Analysis IN BRIEF

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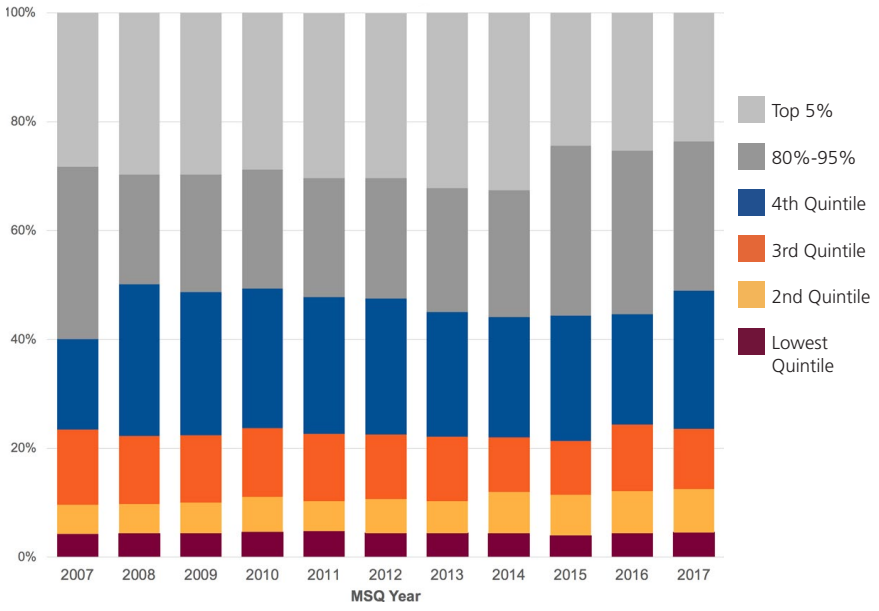
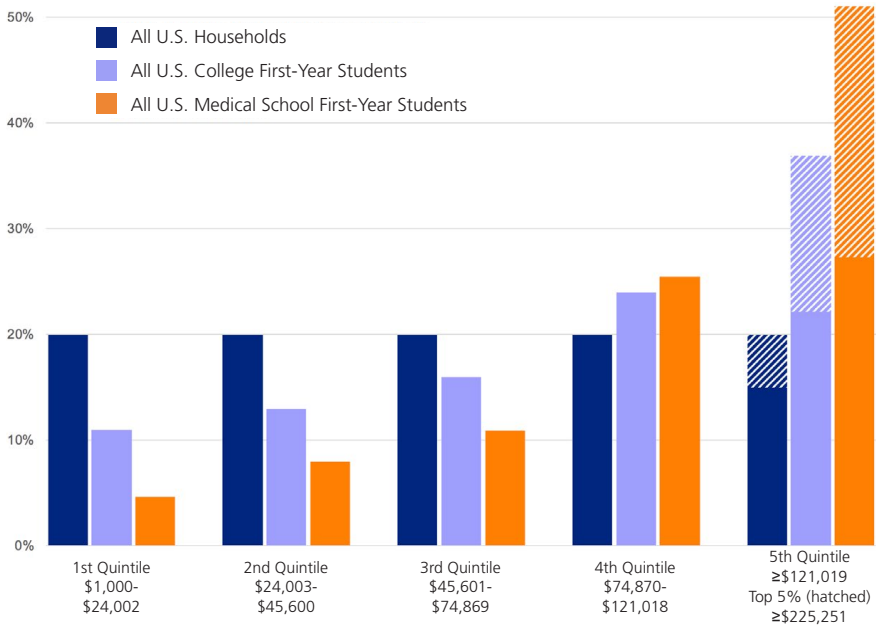
An Updated Look at the Economic Diversity of U.S. Medical Students

Ten years ago, research in an *Analysis in Brief (AIB)* comparing the economic diversity of U.S. medical school matriculants with U.S. Census data found that "more than three-quarters of medical students came from families in the top two quintiles of family income."[1] This *AIB* replicates that previous research and methodology to provide updated parental income data from 2007 through 2017. In addition, it adds a new measure of socioeconomic status (SES) to the research. The results demonstrate that altering the economic diversity of U.S. medical school matriculants remains a persistent challenge, but one worth addressing because increasing diversity improves the quality of medical education and health care for all.[2]



Source: Matriculating Student Questionnaire 2007-17.

Figure 1. Parental income of first-year U.S. medical students by quintiles of U.S. household income, MSQ years 2007-17.



Sources: 2016 U.S. Census,[5] Eagan et al.,[6] and 2017 Matriculating Student Questionnaire (MSQ).

Figure 2. Percentage of first-year U.S. medical students and U.S. college students by U.S. household income, 2017 MSQ and 2016 Census.

Methods

The primary data source for this research is the AAMC Matriculating Student Questionnaire (MSQ), an annual survey of entering medical students that includes self-reported data on combined parental income in the previous year.[3] A total of 126,856 matriculants provided parental income data of at least $1,000 from MSQ years 2007 through 2017,[4] and the annual survey response rate ranged from 64% to 78%. For this analysis, the MSQ parental income data were grouped by year into household-income quintiles defined by national U.S. Census data[5] and included a focus on the subset of the highest-income quintile that comprises the top 5% of U.S. households.

Because U.S. Census quintile boundaries change annually, adjusting for inflation in grouping the MSQ data was not necessary. For example, in Figure 1, the top national household-income quintile began at $97,033 in 2006, which corresponds to the 2007 MSQ survey year, and that same income quintile began

at $121,019 in 2016, which corresponds to the 2017 MSQ survey year. Figure 2 shows the income ranges for each quintile from the 2016 U.S. Census.

The American Medical College Application Service® (AMCAS®) SES Education-Occupation (SES-EO) indicator was introduced in 2014 to help admissions officers identify applicants who may be from socioeconomically disadvantaged backgrounds.[7] It is calculated by combining parental education and parental occupation information. The SES-EO data include four groups of students: 1) parents with less than a bachelor's degree or parents with any degree and a service, clerical, skilled, or unskilled occupation (i.e., EO-1 and EO-2); 2) parents with a bachelor's degree or higher and an executive, managerial, or professional occupation (i.e., EO-3, EO-4, and EO-5)[8]; 3) not applicable[9]; and 4) unknown[10] (Table 1).

Results

Results show that the percentage of respondents reporting parental income totals that fall in the top two household-income quintiles ranged from 76% (8,095) to 79% (8,645) over the 11 years (see Figure 1, blue (second-highest quintile) plus gray (highest quintile) bars, and Table 2). These stagnant results are like those reported in the previous *AIB*, where the comparable range was 73% to 79%. In sum, when looking at matriculating medical students by quintile of household income, for students entering medical school in the 30-year span from 1988 through 2017, the top two household-income quintiles contributed between 73% and 79% of all matriculants each year.

Results also show that only 5% of all matriculants who provided parental income data in the 2017 MSQ were in the lowest household-income quintile, whereas 24% were in the top 5% (see Figure 2, which shows the proportion of medical students from each grouping of household income). In fact, in MSQ years 2007 through 2017, between 24% and 33% of entering medical students reported parental income in the top 5% of U.S. households. As Figure 2 shows, the overrepresentation of the highest parental income groupings is also found among first-year undergraduate college students, and those with a four-year college degree typically comprise most of the medical school applicant pool. However, relative to the U.S. population, the overrepresentation of the highest income levels and the underrepresentation of the lowest income levels are more pronounced among matriculants to medical schools than among matriculants to U.S. colleges and universities.

Finally, results show that matriculants in higher-income quintiles were more likely to be in higher SES-EO groupings (Table 1). For example, among those in the top 5% of household incomes, more than 93% were in the EO-3, EO-4, and EO-5 groupings, while students from the lower income quintiles were more likely to be in the lower SES groupings (EO-1 and EO-2). For matriculants from the lowest income quintile, 62% were in the lower SES categories (EO-1 and EO-2), 17% were in the higher SES categories (EO-3, EO-4, and EO-5), and the remaining 21% had an EO score of "Not Applicable" or "Unknown," which appears to be due mostly to having a deceased parent or having a parent whose highest level of education was completed outside the U.S.

Discussion

In the U.S., household income and education levels are tightly linked. Higher levels of education are correlated with higher household income and vice versa.[11] Medical education exemplifies this relationship; a medical degree is among the highest levels of educational attainment, and physician is among the highest-earning professions.[12]

This research shows that roughly three-quarters of medical school matriculants come from the top two household-income quintiles, and this distribution hasn't changed in three decades. U.S. medical schools have almost always relied on applicants with bachelor's degrees from colleges and universities, whose attendees are not evenly distributed across income levels, so the pool of medical school applicants has not been evenly distributed across income levels. The harsh reality of these data underscores the vast challenge medical schools face if they attempt to change the mix of matriculants by household income.

Table 1. Parental Education and Occupation of First-Year U.S. Medical Students, by U.S. Census Income Groupings, 2014-17

Parental Income Quintile	Less than a bachelor's degree or any degree with a service, clerical, skilled, or unskilled occupation (EO-1 and EO-2) (N)	With a bachelor's degree or more and an executive, managerial, or professional occupation (EO-3, EO-4, and EO-5) (N)	Not Applicable or Unknown[1] (N)	Total (N)
1st	62% (1,213)	17% (333)	21% (418)	100% (1,964)
2nd	66% (2,278)	22% (770)	12% (403)	100% (3,451)
3rd	52% (2,507)	40% (1,898)	8% (405)	100% (4,810)
4th	31% (3,180)	64% (6,501)	5% (557)	100% (10,238)
5th: 80%-95%	13% (1,580)	83% (10,400)	4% (513)	100% (12,493)
5th: Top 5%	4% (453)	93% (11,187)	3% (354)	100% (11,994)

Sources: AAMC MSQ and AMCAS data from 2014 through 2017.

1. "Not Applicable" includes applicants whose parents' highest level of education was completed outside the U.S. and are not legal residents of the U.S.; whose parents are deceased; who did not provide parent data; or who are not U.S. citizens or permanent residents. "Unknown" includes applicants whose parental EO levels are "Unknown" or one parental EO level is "Unknown" and all other parental EO levels are "Not Applicable."

Overcoming the challenge of unequal college attendance by income level requires a blend of innovative approaches. One strategy is to review medical school applicants holistically by factoring in academic metrics, experiences, and attributes while remaining grounded in an institution's mission.[13] Another strategy is to partner with undergraduate institutions or community organizations that seek to expand the pipeline of health professions applicants from underrepresented backgrounds by fostering interest in science careers among students of all ages. Such medical school efforts are both important and necessary because without them or without a substantial change in access to higher education for all income quintiles, the economic diversity of entering medical students is unlikely to change.

Table 2. Parental Income of First-Year U.S. Medical Students, by Quintile of U.S. Household Income, 2007-17

MSQ Year	1st Quintile (N)	2nd Quintile (N)	3rd Quintile (N)	4th Quintile (N)	5th Quintile (N)		Total (N)
					80%-95%	Top 5%	
2007	4% (482)	5% (604)	14% (1,518)	17% (1,848)	32% (3,529)	28% (3,128)	**100% (11,109)**
2008	4% (535)	5% (655)	13% (1,525)	28% (3,401)	20% (2,452)	30% (3,621)	**100% (12,189)**
2009	5% (541)	6% (677)	12% (1,480)	26% (3,165)	22% (2,597)	30% (3,577)	**100% (12,037)**
2010	5% (567)	6% (775)	13% (1,519)	26% (3,096)	22% (2,631)	29% (3,453)	**100% (12,041)**
2011	5% (528)	6% (602)	12% (1,346)	25% (2,759)	22% (2,382)	30% (3,316)	**100% (10,933)**
2012	5% (515)	6% (704)	12% (1,343)	25% (2,845)	22% (2,519)	30% (3,452)	**100% (11,378)**
2013	5% (546)	6% (724)	12% (1,434)	23% (2,806)	23% (2,777)	32% (3,930)	**100% (12,217)**
2014	4% (539)	8% (926)	10% (1,224)	22% (2,694)	23% (2,845)	33% (3,958)	**100% (12,186)**
2015	4% (439)	8% (819)	10% (1,076)	23% (2,540)	31% (3,415)	25% (2,690)	**100% (10,979)**
2016	5% (476)	8% (820)	12% (1,303)	20% (2,174)	30% (3,206)	25% (2,715)	**100% (10,694)**
2017	5% (511)	8% (886)	11% (1,207)	26% (2,830)	27% (3,028)	24% (2,631)	**100% (11,093)**

Source: Matriculating Student Questionnaire 2007-17.

Notes

1. Jolly P. Diversity of U.S. medical students by parental income. *AAMC Analysis in Brief.* 2008;8(1):1-2. https://www.aamc.org/download/102338/data/aibvol8no1.pdf.
2. Acosta DA, Poll-Hunter NI, Eliason J. Trends in racial and ethnic minority applicants and matriculants to U.S. medical schools, 1980-2016. *AAMC Analysis in Brief.* 2017;17(3):1-4. https://www.aamc.org/download/484966/data/november2017trendsinracialandethnicminorityapplicantsandmatricu.pdf.
3. For more information on the MSQ, see aamc.org/data/msq. The 2017 MSQ response rate was 65%. Parental income values of less than $1,000 were excluded, and only data from the first administration of the MSQ were used. Because previous-year parental income is reported, the 2017 MSQ data align with 2016 U.S. Census data.
4. A total of 26,032 MSQ participants were excluded from the analysis: 24,281 MSQ participants did not report parental income, and 1,751 MSQ participants reported parental income values of less than $1,000. Before 2008, values less than $1,000 were not retained; therefore, for consistency across years, values less than $1,000 for all years in the analysis were excluded.
5. Historical U.S. Census data for household income by quintiles are available at https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html.
6. Eagen K, Stolzenberg EB, Zimmerman HB, Aragon MC, Sayson HW, Rios-Auilar C. *The American Freshman: National Norms Fall 2016.* Los Angeles: Higher Education Research Institute, UCLA; 2017.
7. For more about the SES-EO indicator in medical school admissions, see Grbic D, Jones DJ, Case ST. *Effective Practices for Using the AAMC Socioeconomic Status Indicators in Medical School Admissions.* Washington, DC: Association of Medical Colleges; 2013. https://www.aamc.org/download/330166/data/seseffectivepractices.pdf.
8. The EO value is based on having both education and occupation information for at least one parent; for students with complete information for two parents, the higher value is used.
9. For applicants who are non-U.S. citizens or not permanent residents, applicants with parents who are non-U.S. citizens or were educated outside the U.S., applicants with deceased parents, or applicants who did not provide parent data.
10. For applicants where all parental EO levels are "Unknown" or one parental EO level is "Unknown" and all other parental EO levels are "Not Applicable."
11. For example, see these two references:

    Ma J, Pender M, Welch M. Education Pays 2016: *The Benefit of Higher Education for Individuals and Society.* New York, NY: College Board; 2016. https://trends.collegeboard.org/sites/default/files/education-pays-2016-full-report.pdf.

    Bureau of Labor Statistics. Measuring the value of education. https://www.bls.gov/careeroutlook/2018/data-on-display/education-pays.htm. Accessed October 2018.
12. See Commins J. Docs dominate another highest-paying jobs list. https://www.healthleadersmedia.com/strategy/docs-dominate-another-highest-paying-jobs-list. Accessed October 2018.
13. See Kirch DG. Transforming admissions: the gateway to medicine. *JAMA* 2012;308(21):2250-2251.

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