Reimagining Undergraduate Medical Education in a Post-COVID-19 Landscape

Matthew Z. Guo, BA[1], Jawara Allen, PhD[1], Matthew Sakumoto, MD[2], Amit Pahwa, MD[3], and Lekshmi Santhosh, MD, MAEd[2] (iD)

[1]Johns Hopkins School of Medicine, Baltimore, MD, USA; [2]Department of Medicine, University of California-San Francisco, San Francisco, CA, USA; [3]Department of Medicine, Department of Pediatrics, Johns Hopkins School of Medicine, Baltimore, MD, USA.

Online education due to the COVID-19 pandemic caused many medical schools to increasingly employ asynchronous and virtual learning that favored student independence and flexibility. At the same time, the COVID-19 pandemic highlighted existing shortcomings of the healthcare field in providing for marginalized and underserved communities. This perspective piece details the authors' opinions as medical students and medical educators on how to leverage the aspects of pandemic medical education to train physicians who can better address these needs.

KEY WORDS: undergraduate medical education; social determinants of health; virtual learning.

"American medical education needed a revolution," writes Professor Jon M. Barry in *The Great Influenza: The Story of the Deadliest Pandemic in History*[1]. He described a different era of medical education, a time in the late 1800s when medical students graduated without having ever touched a patient. The revolution began at Johns Hopkins Hospital with William Osler's teaching hospital model for postgraduate training, a model that spread across the nation and has formed the foundation for modern medical education[2]. A few decades later, the *Flexner Report* commissioned by the American Medical Association codified recommendations for standardized curriculum based on Osler's program at Hopkins, giving rise to the biomedical model of medical education[3, 4]. In the same decade, the 1918 influenza pandemic, one of the deadliest pandemics in the history of humankind, infected approximately one-third of the world's population, causing an estimated 50 million deaths[5]. Clearly, as Barry describes, it was a time of great crisis, ripe for great change.

The *Flexner Report* and 1918 pandemic thus led to many medical schools adopting the biomedical model and overhauling their curricula. Since then, shortcomings of the *Flexner Report*, such as limiting the opportunities of Black physicians and excluding social determinants of health from the medical model[4, 6], have been acknowledged and medical education has increasingly prioritized diversity and inclusion and public health education to better serve the diverse health needs of society[7–9]. The biopsychosocial model of medicine has largely supplanted the biomedical model[7, 8], and many medical schools have modified their biomedical curricula to incorporate systems-based learning and social determinants of health.

Yet healthcare is far from perfect today, with issues of cost, access, and systemic inequality still plaguing patients. As medical students and medical educators, we strive for a medical education that will better prepare the next generation of physicians to address these failures of the profession. We also have experienced how the current COVID-19 pandemic, similar to the 1918 influenza pandemic, has caused great crises in healthcare and changes in medical education[10–12]. As vaccines have made a post-COVID era more tangible, we believe the medical field is once again ripe for revolution. In this perspective piece, we detail how we can leverage the current flux in medical education, capitalizing on asynchronous and virtual learning with a focus on social determinants and disparities, to better train physicians who will be prepared to serve the public health in a post-COVID era.

THE COVID-19 PANDEMIC EXACERBATED HEALTH DISPARITIES

The COVID-19 pandemic significantly altered the practice of medicine and highlighted existing failures of the US healthcare system by disproportionately affecting historically marginalized communities, particularly Black and Latinx patient populations who suffered higher COVID infection and mortality rates[13–15]. Additionally, COVID-19 has severely impacted rural areas, which

tend to be less resilient, have less capability to recover from significant changes[16], and are experiencing a significant shortage of primary care physicians[17, 18]. Although the increased use of telehealth has improved access to care for these patient populations, particularly in psychiatry[19], many patients experiencing socioeconomic insecurity and technology inequality cannot access these virtual physician visits[20–23].

The disparities seen with the COVID-19 pandemic are not new; the same disparities in healthcare access and outcomes for underserved populations have plagued the US for many years[9]. As medical students and medical educators, we believe that medical school is a key location to begin addressing healthcare disparities by training physicians who will make it a priority. Sharma et al. eloquently present medical education with this charge, insisting it is a failure to teach about "poverty but not oppression, race but not racism, sex but not sexism, and homosexuality but not homophobia." We believe that medical education can meet this charge and accomplish this by incorporating more aspects of public health education and social determinants of health and increasing exposure to diverse patient and provider populations in the curriculum. Many of the changes in medical education precipitated by the COVID-19 pandemic can be adapted to accomplish these goals.

SELF-DIRECTED LEARNING AND PRE-COVID CHANGES IN MEDICAL EDUCATION

To understand how medical education should move forward in a post-COVID era, we first detail the trajectory of medical education prior to the pandemic. In the past few decades, many medical schools have shifted towards curriculum delivery methods that favor self-directed learning. Prior to the COVID-19 pandemic, we were already starting to see greater utilization of flipped classroom learning, in which students spend most of their synchronous class time working on case-based problem sets and their asynchronous class time watching pre-recorded lectures. With less time in the large lecture hall and more time in small groups, nonclinical and clinical education came more from practical problem sets, clinical correlations and scenarios, and individualized mentorship from faculty dedicated to investing in their students personally[24–27].

With these changes in pedagogy, medical students practiced more mastery learning, focusing on synthesis and application of material rather than memorization of every detail. Furthermore, they found themselves with more elective time and opportunities for individual career interest exploration and expression[24–27]. It was in this structure of medical education, already leaning towards self-directed learning, that we entered the COVID-19 pandemic and transitioned to an unprecedented time of virtual and remote curriculum delivery.

LEVERAGING THE CHANGES TO MEDICAL EDUCATION DUE TO COVID-19 TO ADDRESS HEALTHCARE DISPARITIES POST-COVID

Lecture Reformatting and Course Content Reevaluation

In the wake of the COVID-19 pandemic, the asynchronous delivery of pre-recorded lectures for nonclinical classes has allowed for several improvements in curriculum delivery, including increased flexibility of medical student schedules and a greater shift towards self-directed learning[28, 29]. Many institutions have also begun updating their suite of team-based learning cases and pre-recorded lectures to a style that is more suitable for a virtual learning format.

The task of re-recording lectures and re-designing team-based learning cases to be better suited for remote delivery provides the perfect opportunity to engage in course content evaluation to identify and address systemic influences of bias. For example, previous studies of medical curriculum have shown that race is often presented as a biological risk factor for disease without explaining social context[30]. Visual representations of disease are also typically presented on white patients, particularly in dermatology[31], limiting medical student exposure to how diseases may present themselves in patients of different races. These and other examples of systemic bias in medical education can result in medical students being less equipped to diagnose and treat patients who come from various backgrounds. A recent study examining 880+ lectures from 21 medical institutions for mechanisms that propagate physician bias for race identified areas for improvement in lectures and curriculum delivery[32]. Another study found similar areas of improvement in training medical students to provide high-quality care for patients with disabilities[33]. Re-adapting lectures and problem sets for online delivery is the perfect time to also charge curriculum leadership and individual lecturers with examining and correcting how systemic racism and other inequalities have infiltrated their teachings. The AAMC DEI toolkit[34] and AAMC MedEd Portal[35, 36] are resources for faculty development in identifying and eliminating bias in teaching material. Medical schools should task their educators to familiarize themselves with these findings and resources as they re-adapt their lectures and other curricula for post-COVID delivery.

Online Educational Tools to Diversify Discussion

Prior to the COVID-19 pandemic, the flipped classroom learning model had been increasingly adopted, facilitating active discussions among medical students and educators about structural inequalities in public health. The virtual learning spaces of the pandemic can enhance the already expanding use of flipped classrooms by increasing the diverse array of patients, policymakers, and physicians from whom students may not have otherwise had the opportunity to learn. For example, future medical school lessons on COVID-19 could

have an asynchronous pre-recorded component detailing the disparities of the pandemic. This could then be followed up with live discussion in small groups facilitated equally by frontline physicians, patients from diverse communities that were hit the hardest by the COVID-19 pandemic, and policy advocates involved in addressing healthcare disparities. Such a repertoire of representatives is best assembled virtually because it allows for the prioritization of the time and comfort of patient and community volunteers.

Given how disproportionately the COVID-19 pandemic has affected minoritized and disadvantaged populations, it is not enough now to only teach the social determinants of health without also emphasizing the need to challenge and change them. Virtual learning spaces can be used to expand discussions with various stakeholders and allow students the time and exposure needed to better understand and affect these forces. Importantly, to promote cooperative and synergistic rather than extortive discussion in these spaces, particularly when addressing sensitive and discriminatory topics, it is imperative to have skilled facilitation by those who have experience working in virtual domains and those with pre-existing personal connections with the community.

Telehealth to Increase Exposure and Extend Care to Diverse Populations

Simulated patient encounters were an essential part of teaching and assessment prior to the COVID-19 pandemic. The necessary transition of these in-person encounters to virtual encounters has provided the perfect opportunity for medical schools to enhance teaching around telehealth, which is essential if we hope to address issues of inequality surrounding patient care in rural communities or those caused by transportation barriers and access issues for older or disabled populations[37].

While telehealth can increase the flexibility and availability of medical care for some patient populations, other populations, primarily those of disadvantaged SES, language, race, ethnicity, or location, may face barriers that must be addressed. For example, one study found that rural youth were less likely than urban youth to have reliable access to the Internet[38], and other studies have highlighted ways that the healthcare field and telehealth inadequately serve people with disabilities[33, 39]. Topically, a study of telehealth utilization in New York City during the COVID-19 pandemic found that Black patients had lower odds of accessing telehealth than white patients[40]. Actions towards addressing these disparities will vary necessarily by the disadvantaged population in question, but education of medical students regarding these issues is the first step to identifying solutions through partnerships with members of these communities. Medical school curricula should therefore be updated to include content on inequalities in telehealth and tools to address them as separate skills from in-person patient encounters to better prepare medical students for the burgeoning use of telehealth to expand healthcare access to areas previously inaccessible.

Additionally, as telehealth visits are increasingly utilized to reach patients in rural areas, medical schools should incorporate training for elements unique to the virtual physician encounter. During the COVID-19 pandemic, standardized patients were trained to interact with medical students in virtual environments in nearly all core clinical clerkships. This training should be formalized, and medical schools should use standardized patients to teach students about the utility of telehealth visits in various specialties and clinical scenarios. For example, by the end of their neurology clerkship, medical students should understand which parts of the physical exam can reliably be performed in a telehealth encounter and what signs and symptoms should warrant an immediate in-person medical evaluation. This early introduction to virtual patient care will allow medical students to begin imagining how telehealth can be integrated into their future medical practices, expanding the reach of specialist medical care, an area already under active investigation[41–44].

The Impact of Virtual Learning on Isolation and Mental Health

Thus, as the pandemic eventually wanes and it becomes safer for in-person instruction, it will be important to invest significant resources to capitalize on the curriculum structures implemented during the COVID-19 pandemic that promote self-directed learning and enhanced education on health disparities. To do this, we must leverage efforts to re-record asynchronous lectures to address bias in medical education, better utilize synchronous learning time to incorporate a more diverse array of voices in discussions around health equity, and introduce competency in telehealth and its inequalities as a new learning objective for all graduating medical students. These advancements in medical education will better equip students to address the severe inequalities in our healthcare system that have been highlighted by the COVID-19 pandemic.

However, it is important to acknowledge that virtual learning is not without drawbacks. Online learning has increased student isolation and disconnection, negatively affecting the mental health of already strained medical students and educators, particularly those from underrepresented backgrounds who already suffer discrimination during their medical training[28, 29]. Teaching to the blank screen and learning alone from the screen non-stop can also manifest burnout and "Zoom fatigue." The impact of the pandemic on physician burnout and post-traumatic stress also cannot be understated, particularly given the historically higher rates of depression and suicide in physicians compared to the general population[45]. As we navigate the post-COVID-19 medical education landscape, critical importance must be placed on how we support the mental health of medical students and medical educators with an emphasis on disparities even within the healthcare field. As vaccination rates increase and virtual learning becomes less necessary, more hybrid approaches may be favorable to capitalize on the aforementioned benefits in online

learning in teaching students to address disparities while minimizing these unintended consequences.

CONCLUSION

When the COVID-19 pandemic first hit, many of us thought we would be back to normal within a month. Now, more than a year later, uncertainty, loss, and change have become the new normal. Medical education, which has had to reshape itself to be safely delivered during the pandemic, faces the great burden of preparing physicians who will be equipped to care for patients in the post-COVID-19 era. The pandemic has highlighted existing needs in healthcare such as challenging inequality and improving accessibility. The pandemic has also forced innovations in medical education that can be capitalized on to address these long-standing issues. We must resist the urge to return to the norm. We must use the lessons we have learned while adapting to the COVID-19 pandemic to improve medical education to better train physicians who will tackle healthcare disparities. Now more than ever, we have the tools needed to form a system of medical education that prioritizes public health education, virtual patient care, and the social determinants of health with the ultimate goal of ensuring that the medical students of today will be fully equipped to serve the public health effectively and equitably as the physicians of tomorrow.

Corresponding Author: *Lekshmi Santhosh, MD, MAEd; Department of Medicine, University of California-San Francisco, San Francisco, CA, USA (e-mail: lekshmi.santhosh@ucsf.edu).*

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