Cultivating the physician workforce: Recruiting, training, and retaining physicians to meet the needs of the population

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ABSTRACT

In the 10 years since the Lancet Commission on Education of Health Professionals for the 21st Century suggested the changes necessary to transform medical education, the United States remains plagued by shortages of physicians and maldistribution of the physician workforce. Minoritized and rural communities usually suffer the most, with widely documented health disparities across the United States by race, ethnicity, gender identity, education, and zip code. Medical schools can respond by recruiting students more likely to practice in these settings and training them to address the community needs. In 2013, the American Medical Association launched an initiative to trigger transformation in medical education and formed a consortium of schools representing a diversity of U.S. institutions. Consortium member schools highlighted in this article share lessons learned in their efforts to strengthen social accountability and develop needed sectors of the physician workforce. Development of the physician workforce involves recruiting and widening pathways of entry for diverse groups, providing training settings and competencies aligned with community needs, and explicit programming in retention, inclusion, and well-being to mitigate against workforce losses.

Practice points

- A transformed educational system, recognizing that health equity is better achieved by a diverse workforce, embraces learners of diverse backgrounds and combats structural barriers and educational inequalities by correcting the unfairness of historical selection practices.
- Regional and national physician workforce needs for urban, rural, and health professions shortage areas should catalyze the development of new pathways to medicine programs.
- Immersion and partnership with communities, ‘where health happens’ will strengthen health equity competency for all physicians and recruit future practitioners to areas of need.
- Workforce attrition at every stage is a constant reminder of the ravages of burnout, depression, and other mental health conditions and the need to continue comprehensive support for learners to practicing physicians.

The social accountability of educational institutions

As for most other wealthy countries, the USA has chronic shortages of physicians, suffers from imbalances in expertise (especially shortage of primary care physicians), and has maldistribution of professionals for coverage of disadvantaged populations.” — The 2010 Lancet Commission on Education of Health Professionals for the 21st Century (Frenk et al. 2010)

In the 10 years since the Lancet Commission suggested the changes necessary to transform medical education, the United States remains plagued by shortages of physicians and maldistribution of the physician workforce. Minoritized communities often suffer the most, with widely documented health disparities that vary by race, ethnicity, gender identity, education, and zip code — to name a few. As gatekeepers to the profession, medical schools can respond to physician specialty and geographic shortages by recruiting and training students more likely to address community needs. For example, there is growing evidence that racial concordance improves not only patient satisfaction and adherence but also health outcomes (Alsan et al. 2019; Greenwood et al. 2020). However, there are stark differences between the backgrounds of students currently enrolled in medical schools and the patients they will serve in terms of race, ethnicity, rural backgrounds, first-generation college status, and economic background (Greenwood et al. 2020; Terregino et al. 2020).

The World Health Organization defines social accountability as ‘directing education, research and service activities toward addressing the priority health concerns of the community, region, and/or nation they have the mandate

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KEYWORDS
Medical education; social accountability; structural and social determinants of health; diversity equity and inclusion; well-being

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to service’ (Boelen and Heck 1995). Advocates for strengthening social accountability in medical education have proposed the following indicators that would highlight schools focusing on the social mission: (1) the percentage of graduates who practice primary care, (2) the percentage of graduates who practice in shortage areas, and (3) the percentage of graduates from backgrounds underrepresented in medicine (Mullan et al. 2010).

The Lancet Commission illustrated the need to align the health system and the educational system to develop a workforce responsive to the needs of the population (Figure 1). In contrast to countries like the Netherlands, Denmark, and Canada (Vaughan 2018), the educational ‘system’ in the U.S. lacks cross-institutional alignment to address workforce needs, and each institution independently responds to multiple missions and market forces. While U.S. MD-granting schools have increased graduates by 18% (Orlowski et al. 2019) and DO-granting schools by 79% from 2008–2018 (AACOM 2020; Morris et al. 2021), increasing the workforce alone is inadequate to address the imbalances, lack of diversity, and maldistribution. A systems framework to collaboratively address workforce needs is lacking in the United States.

The American Medical Association Accelerating Change in Medical Education Initiative

In 2013, the American Medical Association (AMA) launched the Accelerating Change in Medical Education initiative to spur transformation in medical education, awarding five-year grants of $1 million to 11 medical schools answering the call to foster competency-based individualized educational pathways, trainee competency in health systems, and improvements in the learning environment. Recognizing the powerful role of community in achieving transformation, the AMA gathered these schools into the Accelerating Change in Medical Education Consortium to share struggles and successes. The consortium was later expanded via more modest grants to include a total of 32 schools in the initial five-year window. This article is primarily focused on 2013–2018, the first five years of the consortium and the original 32 medical schools.

The AMA’s initiative was designed to promote a systems-level view of medical education in the United States. The AMA made a concerted effort to invite into the consortium schools that represent a diversity of institutions with respect to governance, funding, size, and mission; each institution serves a different role in developing the physician workforce for the country. The schools highlighted in this article were invited to become members of the consortium based in part upon proven track records in social accountability, with the expectation that their ongoing efforts would be informative to collective growth across the entire consortium membership. Social accountability spans the continuum of medical education from recruitment to practice; although the consortium initially included only medical schools, member institutions brought to bear their experiences across the continuum and share a desire to extend these activities into graduate medical education and practice.

Advancing social accountability together

Ideally, the AMA initiative seeks to foster a systems approach to strengthen the national educational response to the needs of U.S. patients and populations. Intervention points of consortium member efforts are outlined in Figure 2. Addressing the social mission of medicine and correcting maldistributions in the U.S. health care workforce requires recruiting and selecting the right people for the right jobs and optimally training those people in the right settings and toward the right competencies. There is a risk of loss of workforce members all along the pathway of training, worsened by the lack of inclusive practices and burnout among trainees and practicing physicians. Any workforce initiative must thus also address member well-
being and success to support retention (Bodenheimer and Sinsky 2014).

Recruitment and selection

‘Ultimately, the criteria for admission are linked to and are indicative of institutional purpose.’ — The 2010 Lancet Commission on Education of Health Professionals for the 21st Century (Frenk et al. 2010)

The U.S. medical education system has historically marginalized many groups of people who could have strengthened the ranks of physicians. Accreditation for U.S. allopathic schools requires efforts toward achieving diversity of the student body, but each school is able to create its own definition of diversity to meet this standard. Minority-serving institutions continue to graduate the largest numbers of physicians historically underrepresented in medicine (Elks et al. 2018), but the overall racial and ethnic composition of the physician workforce has not significantly changed (Morris et al. 2021). Innovative selection strategies include holistic review, improved understanding of the range of scores on the U.S. Medical College Admission Test (MCAT) over which students can be successful in medical school (Busche et al. 2020), appreciation of the rich diversity in applicants in the middle score of the MCAT (Elks et al. 2018; Terregino et al. 2020), multi-mini interview (MMI) (Jerant, Henderson, Griffin Talamantes et al. 2018; Jerant, Henderson, Griffin, Hall et al. 2018), and other interview strategies with predictive validity for desired attributes (Rees et al. 2016; Terregino et al. 2018) and implicit bias training for the admissions team (Capers et al. 2017, 2018). The workforce that will be successful in meeting societal needs must have an enhanced diversity and service orientation. Recruitment to areas of workforce need may be an essential element of a school’s mission for all students or may involve the creation of targeted tracks or pathways. Mission-based admissions to undergraduate medical education (UME) and selection into UME with direct progression into graduate medical education (GME) concomitantly have been developed to address ongoing shortages of physicians in primary care, rural-based practice, community-engaged practice, and cohorts of diverse students and residents.

Exemplars in recruitment and selection

**Brody School of Medicine at East Carolina University**

Brody has developed a model of preparing a primary care physician workforce that meets North Carolina’s future physician workforce needs. Its success can be attributed to recruiting students only from North Carolina, conducting a holistic review of applicants, providing a primary care-focused educational process, and maintaining low tuition rates so specialty choice is not significantly influenced by student debt. To combat continuing issues of disparity, Brody is ensuring that at least one-fifth of each medical school class is comprised of students from groups underrepresented in medicine (UiM). To address the ongoing decline in the number of primary care physicians who choose to practice in North Carolina, the school is looking to increase residency positions in the state and create more opportunities for medical school graduates to do at least part of their residency training in rural areas.

**City University of New York School of Medicine**

In 1973, the Sophie Davis Biomedical Education Program at the City College of New York was established to recruit UIM high school students who expressed interest in practicing primary care in underserved areas. It was created as a BS program that included the first two years of medical school courses, after which students transferred to a cooperating medical school to complete their clinical training and graduate as MDs. Data including graduates from its first class in 1977 through 2010 revealed 41% practicing primary care and 29% practicing in Health Professions Shortage Areas (HPSA). In 2016, this five-year BS became a seven-year combined BS/MD program at CUNY School of Medicine. Five population health courses are included in the undergraduate phase of the combined BS/MD program and students are assigned to an outpatient primary care...
federally qualified health center (FQHC) or FQHC look-alike beginning in the spring semester of year 3 and remain at that site for the three years of the continuity experience, learning to identify the structural and social determinants of health that impact the health of patients and communities served by these health centers and even to intervene in the health care of defined populations. Fifty-five percent of enrolled students are UiM, and 70% are immigrants or first-generation college students. Program evaluation demonstrated that the UiM students were at risk of attrition along the pathway. Performance on the MCAT was a significant barrier for that group, as reported at most medical schools (Agrawal et al. 2005), and this requirement was subsequently removed, positioning CUNY to meet its mission to graduate students UiM who practice primary care in underserved areas (Martos et al. 2017).

Morehouse School of Medicine

Morehouse School of Medicine (MSM) was founded in 1975 with a tripartite mission of workforce diversity, primary care, and underserved populations. Since that time, MSM has added residencies and additional degree programs and has remained true to this mission. From its first classes, MSM has addressed the need to expand the number of academically prepared students from the communities it serves, creating an interlocking series of over 25 pathway and outreach programs. These programs include academic advisement, academic enrichment, and service and research experiences to foster interest and preparation for health careers; on average 25% of matriculants in any given class have participated in a pathway and outreach program. The admissions process includes holistic review that values commitment to service and commitment to underserved populations. In 2011, MSM was recognized as the top ranked school in the United States for addressing the social mission (Mullan et al. 2010). Matriculating academically diverse students predominantly from groups UiM, MSM has a track record of ‘shifting the curve’ and enabling diverse students to have academic outcomes that exceed those expected based on entering credentials (Elks et al. 2018). In 2013, MSM systematically increased the class size from 56 to 100 without losing commitment to mission or excellence of outcomes. In the latest residency selection cycle, over 62% of graduates pursued primary care, and over 89% entered core specialties of need as defined by the state of Georgia.

Ohio University Heritage College of Osteopathic Medicine

The Ohio University Heritage College of Osteopathic Medicine (OUHCOM) mission is rooted in creating a physician workforce that will serve rural and urban underserved communities in Ohio. By emphasizing primary care and embracing diversity, 60% of graduates practice in Ohio, 50% practice in primary care, and 41% practice in a federally designated HPSA. OUHCOM uses a holistic admissions model to select matriculants who will meet its mission. The classes are typically greater than 95% in-state students. First-generation college students (typically greater than 25%) and students from counties designated as HPSAs are actively recruited as outcomes demonstrate that such students have a higher likelihood to practice where they were raised. Training is intentionally designed to occur in the very communities of need targeted by the social mission of the college. Pathway programs include Aspiring Doctors, an enrichment program created in the Cleveland community that serves several challenged school systems. Medical students, faculty, and staff introduce the students in grades 10-12 to health care professions and provide mentorship, leadership training, and college application assistance. OUHCOM has expanded to three campuses in Ohio to extend this mission on a regional level.

University of California Davis School of Medicine

The University of California, Davis (UC Davis) was an earlier adopter of holistic admissions and the Multi Mini Interview (MMI). To quantify socioeconomic and educational disadvantage without consideration of race and ethnic group, UC Davis has developed a continuous scale that incorporates information on parental education level, family participation in public assistance programs, family income level, whether an applicant spent their childhood in an underserved area, applicant contribution to family income, receipt of financial-need scholarships for college education, and whether an applicant had their medical school application fee waived (Jerant, Henderson, Griffin Talamantes et al. 2018). Seeking to address shortages in primary care physicians — in partnership with Kaiser Permanente of Northern California and with support from an AMA Accelerating Change in Medical Education grant — UC Davis developed the Accelerated Competency-based Education in Primary Care (ACE-PC) program, a six-year pathway from medical school to residency for students committed to careers in family medicine or primary care internal medicine. Prospective students are initially evaluated using the same holistic review and MMI as traditional UC Davis applicants. Via an additional panel interview with ACE-PC program leadership and representatives from partner GME programs, students are placed on a pathway from UME to primary care GME. Since starting in 2014, 75% of ACE-PC students are from UiM communities, 88% are from disadvantaged backgrounds, and 100% have entered family medicine or primary care internal medicine. Of the graduates to date, 50% are working in federally designated HPSAs.

Collective Consortium Efforts in Recruitment and Selection

Promoting diversity of the medical student population and fostering an inclusive learning environment was the focus of the consortium meeting in April 2019, hosted by the AMA in Atlanta in conjunction with member institutions MSM and Emory University School of Medicine. A separate thematic conference, focused more directly upon improving diversity of the physician workforce, was hosted by the AMA at the campus of the University of Connecticut in Farmington in May 2019. In addition to designated consortium grant team members, each member school sent admissions officers to participate. Anchoring discussions in evidence that health equity will improve with enhanced diversity of health care providers, schools shared strategies
for pathway programs, recruitment, selection, and retention. Members of a student panel shared personal struggles related to getting into, and staying in, medical school. Experiences with a variety of tools to support holistic admission processes — including the multiple mini-interview format, standardized video interviews, implicit bias training for admissions committees and interviewers, and a scale to quantify socioeconomic and educational disadvantage without consideration of race and ethnic group — were evaluated by consortium members. Schools with success in recruiting and retaining students from groups under-represented in medicine shared strategies. The consortium supports ongoing collective efforts in this area, including a statement to raise awareness of educational inequities among medical trainees (AMA 2019, 2020).

**Optimal Training Competencies and Settings**

‘…all health professionals in all countries should be educated to mobilise knowledge and to engage in critical reasoning and ethical conduct so that they are competent to participate in patient and population-centred health systems as members of locally responsive and globally connected teams. The ultimate purpose is to assure universal coverage of the high quality comprehensive services that are essential to advance opportunity for health equity within and between countries.’ — The 2010 Lancet Commission on Education of Health Professionals for the 21st Century (Frenk et al. 2010)

Traditional clinical education focuses on acute inpatient and episodic care settings, despite an increasing proportional burden of chronic disease that is managed in outpatient settings. From a systems perspective, U.S. hospitals have come to rely on medical trainees as a relatively inexpensive labor workforce (He et al. 2021), which may be a contributing factor anchoring training in inpatient settings. Based on societal needs, physician competencies and desired learning outcomes should increasingly focus on outpatient medicine, primary care, and chronic care. Training in structural and social determinants of health is critical, and empowering learners to understand and address the needs of the patient in the community has been shown to improve the learner experience (Gimpel et al. 2018). In this section we focus on novel strategies to identify and support attainment of professional competencies based on population needs; to develop curricula and competencies related to equity; and to correct misalignment of where learning takes place versus where health and illness happen (Park et al. 2019) in a ‘move from academic health centers to academic-community health systems.’

**Exemplars in optimal training settings and competencies**

**Warren Alpert Medical School of Brown University**

Brown has developed a primary care-population medicine program in which students complete a Master of Science in Population Medicine during the four years of medical school, which includes course work in health systems, health policy, the role of law and policy in health disparities and social determinants of health, and the social and community context of health care. Students complete a thesis focused on population medicine and take part in significant leadership training. Longitudinal integrated clerkship experiences during the third year of medical school are primarily based in the outpatient, rather than the hospital, setting, encouraging students to explore and apply their skills in the communities in which they work and learn (Epstein-Lubow et al. 2015).

**Herbert Wertheim College of Medicine at Florida International University**

The Herbert Wertheim College of Medicine at Florida International University has developed the Green Family Foundation Neighborhood Health Education Learning Program, which aligns with the school’s mission to create socially accountable physicians. Interprofessional teams of students and faculty are assigned to households with the goal of identifying and addressing their social determinants of health longitudinally. Community needs were determined based on the results of a door-to-door survey of 1,845 households. A network of academic-community partners was formed to create an infrastructure that facilitates all aspects of care for these households, from identifying social determinants to advocating for specific needs. Community capacity and trust is built through an engagement processes in which staff work with community leaders to recruit, enroll, and better advocate for their needs (Greer et al. 2018).

**Rutgers Robert Wood Johnson Medical School**

Primary care shortages are often recognized in the context of rural and inner-city populations. As medicine shifts to value-based care — in which outcomes and population health drive reimbursement — the need for primary care physicians will increase in all environments, even among the fully insured and in the physician-dense metro and urban environments of New Jersey. Two innovations at Rutgers Robert Wood Johnson Medical School (Rutgers RWJMS) have addressed this need for a workforce prepared to provide comprehensive integrated management of people’s health and disease prevention. The Maximizing Integrated Care Delivery through Interprofessional Learner Teams (ILT) project has deployed medical students and other health professions learners on care coordination teams of an accountable care organization (ACO) to augment patient care and maximize integrated care delivery at home. In the cohort of ACO patients with interprofessional learner team home visits, there was a 19% overall cost reduction, a 19% reduction in emergency department visits, a 14% reduction in inpatient hospitalizations, and a 44% decrease in inpatient costs, compared to the previous year of this cohort in the ACO without ILT home visits (unpublished data). The Primary Ambulatory and Community Clerkship Experience (PACCE) affords students enhanced continuity of care and continuity of faculty mentorship. Longitudinal relationships between faculty mentors, other health professionals, patients, and a medical student cohort are salient features of the track based in a community hospital environment with only family medicine residents and fellow students in nursing and pharmacy. The interprofessional learners partner in delivery of care, transitions of
care, and in documentation within an electronic health record. Rutgers RWJMS intends to further develop this program to create a three-year track to residency in family medicine.

University of Connecticut School of Medicine

Diversity, inclusion, and community-responsive workforce development are longstanding values and institutional goals of the University of Connecticut School of Medicine (UConn). Pathway programs, intentional admissions processes, and strong scholarship support have helped UConn sustain an average population of UiM students of 22% (well above national means) for many years. In 2016, UConn launched a new curriculum, MDelta, in an effort to produce graduates capable of providing high quality care to individuals as well as communities. There is emphasis on population health throughout the curriculum. One course, Vertically Integrated Teams Aligned in Learning, spans the first three years and teaches the fundamentals of population health, health law, ethics, and advocacy. Another unique feature of MDelta is the Certificate in the Social Determinants of Health Disparities that all students earn in addition to the MD degree, consisting of four public health graduate school courses imbedded longitudinally across the first three years of medical school, with a dedicated focus on health equity and social justice.

University of North Carolina School of Medicine

The University of North Carolina School of Medicine (UNC) has focused on the unique competencies necessary in a workforce serving the rural state of North Carolina. The school prioritizes minimizing tuition debt to enable graduates to effectively serve in rural communities and in primary care. The Office of Rural Initiatives houses many targeted pathway, scholarship, cohort, and community engagement programs focused on rural service. The Kenan Primary Care Medical Scholars program provides scholarship funding, community engagement projects, support, and a celebrated cohort interested in rural service. One hundred percent of the graduates of this program, which is seven years old, are practicing in a high need discipline in a rural community in the state of North Carolina. Additionally, UNC has launched the FIRST program, a three-year graduation pathway leading into a UNC residency in a high need discipline of interest declared by the student in their first year. This innovative program targets careers in family medicine, psychiatry, pediatrics, and general surgery, with anticipated expansion to obstetrics and gynecology and internal medicine in the future. In addition to an expedited and therefore lower cost medical school curriculum, the students in FIRST develop continuity with the faculty who will teach them during their residencies. The most unique piece of the UNC FIRST program is its expectation for three years of faculty support right out of residency, enabling ongoing competency development as one’s career is launched and providing a community to bolster practice sustainability in communities of high need (Coe et al. 2021).

Collective consortium efforts in optimal training settings and competencies

In December 2018, the AMA gathered representatives from consortium schools at the campus of Florida International University Herbert Wertheim College of Medicine in Miami for a thematic conference ‘Community Medical Education: from Engagement to Development.’ The conference featured keynote speakers who articulated a continuum of socially accountable education, ranging from engagement with local communities to active partnership in further development of those communities. Participants shared their strategies for effective collaboration to involve community partners in medical education programs. Many of these programs are interprofessional and apply a longitudinal approach to impact all levels of the medical education continuum. The AMA sponsored consortium teams to participate in national conferences of the Beyond Flexner Alliance, which promotes a view of medical training that extends beyond the traditional focus on basic science to include core competencies aligned with the social mission. The consortium has a shared focus on the need for strengthening equity training for all physicians regardless of discipline, in addition to actively recruiting and developing cohorts who will serve the underserved.

Retention: student and physician success, well-being and inclusion

‘Health is all about people. Beyond the glittering surface of modern technology, the core space of every health system is occupied by the unique encounter between one set of people who need services and another who have been entrusted to deliver them. This trust is earned through a special blend of technical competence and service orientation, steered by ethical commitment and social accountability, which forms the essence of professional work. Developing such a blend requires a lengthy period of education and a substantial investment by both student and society. Through a chain of events flowing from effective learning to high-quality services to improved health, professional education at its best makes an essential contribution to the wellbeing of individuals, families, and communities.’—The 2010 Lancet Commission on Education of Health Professionals for the 21st Century (Frenk et al. 2010)

When considering workforce issues, there is a tendency to focus primarily on inputs to the system — how to recruit and select new members to the workforce. However, premature loss of physicians to burnout has significant workforce impacts as well. Retention of a healthy workforce requires investment in competency development, professional development, and well-being of all physicians across the continuum of education and practice. Learners need financial, academic, peer, and personal support to thrive. Structural inequities and stressors within work and learning environments threaten learner and physician well-being, resulting in alarming rates of burnout, depression, and suicide (Aronsson et al. 2017). The high prevalence of burnout among U.S. physicians results in reduced productivity and increased medical error, which in turn worsens burnout (Prentice et al. 2020). Many physicians suffering from burnout reduce their clinical hours, abandon care delivery entirely, or transition to roles other than patient care. This real or soft attrition is costly to health systems; recruiting and on-boarding a new physician into a practice is
estimated to require a year’s time and cost $500k or more (Olson et al. 2019). Lack of well-being is rampant among U.S. medical trainees as well. Medical students have a higher prevalence of anxiety, depression, suicidal thoughts, and burnout than their age-matched peers (Dyrbye et al. 2014). In one prospective cohort study, the prevalence of major depression among interns rose from 4% at baseline to 27% within 3 months of beginning residency (Sen et al. 2010). Students from groups historically excluded or UIM backgrounds often suffer confounding issues related to a lack of inclusion and structural racism. Microaggressions and isolation amplify the inherent stresses of the profession and contribute to attrition all along the path of training and practice (Hill et al. 2020; Ackerman-Barger et al. 2020).

Additionally, anxiety related to the cost of medical education adds unneeded stress. The current investment by society in medical education is minimal, with education expenditures representing less than 1% of total health expenditures in the United States (Frenk et al. 2010). Debt burden impacts most students, but disproportionately affects already disadvantaged students (Phillips et al. 2019).

Exemplars in retention, well-being, and inclusion

Morehouse School of Medicine

Morehouse has a long record of supporting the success of academically diverse students, placing emphasis on thoughtful design of the educational milieu. Academic structures include a curriculum with integration and intentional repetition and an Office of Student Learning and Educational Resources that provides guidance on study and test-taking skills, tutoring, and academic coaching. This is bolstered by a nurturing environment with highly engaged and highly experienced faculty, strong student support, inspiring role models, and intensive monitoring with supportive feedback. Using this approach, the school has demonstrated that learners with MCAT scores below the national average can attain average or above average performance on Step 1 of the United Stated Medical Licensing examination (Elks et al. 2018).

Rutgers Robert Wood Johnson Medical School

Rutgers RWJMS has matriculated high percentages of individuals who are UIM, including those socioeconomically disadvantaged and first-generation college students. Three educational psychologists support the needs of this diverse student body in terms of academic preparation. ‘Cog Skills,’ as named by students, is a normalized, stigma-free support service that provides individualized consultations and a peer tutoring program. The program has a strong track record; any student who has had academic difficulty and regularly engaged the services of the program, unless challenged with personal/family issues, has achieved academic success. Additionally, to reduce the impact of debt burdens on well-being, the Rising Stars Program, supported by partner health system RWJ Barnabas, invests up to $200K in loan repayment to students who train and remain in the health system, with preference given to primary care specialties.

Mayo Clinic Alix School of Medicine

Organizational accountability for the well-being of learners demands the ability to track aggregate well-being. That which is measured, improves. Mayo developed a web-based version of its Medical Student Well-Being Index (MSWBI) (Dyrbye et al. 2010) and made it available for use by other consortium schools. The web-based MSWBI enables students to assess their current level of distress, immediately learn how their distress level compares to what is typical for medical students, ascertain when their level of distress puts them at higher risk for potentially serious personal and professional repercussions, track their personal score over time, and gain access to just-in-time information regarding mental health resources and independent well-being learning modules. The MSWBI also enables participating schools to view aggregated data for learners who use the web-based tool and compare these data to national medical student norms. The MSWBI is one of many strategies employed by Mayo to support learner wellbeing. Other wellness programming includes a stress management and resiliency training (SMART) elective, robust counseling services dedicated to medical students, a concierge advising program involving over 90 physicians from 20 specialties, mentorship families with students across various years, a student wellness committee with resources to fund student-initiated wellness activities, monthly ‘My Story’ sessions for students and faculty to share stories of overcoming adversity, and free membership in an organizational health living center (which offers fitness facilities, cooking classes, wellness coaches, mindfulness classes, relaxation rooms, and other related resources).

Collective efforts in retention

Supporting well-being

Despite laudable ongoing efforts to support learner well-being across many institutions and many years, the issue persists. Identifying this as a ‘wicked problem’ — one associated with complex social interdependencies that extend beyond the reach of any given institution — the consortium applied a root cause analysis to outline key drivers of impaired well-being during the AMA ChangeMedEd® conference in 2019 (Figure 3). Historically, well-being efforts have been focused on supporting the resilience of the individual; this exercise in deconstruction pointed to many dysfunctional organizational and structural factors in educational and health care systems that must be tackled to enable sustained professional satisfaction.

This work informed a subsequent thematic conference in the fall of 2019, hosted by the AMA in conjunction with A.T. Still University’s School of Osteopathic Medicine in Arizona. Consortium members applied a systems-thinking approach to enhance institutional support of learner and faculty well-being. Obstacles to creating a well culture were explored — such as stigma, mixed messaging, and expecting individual resilience rather than re-designing workflows to sustain wellness. Students lead a section of the conference agenda and shared that their greatest stressors relate to institutional systems issues in educational programming, such as competing curricular demands among courses, lack of clarity regarding expectations, and
poor communication of scheduling and changes in pro-
gramming. Of course, external drivers such as licensing
exams and the residency selection process were cited by
students as well, and the AMA has pursued advocacy
efforts regarding such national structures that impact well-
being (InCUS2019).

During the conference, consortium members generated
strategies aimed at institutional culture and workflows
rather than the individual learner. Key elements identified
include ensuring a common agenda and shared vision
throughout the institution of what well-being means; trans-
parency in decision-making; mutually reinforcing activities;
meaningful engagement of learners to enhance purposeful-
ness; prioritizing competency development in drivers of
well-being and personal strategies to support it; exposure
to arts and humanities; investment in appropriate support-
ive resources; ongoing input from stakeholders; and actionable measures of outcomes. The imperative for intentional
consideration of the needs of diverse groups and ensuring
diverse representation when soliciting input and feedback
was reinforced.

Promoting inclusion

Inclusion is a significant factor in retention, particularly for
learners and physicians from groups under-represented in
medicine. The consortium meeting in the spring of 2019
included panels of students, residents, and faculty who
shared their struggles with inclusion and consortium mem-
bers examined issues of unconscious bias and microaggres-
sion in the learning environment. Teams from each
institution completed a guided process of self-study (AMA
2019) to assess their educational culture and climate. The
review process addresses curricular issues (correcting mis-
representation of race in lectures and case vignettes as
well as developing new content to elucidate structural
racism in medicine), assessment issues (analysis for dispar-
ities in assessment outcomes and awards) and environmen-
tal issues (microaggressions, bystander training, minority
tax). Each site team identified its most pressing vulnerabil-
ities and generated action plans to gather data and
respond accordingly. This work was revisited via an online
series in the fall of 2020, positioning consortium members
to respond to rampant political and racial unrest through-
out the United States with meaningful institutional
improvements to support the well-being and retention of
trainees and faculty.

Conclusion

Socially accountable educational institutions contribute to
the development of the U.S. health care workforce via
interventions in recruitment, inclusive pathways of entry,
holistic selection, and redesigned educational experiences.
Dedicated efforts in professional success, well-being, and
inclusion are necessary to support retention. While much
remains to be done, the Accelerating Change in Medical
Education Consortium schools emerge as ‘educational pos-
sibilists’ seeking creative solutions and dismantling trad-
tional limitations to fulfill the social mission.

Medical schools and residency programs can prepare
the workforce to care for the U.S.’s socioeconomically div-
ided, racially and ethnically diverse populace by redoubling
efforts to recruit applicants from groups that have histori-
cally been marginalized. This requires fundamental changes
to the review and selection of applicants and to the goals
and settings of training experiences. Institutional commit-
tment to sustainable and inclusive working and learning
environments — supportive across the continuum of stu-
dent, trainee, educator, and practicing physician — is
essential for a vibrant workforce. Regional and national
workforce needs and health equity data should inform the
who (racial, ethnic, and socioeconomic diversity), the where
(place of origin and place of practice), the what and how
(foundational knowledge on caring for communities and
for what specialty) of medical training. The lenses of social
justice, social accountability, and health equity will inform
efforts in cultivating a physician workforce to yield a cul-
ture of wellness for individuals, families, communities,
and physicians.

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References
AACOM. 2020. AACOM Reports on Graduates and GME: Graduates by Osteopathic Medical College and Gender 2000–2018. Bethesda (MD): American Association of Colleges of Osteopathic Medicine. [accessed 2021 May 18]. https://www.aacom.org/reports-programs-initiatives/aacom-reports/graduates-and-gme.

Ackerman-Barger K, Boatright D, Gonzalez-Coloso R, Orozco R, Latimore D. 2020. Seeking inclusion excellence: Understanding racial microaggressions as experienced by underrepresented medical and nursing students. Acad Med. 95(5):758–763.

Agrawal JR, Vlasic S, Carasquilo O. 2005. Progress and pitfalls in under-represented minority recruitment: Perspectives from the medical schools. J Nat Med Soc. 97(9):1226–1231.

Alsan M, Garrick O, Graziani G. 2019. Does diversity matter for health? Experimental evidence from Oakland. Am Econ Rev. 109(12):4071–4111.

AMA. 2019. AMA curricular diversity and inclusion: outline for self-study and action plans. Chicago (IL): American Medical Association. [accessed 2021 May 18]. https://www.ama-assn.org/system/files/2020-07/curricular-diversity-inclusion-self-study.pdf.

AMA. 2020. Protecting underrepresented students and residents during COVID-19. Chicago (IL): American Medical Association. [accessed 2021 May 18]. https://www.ama-assn.org/delivering-care/public-health/protecting-underrepresented-students-and-residents-during-covid-19.

Aronsson G, Theorell T, Grape T, Hammarstrom A, Hogstedt C, Marteinsdottir I, Skoog I, Träskman-Bendz L, Hall C. 2017. A systematic review including meta-analysis of work environment and burnout symptoms. BMC Public Health. 17(1):264[accessed 2021 May 18].

Bodenheimer T, Sinsky C. 2014. From triple to quadruple aim: care of the patient requires care of the provider. Ann Fam Med. 12(6):573–576.

Boelen C, Heck JE. World Health Organization. 1995. Defining and measuring the social accountability of medical schools. Geneva: World Health Organization. [accessed 2021 May 18]. https://apps.who.int/iris/handle/10665/59441.

Busche K, Elks ML, Hanson JT, Jackson-Williams L, Manuel RS, Parsons WL, Wofsy D, Yuan K. 2020. The validity of scores from the new MCAT exam in predicting student performance: results from a multisite study. Acad Med. 95(3):387–395.

Capsers Q, Clinchot D, McDougle L, Greenwald AG. 2017. Implicit racial bias in medical school admissions. Acad Med. 92(3):365–369.

Capsers Q, McDougle L, Clinchot DM. 2018. Strategies for achieving diversity through medical school admissions. J Health Care Poor Underserved. 29(1):9–18.

Coe CL, Baker HM, Byerley JS, Page CP. 2021. Fully integrated readiness for service training (FIRST). Acad Med. [accessed 2021 May 18]. https://journals.lww.com/academicmedicine/Abstract/9000/Fully_Integrated_Readiness_for_Service_Training.96849.aspx.

Dyrbye LN, Szydlow DW, Downing SM, Sloan JA, Shanafelt TD. 2010. Development and preliminary psychometric properties of a well-being index for medical students. BMC Med Educ. 10:8. [accessed 2021 May 18]. https://bmcmededuc.biomedcentral.com/articles/10.1186/1472-6920-10-8.

Dyrbye LN, West CP, Satele D, Boone S, Tan L, Sloan J, Shanafelt TD. 2014. Burnout among U.S. medical students, residents, and early career physicians relative to the general U.S. population. Acad Med. 89(3):443–451.

Elks ML, Herbert-Carter J, Smith M, Klement B, Knight BB, Anachebe NF. 2018. Shifting the curve: Fostering academic success in a diverse student body. Acad Med. 93(1):66–70.

Epstein-Lubow G, Cinesas S, Yess J, Anthony D, Fagan M, George P. 2015. Development of a longitudinal integrated clerkship at the Warren Alpert Medical School of Brown University. R I Med J. 98(9):397–407.

Frenk J, Chen L, Bhutta ZA, Cohen J, Crisp N, Evans T, Fineberg H, Garcia P, Ke Y, Kelley P, et al. 2010. Health professionals for a new century: transforming education to strengthen health systems in an interdependent world. The Lancet. 376(9756):1923–1958.

Gimpel N, Kindratt T, Dawson A, Pagels P. 2018. Community action research track: Community-based participatory research and service-learning experiences for medical students. Perspect Med Educ. 7(2):139–143.

Greenwood BN, Hardeman RR, Huang L, Sojourner A. 2020. Physician-patient racial concordance and disparities in birthing mortality for newborns. Proc Natl Acad Sci U S A. 117(35):21194–21200.

Greer PJ, Brown DR, Brewster LG, Lage OG, Esposito KF, Whisenant EB, Anderson FW, Castellanos NK, Stefano TA, Rock JA. 2018. Socially accountable medical education: An innovative approach at Florida International University Herbert Wertheim College of Medicine. Acad Med. 93(1):60–65.

He K, Whang E, Kristo G. 2021. Graduate medical education funding mechanisms, challenges, and solutions: A narrative review. Am J Surg. 221(1):65–71.

Hill KA, Samuels EA, Gross CP, Desai MM, Sitkin Zelin N, Latimore D, Huot SJ, Cramer LD, Wong AH, Boatright D. 2020. Assessment of...
the prevalence of medical student mistreatment by sex, race/ethnicity, and sexual orientation. JAMA Intern Med. 180(5):653–665.

InCUS 2019. Summary report and preliminary recommendations from the Invitational Conference on USMLE Scoring (InCUS), March 11-12, 2019. United States Medical Licensing Examination®. [accessed 31 Mar 2021]. https://www.usmle.org/pdfs/incus/InCUS_summary_report.pdf

Jerant A, Henderson MC, Griffin E, Hall TR, Kelly CJ, Peterson EM, Wofsy D, Franks P. 2018. Do Multiple Mini-Interview and traditional interview scores differ in their associations with acceptance offers within and across five California medical schools? Acad Med. 93(8):1227–1233.

Jerant A, Henderson MC, Griffin E, Talamantes E, Fancher T, Sousa F, Franks P. 2018. Medical school performance of socioeconomically disadvantaged and underrepresented minority students matriculating after a Multiple Mini-Interview. J Health Care Poor Underserved. 29(1):303–320.

Martos AJ, Piracha YS, Oladele M, Erves JG, Dorn J, Friedman E. 2017. An innovative educational pipeline programme for under-represented youth: the Sophie Davis Biomedical Education/CUNY School of Medicine model. Educ Prim Care. 28(5):282–287.

Morris DB, Gruppuso PA, McGee HA, Murillo AL, Grover A, Adashi EY. 2021. Diversity of the national medical student body - Four Decades of Inequities. N Engl J Med. 384(17):1661–1668.

Mullan F, Chen C, Petterson S, Kolsky G, Spagnola M. 2010. The social mission of medical education: ranking the schools. Ann Intern Med. 152(12):804–811.

Olson K, Sinsky C, Rinne ST, Long T, Vender R, Mukherjee S, Bennick M, Linzer M. 2019. Cross-sectional survey of workplace stressors associated with physician burnout measured by the Mini-Z and the Maslach Burnout Inventory. Stress Health. 35(2):157–175.

Orlowski J, Dill M, Jones K. 2019. AAMC Results of the 2018 Medical School Enrollment Survey. Washington (DC): Association of American Medical Colleges. [accessed 2021 May 18]. https://store.aamc.org/ downloadable/download/sample/sample_id/287/.

Park B, Frank B, Likumahuwa-Ackman S, Brodt E, Gibbs BK, Hofkamp H, DeVoe J. 2019. Health equity and the tripartite mission: moving from academic health centers to academic-community health Systems. Acad Med. 94(9):1276–1282.

Phillips JP, Peterson LE, Kovar-Gough I, O’Neill TR, Peabody MR, Phillips RL. 2019. Family medicine residents’ debt and certification examination performance. PRIMER. 3:7.

Prentice S, Dorstyn D, Benson J, Elliott T. 2020. Burnout levels and patterns in postgraduate medical trainees: A systematic review and meta-analysis. Acad Med. 95(9):1444–1454.

Rees EL, Hawarden AW, Dent G, Hays R, Batest J, Hassell AB. 2016. Evidence regarding the utility of multiple mini-interview (MMI) for selection to undergraduate health programs: A BEME systematic review: BEME Guide No. 37. Med Teach. 38(5):443–455.

Sen S, Kranzler HR, Krystal JH, Speller H, Chan G, Gelernter J, Guille C. 2010. A prospective cohort study investigating factors associated with depression during medical internship. Arch Gen Psychiatry. 67(6):557–565.

Terregino CA, Copeland JL, Laumbach SG, Mehan DA, Dunleavy D, Geiger T. 2018. How good are we at selecting students that meet our mission? Outcomes of the 2011 and 2012 entering classes selected by a locally-developed multiple mini interview. Med Teach. 40(12):1300–1305.

Terregino CA, Saguil A, Price-Johnson T, Anachebe NF, Goodell K. 2020. The diversity and success of medical school applicants with scores in the middle third of the MCAT score scale. Acad Med. 95(3):344–350.

Vaughan S. 2018. Current state and future directions of medical specialties internationally. Joint project by the Australian Medical Council and the Medical Specialties Council of the Royal Dutch Medical Association. [accessed 2021 May 18]. https://www.knmg.nl/web/file?uuid=0966dbfe-0b45-45fd-bb2f-25565c10c56e&owner=5c945405-d6ca-4deb-aa16-7af2088aa173&contentid=74550.