

THE DUKE MASTER OF BIOMEDICAL SCIENCES ENHANCES STUDENT MCAT PERFORMANCE

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Background: Aspirants to medical school are required to take a standardized examination of “aptitude” as part of the admissions process. The predecessor of the current exam was instituted in 1928. In 1946, liberal arts content was added to the exam, and two years later, it was named the Medical College Admissions Test (MCAT). In 1977, the liberal arts content was removed, increasing the focus on scientific knowledge, problem solving, and analysis. A writing section was added in 1991. (1) The “new MCAT” was launched in April 2015 after extensive revisions. The “new,” current version has four subsections: Chemical-Physical Foundations, (CP) Critical Analysis and Reasoning (CARS), Biological- Biochemical Foundations (BB) and Psychological, Social, and Biological Foundations (PS).

Though widely used, many question the MCATs ability to predict medical school performance. Some students succeed in medical school despite lower MCATs. (2) Certain demographic groups, including racial, ethnic, low socioeconomic status, first generation to college, and rural-born typically have lower MCATs than majority students with more advantages. (3) Time management and self-testing, study skills which can be enhanced through deliberate cultivation, correlate more strongly with medical school performance than MCATs. (4) Postbaccalaureate programs have been shown to increase student MCAT scores on the “old MCAT,” though this study compared aggregate performance and not changes for individual students. (5) We could find no reports of postbaccalaureate programs' impact on the new MCAT.

The Duke Master of Biomedical Sciences (MBS) is a postbaccalaureate program that emphasizes student enhancement of learning strategies. It includes coursework and experiential learning reflecting a great deal of content reflected in the MCAT's BB and PS subsections, some content reflected in the CARS subsection, and little to no content reflected in the CP subsection.

Objective: We predicted an improvement across three of the four MCAT subscales based on intentional learning in the content areas of MBS curricular focus.

Methods: MCAT scores for students with both a pre-MBS MCAT and a post-MBS MCAT were compared. All MCATs were verified through AMCAS or review of the actual report, not by student self-report. MCAT scores for students who had both a pre-MBS and post-MBS “new MCAT” were compared, examining changes within the 4 subsections. Since both old and new MCATs also provide a percentile rank, percentiles were used to compare pre and post-MBS MCAT scores. The significance of the difference between scores was assessed using the Wilcoxon signed rank test.

Results: Forty-six students had both pre and post-MBS MCATs. They took a total of 62 MCAT tests before starting MBS (pre-MBS). Thirty tests were the “old MCAT” and 32 were the “new MCAT.” Twenty-seven students took the “new MCAT,” both pre and post-MBS. Overall performance increased from the 57th percentile to the 77th percentile. ($p < 0.001$). Subsection scores all increased but the extent varied by subsection. Percentile increases and p values were: CP (11, 0.002); CARS (12, 0.002); BB (22, <0.001) and PS (21, <0.001).

Significance: Students experienced statistically significant increases in the MCAT subsections that reflected MBS' major areas of curricular emphasis.

References:

1. Pigg T. Kroopnick M. The Evolution of the Medical College Admission Test (MCAT Exam). *Acad Med.* 2015 Apr 90(4):541
2. Elks ML Herbert-Carter J Smith M Klement B Knight BB Anachebe NF. Shifting the Curve: Fostering Academic Success in a Diverse Student Body. *Acad Med.* 2018 Jan;93(1):66-70
3. David D Dorsey JK Sackett PR Searcy CA Zhao X. Do racial and ethnic group differences in performance on the MCAT exam reflect test bias? *Acad Med.* 2013 May;88(5):593-602
4. West C Sadoski M. Do study strategies predict academic performance in medical school? *Med Educ.* 2011 Jul;45(7):696-703
5. Metz AM. Medical School Outcomes, Primary Care Specialty Choice, and Practice in Medically Underserved Areas by Physician Alumni of MEDPREP, a Postbaccalaureate Premedical program for Underrepresented and Disadvantaged Students. *Teach Learn Med.* 2017 Jul-Sep;29(3):351-359