

The Relationship among Undergraduate Educational Pathways, MCAT® Exam Scores, and Acceptance Rates for U.S. Medical School Applicants

The move toward a common transcript among higher education institutions facilitated student mobility between institutions in the latter part of the 20th century. This movement, which reflected a standardized course credit accounting system, increased the complexity of students' undergraduate educational pathways, with some students attending multiple undergraduate institutions.^{1,2,3} Multi-institutional attendance patterns have been associated with lower levels of academic achievement, and research shows that groups underrepresented in medicine (e.g., black or African American, Hispanic or Latino, and lower socioeconomic status) are more likely to have attended multiple educational institutions and community colleges.^{3,4}

Does this pattern hold true for medical schools and do they accept students from multi-institutional backgrounds in the same proportion as students with attendance at fewer institutions? This *Analysis In Brief* highlights our initial investigation into the educational pathways of U.S. medical school applicants by exploring the number and type of undergraduate institutions they attended. We then show how these attendance patterns are associated with academic preparedness and eventual acceptance.

Methodology

Our investigation used 2011 college transcript information for U.S. citizen and permanent resident applicants to U.S. medical schools, obtained from the

American Medical College Application Service (AMCAS). Analysis of these transcripts does not include students who obtained a graduate degree and focuses only on those who have been awarded or were working toward a bachelor's degree. We classified educational institutions using an aggregated version of the most

recent 2005 Carnegie Classification system.⁵ Based on the Carnegie scheme, an institution that a medical school applicant attended was coded as one of 10 institution types (Table 1). We used MCAT® exam scores and acceptance to medical school as measures of academic preparedness.

Table 1: Number of Undergraduate College Transcripts and Type of Institution Attended among 2011 U.S. Medical School Applicants

	ALL
Number of U. S. medical school applicants*	31,479
Percentage of applicants with different numbers of transcripts (%)	
One transcript	38.9
Two transcripts	36.2
Three transcripts	16.6
Four transcripts	5.7
Five or more transcripts	2.6
Percentage of applicants with specific type of college record (%)	
<i>Research-intensive institutions</i>	
Doctoral degree-granting, very high research intensity [R1]	76.5**
<i>Non-R1 institutions</i>	
Doctoral degree-granting, other [R2]	6.7
Four-year baccalaureate, liberal arts [B1]	11.7
Four-year baccalaureate, other [B2]	4.9
Master's degree-granting, large [M1]	18.5
Master's degree-granting, small to medium [M2]	6.4
<i>Community college institutions</i>	
Community college [CC]	32.5
<i>Specialized and non-U.S. institutions</i>	
Specialized institutions, medical and health [S1]	0.9
Specialized institutions, all other [S2]	0.5
Non-U.S.-based college	9.2

*U.S. citizen or permanent resident who applied to medical school through AMCAS, whose highest achieved college degree was at the bachelor's level, and who provided college transcript information.

**The sum of the percentages is greater than 100 because the majority of applicants attended two or more types of institutions.

1 McCormick AC. Swirling and double-dipping: New patterns of student attendance and their implications for higher education. *New Directions for Higher Education*. 2003;121:13-24.
 2 Adelman C. *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000*. Washington, D.C.: U.S. Department of Education, Institute of Education Sciences. 2004.
 3 Rab-Goldrick S. Following their every move: An investigation of social-class differences in college pathways. *Sociology of Education*. 2006;79:61-79.
 4 Roska J, Grodsky E, Hom WC. The role of community colleges in promoting student diversity in California. In Grodsky E, Kurlaender M (eds.), *Equal Opportunity in Higher Education*. Cambridge: Harvard Education Press. 2010.
 5 The Carnegie Classification scheme uses a multi-measure research index to classify educational institutions. For more information, see: <http://classifications.carnegiefoundation.org/descriptions/>

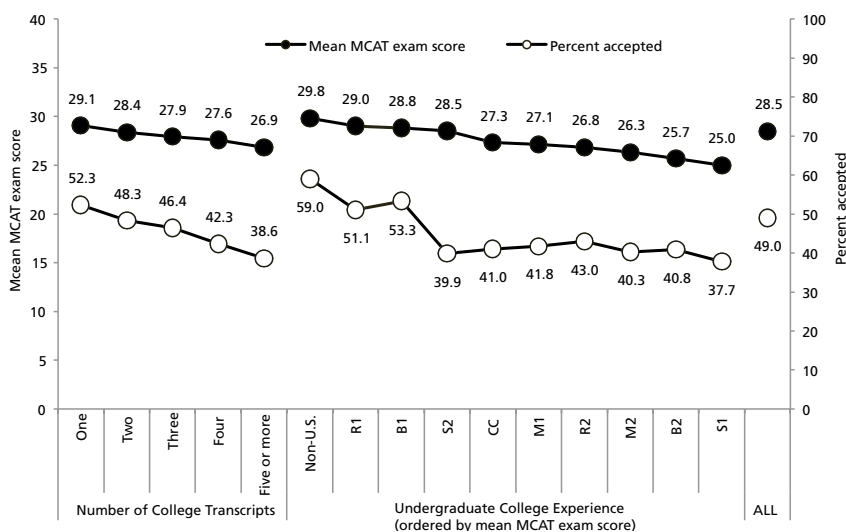
Results

The number of institutions U.S. medical school applicants attended varied widely. As seen in Figure 1, the majority of medical school applicants attended two or more institutions (36.2% and 24.9% respectively). The specific types of educational institutions attended also varied. Results show that 76.5 percentage of applicants attended a doctoral degree-granting, high research-intensity institution (R1) either alone or in combination with another institution (i.e., roughly three-fourths of all applicants had at least one educational experience at an R1 institution). Among all applicants, 27.5% attended only one research-intensive institution, which was the most common educational pathway (results not shown). The second most common educational experience, accounting for roughly one-third of applicants (32.5%) was at a community college. Another 18.5% of applicants had at sometime attended a large master’s degree-granting institution (M1) and another 11.7% had attended a four-year baccalaureate, liberal arts institution (B1).

Academic preparedness and admissions
Multi-institutional attendance is associated with both lower mean MCAT exam scores and acceptance rates to medical school. Mean MCAT exam scores were highest (29.1) for those students who only attended one college institution, dropping to 26.9 for those who attended five or more institutions (Figure 1). Similarly, the percentage of applicants accepted to medical school decreased from 52.3 to 35.6 for those same groups. Other differences are seen for students who at some time attended a non-U.S. institution (mean MCAT exam score 29.8) and students who at sometime attended a medical or health-related institution (mean MCAT exam score 25.0).

Acceptance rates differ noticeably by type of institution attended. The mean acceptance rate among those who ever attended a non-U.S. (59.0%), R1 (51.1%), or B1 (53.3%) institution are higher than the rates for those who ever attended one of the remaining seven types of institutions.⁶ Acceptance

Figure 1: Mean MCAT® Exam Scores and Acceptance Rates by Number of College Transcripts and Type of Institution Attended among 2011 U.S. Medical School Applicants



rates for these institutions range from 37.7% for medical or health-related institutions (S1) to 43.0% for other doctoral degree-granting institutions (R2). These rates are noticeably lower than the overall acceptance rate of 49.0%.

Discussion

Medical school applicants who attended multiple undergraduate institutions may face greater challenges in accessing medical education. Findings show that these applicants have lower mean MCAT exam scores and lower acceptance rates to medical school. However, with regard to admission outcomes, findings also show that the number of institutions attended is of less importance than the type of educational institution that an applicant attended (i.e., the rate of acceptance to medical school for 7 of 10 types of institutions that an applicant attended is roughly equal to an applicant who attended 4 or more institutions). This finding may suggest that across types of educational institutions differences exist in the ability to access important resources, such as knowledge of the application process, pre-medical educational programs, health-related work and voluntary experiences, and peers with

similar aspirations — all things that might encourage a student to pursue a career in medicine.

Because individuals who are underrepresented in medicine more frequently attend two or more institutions and are more likely not to attend an R1 institution,^{1,3} these findings may have implications for medical schools that aim to increase the diversity of their student populations. Future studies will explore the patterns presented in this *Analysis in Brief* by race and ethnicity, socioeconomic status, and specific sequences of educational experiences.

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⁶ Because an applicant could have attended two or more types of institutions, these 10 categories are not mutually exclusive.