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PERSPECTIVES

The dynamics of poverty, educational attainment, and the children of the disadvantaged entering medical school

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Abstract: Approximately one-third of the US population lives at or near the poverty line; however, this group makes up less than 7% of the incoming medical students. In the United Kingdom, the ratio of those of the highest social stratum is 30 times greater than those of the lowest to receive admission to medical school. In an effort to address health disparities and improve patient care, the authors argue that significant barriers must be overcome for the children of the disadvantaged to gain admission to medical school. Poverty is intergenerational and multidimensional. Familial wealth affects opportunities and educational attainment, starting when children are young and compounding as they get older. In addition, structural and other barriers exist to these students pursuing higher education, such as the realities of financial aid and the shadow of debt. Yet the medical education community can take steps to better support the children of the disadvantaged throughout their education, so they are able to reach medical school. If educators value the viewpoints and life experiences of diverse students enriching the learning environment, they must acknowledge the unique contributions that the children of the disadvantaged bring and work to increase their representation in medical schools and the physician workforce. We describe who the disadvantaged are contrasted with the metrics used by medical school admissions to identify them. The consequences of multiple facets of poverty on educational attainment are explored, including its interaction with other social identities, inter-generational impacts, and the importance of wealth versus annual income. Structural barriers to admission are reviewed. Given the multi-dimensional and cumulative nature of poverty, we conclude that absent significant and sustained intervention, medical school applicants from disadvantaged backgrounds will remain few and workforce issues affecting the care patients receive will not be resolved. The role of physicians and medical schools and advocating for necessary societal changes to alleviate this dynamic are highlighted.

Keywords: lower socioeconomic populations, medical school admissions, health disparities, diversity and inclusion, social justice

Introduction

Broadly divided, two major theories about the reasons for poverty have gained prominence. The first posits that intrinsic characteristics like motivation and beliefs are primarily responsible for poverty. The second locates the root of poverty within largely extrinsic societal problems. Framed around concerns like individual agency and the "deservedness" of the poor, attitudes aligned with the first theory have been consistently associated with negative beliefs about the poor and welfare in international surveys.[1–3] If poverty is due to individual characteristics then we would expect

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long-term poverty to predominate, as personal traits are relatively fixed in adulthood. Yet we know this is not the case. According to the results of the most recent three-year longitudinal US Census survey, about one-third of Americans found themselves below the federal poverty line at some point in that timeframe, but only 3.5% were below the poverty line for all 3 years.[4] Even in the European Union, where social safety nets would be expected to enrich for the chronically impoverished, less than 60% of those meeting their "at risk of poverty" cut-off in 2014 met that definition in at least 2 of the preceding 3 years.[5] By contrast, a three-year timeframe is compatible with shifts in a broader economic environment. Thus, we look to structural issues in society as a more important driver of poverty.

The disadvantaged within the United States and globally

Before we can identify those societal issues that contribute to poverty, we must look at who the disadvantaged really are in the United States. This article will define families with a household income of 24,000 dollars—about the US federal poverty level—as "disadvantaged."[6] In 2018, even though one-third of the population has a family income near the poverty level, only 6% of the medical students come from such families.[4,6–9] Simultaneously, the proportion of US matriculants from the uppermost income quintile has increased to nearly 60%, the number from the top 1% exceeds the number from the bottom 3 quintiles, and the average medical student comes from a family with an income nearly 5 times the poverty level.[8,9] In the United Kingdom, the ratio of those of the highest social stratum is 30 times greater than those of the lowest to receive admission to medical school.[10]

The poverty rate also varies widely by race and ethnicity. Indigenous peoples have the highest rate of poverty. Native Americans and Alaska natives have the highest poverty rate (27.0%),[11] followed by African-of Americans (25.8%), Hispanics (23.2%), and native Hawaiians and other Pacific Islanders (17.6%). Whites not of Hispanic origin (11.6%) and Asians (11.7%) have much lower poverty rates, although there is heterogeneity within the latter. Vietnamese and Koreans have a higher rate than Filipinos. Location matters as well: Native American and Alaska natives in Rapid City, South Dakota (50.9%), have a much higher poverty rate than those in Anchorage, Alaska (16.6%).[12,13]

As outlined in the American case earlier, demographic factors like ethnic minority status, indigenous populations in countries with a history of colonial expansion, geographic distribution and disability often mark marginalization and over-representation among the poor. Over a decade ago,[14] the UK medical system like many others around the world responded to the recognition that the medical profession was by dominated by those from more affluent backgrounds[15] and began efforts to widen access –

> "ensuring that students from disadvantaged backgrounds can access higher education, get the support they will need to succeed in their studies, and progress to further study and/or employment suited to their qualifications and potential".[16]

Assessment of poverty

The most widely used measure of socioeconomic status for American medical school applicants is the cross-sectional SES EO system offered by the AAMC.[17] Several weaknesses have been identified in the system, particularly among the E02 category. African Americans and Hispanics, despite the same educational or job classification experience lower salaries, much higher rates and durations of unemployment compared to whites at the same educational levels.[18] The dependence of the current system on educational attainment disadvantages candidates of these backgrounds through a "false negative" phenomenon, over-estimating their familial resources. About 10% are false negative using the EO system.[17] False positives, with no indicators of disadvantaged status, represent 36% of the EO1 and EO2 designees according to the validating article.[17] EO1, the lowest indicator of socioeconomic status represents nearly 25% of the population – four times the prevalence expected when using alternative metrics of disadvantage like parental income. Similarly, the UK employs a system based on the parent's job titles, in spite of the fact that among those classified as managerial/professional jobs, only 15% of Blacks live in affluent areas as compared with 72% of Whites.[19]

The effects of intergenerational mobility and poverty

The disadvantaged are not middle-class Americans who have less money in their bank accounts. They live very different lives. Disadvantaged parents may raise their children differently.[20] They likely dispense different advice about higher education.[21] Society and the medical profession also treat the disadvantaged differently.[22]

Growth in income inequality has increasingly made America a land of rich and poor with the middle class shrinking.[23,24] Urban settings may magnify socioeconomic inequality within that immediate environment even as, to relative rural settings, better outcomes are achieved.[25] Further, intergenerational mobility is relatively poor. Compared to their fathers', 42% of American men remained in the bottom quintile of earnings compared to 30% in Britain and 25% in Denmark.[26] In the United States, it could take at least 5 generations for the descendants of a low-income family to achieve an average income.[27]

Being born into a wealthy family greatly enhances opportunity.[28] Socioeconomic status is one of the most consistent predictors of academic achievement in children. It affects academic achievement in 2 ways: materially by providing higher-quality educational resources; and perceptually as students identify their educational prospects and opportunities. In America, the wealth of one's grandparents is a unique predictor of one's own wealth.[29] Two-thirds of the differences in a family's ability to retain wealth are explained by their ability to access and hold real estate.[30] For communities of color, a constellation of discriminatory practices and laws made passing down property wealth to one's offspring nearly impossible and often illegal until Title VIII of the Civil Rights Act of 1968 (the Fair Housing Act). The lasting effects of more than a century of discriminatory policy remain problematic to this day. Even with laws like the Fair Housing Act, housing practices did not change overnight, leaving communities of color less able to accumulate the same wealth as other communities across generations.

For more recent immigrants, such as Asian-Americans, their future economic outlook is tied to their educational attainment upon arrival.[4] The higher the educational attainment of an individual or group (eg, Asian Indian, Pakistani, Chinese), the greater the likelihood that their children will remain at or above the median income in the United States. In contrast, those with lower educational attainment upon arrival (eg, Vietnamese, Cambodian, Laotian) are likely to remain at the bottom of the economic ladder.

The chances of moving up and into the middle class differ according to racial/ethnic origins: White Americans have a greater chance.[31] Poverty in the preceding generations and residence in a disadvantaged neighborhood are markers for chronic poverty. Applied to racial/ethnic minority groups, they suggest many individuals will not escape their situation. Poverty among Native American and Alaska natives is both endemic and multigenerational.[11] Nearly two-thirds of African-Americans aged 13–28 are now living in disadvantaged neighborhoods.[31] Considering all black families, 48% have lived in disadvantaged neighborhoods over at least two generations.[32] Even for disadvantaged Asians, evidence of upward mobility for those at the bottom is limited.

The role of familial wealth and its impact on educational attainment

Even when the disadvantaged achieve middle-class income, their status is tenuous, and they may never quite fit in. They often continue to live in disadvantaged neighborhoods,[33,34] and their children have less access to a quality education. Particularly following the Great Recession,[6] the more than tenfold difference in familial wealth (for those with the same income) between the disadvantaged new to the middle class and those native to the middle class meant that the disadvantaged recovered more slowly or not at all.[35] This disparity in wealth versus income has increased in recent years.[36] It has become more important as familial wealth (ie, the net of many key dimensions of socioeconomic status) has become more predictive of children's educational success across and within races.[36–38]

The environment in which a child is raised matters. Genetic endowments (ie, one's innate abilities) are nearly equally distributed among low- and high-income children.[39] However, success is not. Social and economic disadvantage, not only income but a host of other associated changes, depress student performance[40] and have a deleterious effect on everything from their educational attainment to their overall success. Its cognitive load is estimated to impair performance comparably to chronic alcoholism or a 24 hr sleep deprivation.[41] Factors associated with poverty, such as poor health, housing instability, crime, inadequate pre-literacy experiences, inadequate after school enrichment opportunities, and higher teacher turnover rates, make it difficult for disadvantaged students to take full advantage of even the best classroom instruction.[42] In addition, experiences associated with lower educational attainment, such as childhood trauma or violent victimization, are more common experiences for the disadvantaged.[43] The harm associated with living in a poor environment is magnified when children live in areas where jobs disappeared long ago, and drugs, violence, and high levels of stress are commonplace.[31] Today, these environments can include suburban and rural

communities in addition to urban ones.[44] When families live in such hostile environments for multiple generations, the harm to children is further magnified.[32] Currently, wealth and location predict a student's educational opportunities and chances of success[44,45] Even for those within poor neighborhoods, the wealthy have great educational success.[45] Higher income families are able to provide for more developmentally oriented activities and goods compared to disadvantaged families.[28]

The gulf between what a disadvantaged family can afford (eg, basic food, clothing, and shelter) and what a wealthy family can afford is very wide. They live in safer neighborhoods with better schools, which affords their children access to the social accouterments and preparedness that lead to educational success. Children who attend poor primary and secondary schools are at a lifetime disadvantage and are less competitive college applicants. Moreover, the children of the disadvantaged have less access to quality educational opportunities, which limits their preparation (eg, study skills, critical reading, and writing skills) and in turn limits their future opportunities for acceptance to a four-year college or for academic scholarships. Many of these children must also work to help support their families, which limits the time they have to pursue the necessary academic recognition and experiences to compete successfully for college or medical school.

Although overall educational attainment has risen for all income groups over time, the gains are concentrated among children from higher income homes.[46] Absent like individuals to model success either in institutions of higher learning or in their local neighborhoods, adequately prepared student from disadvantaged backgrounds often fail to apply to medical school, believing people from their background do not become physicians.[47–49] The children of the disadvantaged fail to graduate from college at five times the rate of children from middle-income families and at six times the rate of children from high-income families.[50] For first-generation college students, 60–80% come from poor backgrounds and nearly 90% leave college within six years without a degree.[51] Increasingly the children of the disadvantaged have become clustered in public two-year institutions, which often are the end of their formal education.[52] If a student attends a four-year college (most children of the disadvantaged do not), the chances that student will obtain a bachelor's degree are 1 in 2 if family income is greater than $90,000, but only 1 in 17 if family income is less than $35,000.[53] The least gifted children from high-income families still graduate from college at higher rates than the most gifted children from low-income families.[39] The greater a child's family income is the greater the likelihood that that child will attend and persist in college and have the opportunity to attend medical school.[8] Educational success in the United States is largely a function of familial wealth.[28]

Poverty is multidimensional

Poverty is multidimensional[54,55] For example, an employed low-income high school graduate who lives in an economically mixed neighborhood and has health insurance is less "poor" then someone with the same income but without the other characteristics.[56] As more disadvantages (eg, income, education, health insurance, employment, living in a poor area) accumulate, "lived" poverty increases. Yet disadvantages do not cluster evenly or in the same way across populations, regions, or communities. Most racial/ethnic minorities are disadvantaged in multiple dimensions, while most whites are not. Among the low-income population, racial/ethnic minorities are more likely to have other disadvantages, compared to whites.[57] Types of disadvantage also differ by location; for example, lack of employment is more common in rural areas and living in a poor area is more common in urban areas.[56]

Multidimensional assessments of poverty (like the ones we have discussed above) have advantages over simple assessments using income only, yet they still only represent a slice in time and may not represent lifetime opportunities. Additional research is required to better understand the effects of different elements of poverty longitudinally including intermittent poverty (eg, duration, intensity, frequency, and total time in poverty)[58] as each may influence educational outcomes.

Adverse practices in higher education

In the aftermath of the Great Recession, all but one state cut spending for higher education. In response to declining financial support, many colleges and universities shifted from offering need-based scholarships to offering merit-based scholarships (the benefits of which largely accrue to upper- and middle-income families), enrolling international and out-of-state students whose higher tuition better helps defray costs (most come from upper-income families),[59] and reducing or curtailing student support services. Nationally, state reliance on tuition revenues more than doubled from 22% in 1982 to 46% in 2017.[60] Just as college tuition skyrocketed, the representation of children of the disadvantaged at the most prestigious public and private universities in the United States declined.[59] Collectively, these actions have reduced access to college for children from disadvantaged families.[46,61] This shift has had

downstream effects as well, such as limiting their presence in the medical school applicant pool.

The inadequacies of financial aid

Financial aid does not level the playing field for the children of the disadvantaged. The effects of poverty continue to plague these children into college. In 2015–2016, 32,000 college applicants were identified as "unaccompanied homeless youth" on federal student aid forms, a number widely considered to be a low count.[62] According to a recent national study of over 33,000 college students, more than 60% were food insecure, 50% housing insecure, and 13% homeless.[63] It did not matter what region of the country was examined. Alarmingly, more than 31% of the students who were food and/or housing insecure were both working and receiving financial aid.[63] The findings of a 2016 survey of the University of California's four-year institutions found similar results.[64]

College costs have risen substantially in the last decade making the practice of "working your way through school" impractical. Working for more than 10–15 hrs per week can negatively affect academic success and hamper efforts to pursue the necessary extracurricular activities to be competitive for medical school. In more than three-quarters of states, disadvantaged students must work more than half time to be able to afford to go to school (often then only part-time) and remain debt-free.[65] Grants are few and rarely cover the costs of college. Federal student loan limits have not increased in decades. Rather than leveling the playing field, financial aid (lack of an adequate amount) is often a barrier to attending college for the children of the disadvantaged.[66]

In the shadow of debt

Debt often casts a shadow on the lives of the children of the disadvantaged. Since the Sullivan Commission,[67] the profound influence of debt on medical school applicants from disproportionately disadvantaged backgrounds has been widely acknowledged. The potential burden of educational debt is a primary reason why high-achieving children from disadvantaged backgrounds choose not to pursue a college degree[21]or medical school.[68] Debt level influences medical students' career choices,[9] and longer-term debt adversely impacts physicians' net worth,[69,70] which in turn can affect available interest rates on other types of loans for decades to come.[70] Students' levels of indebtedness are greater when their parental income is less.[9,71] Reducing the indebtedness of children from disadvantaged families increases their odds of attaining a bachelor's degree[72] and attending a four-year college instead of a community college.[73]

Benefits of increasing disadvantaged presence in medicine

Increasing physician diversity will increase access to health care services for the underserved, improve patient satisfaction, and expand the options for patient care. Medical students raised in underserved areas are more likely to practice in an underserved area upon completion of their training[74] as has been documented in Scotland as well.[75] Internationally, students from rural and underserved areas were more likely to practice in rural and underserved areas.[76] As in the United States, indigenous populations across a variety of developed and developing countries have been found to have significantly worse health outcomes and socioeconomic status.[77] It is essential to address underrepresentation of indigenous health professionals globally as being both vital to overcome indigenous health and health disparities.[22,78] In interactions with students from diverse backgrounds during training helps all students challenge their assumptions, broaden their perspectives, and better understand cultural differences.[79,80] Therefore, an increase in both within the United States and globally the representation of the disadvantaged in the physician workforce may help to alleviate health disparities and improve care for all.

We must act

Health care professionals have fallen short in improving access for the economic disadvantaged in applying to and entering medical school. Medical students and physicians appear to have a class-based bias against the disadvantaged,[22,78,81] which is stronger even than racial prejudice.[22] These implicit and explicit biases have been shown to cause harm in adults and children,[82] impact medical care,[83] adversely influence medical school admissions,[84] and perpetuate health disparities.[85] Justice dictates every person has a fundamental right to equitably delivered health care.[86,87]

One clear component of this effort must be advocacy against the drivers of these socioeconomic disparities, even if this implies addressing structural inequality within our societies. Compared to the rest of international community efforts to widen access, American efforts have been anemic. There is yet no uniform definition of who the disadvantaged are, acknowledgment of their underrepresentation in medicine,[88] nor has there been any significant organizational efforts to widen access

for the disadvantaged.[89] Entitlement to education is both fundamental for freedom, justice, and peace. As Horace Mann expressed in 1848 about the American educational system "Education, then, beyond all other devices of human origin, is the great equalizer of the conditions of men–the balance-wheel of the social machinery".[90] Absent reflective, well-informed citizenry, medical educators and administrators, institutions may perpetuate practices of privilege and discrimination. Such activity is well within the purview of medicine. Echoing Virchow's beliefs from three centuries prior,[91] the American Medical Association has called for physician advocacy for "social, economic, educational, and political changes that ameliorate suffering and contribute to human well-being".[92] Faced with structural impediments to applicants from impoverished backgrounds, Abraham Flexner's landmark report on medical education argued vociferously that medical schools were "bound to assist the development of the secondary school" and should not exclude the "poor boy".[93] Then as now, a key strategy will be to enhance the quality of public education, as more than 50% US public school students are now disadvantaged.[94] Given the intersection with social determinants of health, other logical targets include food insecurity and general expansions of the social safety net in America.

Qualified medical school applicants are not being identified and retained by colleges; thus, they are not making it so far as even applying to medical school.[95–97] Pipeline programs have some degree of efficacy although long-term they often fail due to the lack of funding/support. In Japan, a regional quota system was rolled out aggressively without any decline in academic performance.[98] It is easy to imagine repurposing such a system to target disadvantaged students. New Zealand recently introduced such a program, though it has a longer standing affirmative action for under-represented indigenous populations, both of which could be adapted.[99,100] Across nations with both developed and developing economies, a wide variety of these strategies has been employed successfully.[101]

Electing between these strategies will depend in part on local conditions and social mores. Surveying developed economies and the United States, there is a uniform embrace of widening access. However, the justification does differ perceptibly. In the United Kingdom and United States, the justification is to support the academically qualified and committed who through their background who happen to be disadvantaged. Cognitive criteria are given the most prominent role as the medical school reaches out to help the needy.[102] Canada, much like New Zealand conceptualizes a more substantial role for the benefits to patients and medical care.[103] Beyond looking to other countries for alternative models for boosting matriculation, cross-pollination of ideological frameworks may also be beneficial. This is especially true in the United States, where several potential strategies have been restricted secondary to political backlash.

More deliberate admissions policies will have to be pursued to address this ongoing physician workforce issue. Non-cognitive attributes better predict applicants' long-term behaviors than their cognitive attributes.[104] Achieving a meaningful representative presence (ie, critical mass) is not achieved linearly,[105] the context in which students are placed may diminish students social and cultural capital,[106] enhance their positive or negative qualities or change them altogether.[107]

Over the last decade, the number of graduating physicians has increased dramatically yet the problems within the physician workforce and health care remain.[108] The fear of litigation has made the focus of the admissions process procedure integrity rather than the outcomes achieved. A mismatch between the schools' social mission values and those manifest within the admissions process may result.[109] Efforts directed at both outreach (aspirational and recruitment) and selection are not a Faustian choice of either/or, both are necessary to widening access.[8,14,110,111]

Conclusions

Neither poverty nor the under-representation of the disadvantaged in medicine are unique in their status as topics of medical concern not readily addressed by treatment interventions. The convergence of medicine's longstanding commitment to enhancing the health of our communities and the need to expand representation in our medical school classes necessitates that we consider how to admit and retain the children of the disadvantaged in our medical schools and training programs. Studying medicine should not be a privilege for the wealthy few. Broad-based public advocacy and policy action is required. We need to recommit making higher education available to all, to better funding public education, and to reducing the burden of debt on our students.

Failure to address the issues we have discussed here will both perpetuate and exacerbate the consequences of our past inadequacies. The disadvantaged represent one of the largest medically underserved populations in the United States, and they are one-third of our total population. We must address the cumulative weight poverty puts on children, especially those who hail from historically underrepresented in medicine populations and recognize the unique contributions they can make to the physician workforce.

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