016 through 2018, while the clerkship and Step 2 CK findings are from students who entered medical school in 2016 because clerkship outcomes and Step 2 CK scores for the students who entered in 2017 are not yet available at the time this analysis was conducted.
5. The blue vertical boxes show the Step 2 CK scores at the 25th to the 75th percentiles, and the black vertical lines show the Step 2 CK scores at the 10th to 25th and 75th to 90th percentiles for students who score at each MCAT total score. The numbers of students with MCAT scores at the bottom and top of the MCAT score scale are too small to be compared with those at other points. Therefore, the results for students with MCAT scores from 472 to 491 are reported together, as are the results for those who scored from 524 to 528. The applicants from the national 2017 application cycle served as the reference population in correcting the correlation of MCAT total scores with Step 2 CK scores for range restriction.
6. This figure shows results for five medical student performance outcomes — preclerkship performance, Step 1 scores, clerkship exam scores, clerkship GPAs, and Step 2 CK scores. In each panel, the triangle shows the median correlation (the correlation at the 50th percentile) of MCAT scores alone with each outcome, the circle shows the correlation of undergraduate GPAs alone, and the diamond shows the correlations of MCAT scores and undergraduate GPAs combined.
7. Blue shading = pass rates of 90-100%; green shading = pass rates of 80-89%; orange shading = pass rates of 70-79%. Dashes = cells with fewer than 10 observations; blank cells = cells with 0 observations.
8. Blue shading = graduation rates of 90-100%; green shading = graduation rates of 80-89%; orange shading = graduation rates of 70-79%. Dashes = cells with fewer than 10 observations; blank cells = cells with 0 observations. Students entering medical school with advanced standing from medical, graduate, or other programs, enrolled in a joint program (e.g., MD-PhD) at the time of matriculation or graduation, participating in special research/non-research studies, or deceased are not included in these tables.

References

American Educational Research Association; American Psychological Association; National Council on Measurement in Education. Standards for Educational and Psychological Testing. Washington, DC: American Educational Research Association; 2014; 198.

Association of American Medical Colleges. Data Snapshot: Graduation Rates and Attrition Rates of U.S. Medical Students. Washington, DC: AAMC; 2018. www.aamc.org/download/492842/data.

Betty AS, Barratt CL, Berry CM, Sackett PR. Testing the generalizability of indirect range restriction corrections. *J Appl Psychol.* 2014;99(4):587-598.

Cohen J. A power primer. Psychol Bull. 1992; 1121: 155-159.

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