

The Impact of the COVID-19 Pandemic on Medical Student Education in Wisconsin

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The rapidly evolving COVID-19 pandemic has challenged health systems and created socioeconomic devastation worldwide. Medical student education has not been immune to these disruptive forces. Medical schools and medical students have had to quickly adapt to frequently changing conditions that have significantly affected the timely delivery of planned hands-on education and student learning in clinical settings.

For students engaged in nonclinical portions of their curriculum, restrictions on public gatherings designed to slow community spread of the SARS-CoV-2 virus made in-person face-to-face large and small group learning sessions impossible. Students engaged in clinical education across most of the United States, including Wisconsin, were abruptly removed from hospital and clinic settings in mid-March 2020, as guided by the Association of American Medical Colleges and public health experts, to reduce viral spread, ensure their safety, and reserve limited supplies of personal protective equipment (PPE) for experienced providers. These

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actions urgently challenged medical educators to find new ways to continue meaningful education. Simply pausing students' educational progression was not a viable or desirable option given physician shortages across Wisconsin and beyond. Students need to progress through medical school in a timely manner to replenish the physician workforce.

Both the University of Wisconsin School of Medicine and Public Health (UWSMPH) and the Medical College of Wisconsin (MCW) rapidly deployed novel means of curriculum delivery. This commentary provides summaries of how COVID-19 has reshaped education in these two institutions.

UWSMPH

In 2016, the UWSMPH launched an innovative, integrated 3-phase, 4-year medical education curriculum: the ForWard Curriculum. This curriculum incorporates learner-driven flipped classroom and blending learning activities, especially during Phase 1. It includes many new, regularly updated online resources (Enduring Learning Objects) to deliver core content virtually and asynchronously. These resources augment in-person small- and medium-sized group hands-on learning activities that focus on collaborative problem solving, professional development, and independent critical thinking. The curriculum integrates meaningful basic science, public health, and clinical content throughout all phases, including Phase 2 clinical immersion blocks. It provides ample opportunities for career explo-

ration, basic science knowledge solidification, advanced public health understanding, and internship preparation during Phase 3.

While the ForWard Curriculum includes plentiful online and distance learning resources across the UWSMPH statewide campus, it also includes many in-person learning activities to provide longitudinal professional and skill development, stimulate self-directed learning through facilitated case-based problem solving peer group exercises, and develop strong relationships with faculty teachers, mentors, and coaches. Thus, UWSMPH education leaders and teachers had to make significant swift curricular changes to meet program objectives when shelter-at-home and social distancing practices began and clinics closed doors to students.

For Phase 1 preclinical students, all in-person large and small group sessions were transformed within 1 week to online virtual sessions that allowed opportunities for meaningful discussions. Phase 2 students, who had just begun 12-week integrated clinical blocks in January 2020 across statewide campus sites, were removed from clinical rotations. Their curriculum was restructured, shifting core didactic content from all Phase 2 blocks to virtual online delivery, allowing students to build knowledge outside clinical settings, and providing opportunities for faculty and staff to create focused clinical 8-week rotations that will begin during the summer of 2020, when safety protocols, resources, and telehealth modalities should permit patient-centered clinical learning. Hands-on clinical skills exams and national

Table. Effects of COVID-19 on Medical Student Education

COVID-19 Restrictions	Effect on Student Education	Medical Schools' Responses
Safer at Home orders for state	<ol style="list-style-type: none"> 1) Students no longer permitted to come to campus for learning activities 2) Students barred from clinical activities at hospitals and clinics 	<ol style="list-style-type: none"> 1) Shift from live groups and lectures to virtual teaching 2) Clinical rotations replaced with virtual learning, clinical simulations, telehealth exercises
Shortage of PPE	Students not permitted to participate in some procedures and surgeries or care for patients with conditions requiring PPE, including proven or suspected COVID-19	Virtual presentations of procedures and clinical cases substituted where appropriate; students included when servicing as key provider (eg, assistant) on case and adequate PPE for safety
Suspension of USMLE testing with limited phased-in reopening of national testing sites	Testing sites not readily available for Step 1, Step 2CK (Clinical Knowledge), and for Step 2CS (Clinical Skills) of USMLE examinations	<p>Medical schools working with AAMC and NBME to develop alternate testing sites at medical schools</p> <p>Student clinical rotations may be adjusted to provide time for students to study and take these high-stakes examination</p>
The newly formed "Work Group on Medical Students in the Class of 2021 Moving Across Institutions for Post Graduate Training" established by The Coalition for Physician Accountability ^a provided new guidance for student away rotations, residency application timeline, and residency interview process for 2020-2021 year	<ol style="list-style-type: none"> 1) Away rotations should be discouraged with exceptions for students who have a specialty interest and do not have access to clinical experiences with a residency program in their school's system and students for whom away rotations are required for graduation or accreditation purposes 2) Submission of residency applications through the AAMC ERAS system is delayed to provide more time for schools and students to submit application materials 3) All residency interviews will now be conducted virtually rather than face-to-face 	<ol style="list-style-type: none"> 1) School will work with students to communicate expectations regarding away rotations and, when they are needed, encourage a limited number of away rotations in geographically proximate programs when appropriate 2) Schools will support students in obtaining needed clinical experiences and in preparing residency applications on new timeline 3) Schools to work with students using simulated on-line interviewing formats so that students can be comfortable with the process <p>Career counseling stepped up for students to assist in evaluating residency programs without on-site visits possible</p>

Abbreviations: PPE, personal protective equipment; AAMC, Association of American Medical Colleges; USMLE, United States Medical Licensing Examination; NBME, National Board of Medical Examiners; ERAS, Electronic Residency Application Service.

^aCoalition for Physician Accountability members: Accreditation Council for Graduate Medical Education, American Association of Colleges of Osteopathic Medicine, American Medical Association, American Osteopathic Graduate Medical Educators, Association of American Medical Colleges, Council of Medical Specialty Societies/ Organization of Program Directors Associations, Education Commission for Foreign Medical Graduates National Resident Matching Program.

board exams suspended in March are resuming in new ways to monitor student progress.

Early Phase 3 students have, perhaps, been most greatly affected by the uncertainty of COVID-19 as they had just begun intensive career exploration, including clinical rotations and acting/sub-internships important for residency applications. Cancellation of these key rotations has been difficult, but their curriculum has continued through several existing and new online courses, allowing students to gain advanced public health and basic science knowledge required for graduation that is relevant to their careers, including courses in clinical therapeutics and preparedness. School leaders and department faculty have been developing individualized learning plans to

help students meet timely career milestones, with clinical rotations starting early summer. The majority of late Phase 3 students had already met most graduation requirements and matched into residencies. Thus, with minor curriculum adjustments, they will be entering their residencies on time this summer.

Fortunately, the ForWard Curriculum is a competency-based pass-fail curriculum that supports equitable assessment on virtual learning platforms. However, scheduling of national licensing exams continues to be challenging due to limited operations of testing centers.

MCW

Similar challenges confronted MCW when large group gatherings were prohibited and

student were removed from clinical sites. In contrast to the UWSMPH curriculum, the MCW medical school curriculum provides 2 years of foundational science instruction and clinical preparation, followed by 1 year of core clerkships and a final year of acting internships and electives. The majority of the foundational science is taught using large group lectures supplemented with some small group activities. Because MCW already delivered the large group learning sessions that comprise most of the curriculum in the preclinical years via synchronous distance learning with live streaming to our 2 regional campuses, transitioning to providing these sessions virtually to all students across the 3 campuses was straightforward. Unfortunately,

the inability to bring lecturers on campus to produce new sessions meant that we have had to rely on taped presentations from the previous year. The previously given lectures are reviewed by faculty members and updated either by supplemental videos or with printed materials that are distributed to the students at the end of each week.

Material covered in the small group setting has been more problematic. Where possible, objectives can be met by switching from small group learning to lectures that can be posted online for students. Clinical learning groups, such as physical examination training and early clinical rotations, have been suspended, with the material deferred to the summer or early fall when students may again come to campus. These changes will result in a short delay in students acquiring these skills but should not significantly impact their clinical progression.

The biggest disruption in education has been for the students in the third and fourth year of training, when they are generally assigned to hospital or clinic locations. With these unavailable, we have turned to the use of simulated patient experiences, online case learning, supervised telehealth visits, and virtual lectures. Additionally, students have been able to participate in novel experiences that we have adapted for testing clinical competencies, including a virtual “night on call” that we have conducted in collaboration with colleagues from New York University. While we have found that these activities can fill in some gaps in learning, they are not always sufficient to meet all the objectives of clinical courses. Students will have to return in the summer to complete some of their core clerkships since several competencies simply cannot be attained or assessed without a live patient encounter. These clerkship extensions will interfere with some early student elective time, which is distressing to students who look forward to these early electives to help them establish their career choice.

UWSMPH and MCW

In addition to issues within the control of the medical schools, other changes beyond the health care industry have affected students. The temporary closure of online testing centers has made it impossible for students to

schedule their United States Medical Licensing Examinations, for example. The uncertainty about when these centers will reopen and the anticipated diminished capacity because of social distancing has made it impossible for most students to plan ahead for their examinations. Since the scores on these examinations are often used by residency programs to influence residency selection, this has caused increased anxiety for medical students.

Additionally, the Association of American Medical Colleges, along with other national stakeholders (see Table), has issued a guidance strongly discouraging schools from offering away rotations to visiting students, except under circumstances where that rotation is not available at the student’s school. Finally, the guidance also will restrict all residency programs to virtual interviews rather than in-person interviews for the next residency cycle. This extends even to students at the institution’s affiliated medical school. These developments may impact students’ and residency programs’ ability to assess student-program fits, as well as costs of the interviewing process. We will need to assess how these changes affect both residency satisfaction and residency program outcomes during subsequent years of training. The guidance also announced a short delay in the residency application process to allow schools and students more time to prepare application materials.

Summary

Thanks to the quick, collaborative work of innovative, committed faculty and staff within and across sites and schools, as well as the remarkable resilience and adaptability of understanding students, medical education has continued with modifications to allow all students to progress and to meet education program objectives. Medical school is more than curriculum, however. Students affected by this pandemic have felt the harsh realities of social isolation; experienced stresses caring for family and friends; missed major in-person milestone events – such as match day and graduation celebrations; lacked opportunities to build in-person connections with faculty, staff, and peers; needed to create virtual research projects; lost desired away rotations

and global health experiences; witnessed closures of student-run free clinics while watching health disparities grow; and missed the joys of in-person socialization associated with learning, studying, and working together. Students are, however, gaining significant first-hand knowledge about the harsh realities of pandemics.

We hope that students are learning invaluable lessons about an ever-changing world, pressing public health issues, principles of novel infectious agents and immunology fundamentals, complex health equity and health economic problems, global health responses, and ethical principles in acute, real-world ways. They, along with all of us, will be forever changed by this unique and unprecedented experience in our lives. These lessons are ones that no curriculum could have adequately taught. Our ongoing curriculum can, however, continue to prepare students to become competent and caring professionals, critical thinkers, evidence-based problem solvers, actively engaged lifelong learners, nimble and innovative leaders, interprofessional team players, and champions of equitable health outcomes.

These changes, brought on by necessity, may also have lasting impact on medical training. Schools have learned that many curricular elements can be delivered just as well virtually as in small or large group settings. Additionally, new resources have been developed to provide foundational science and clinical opportunities that could expand student learning opportunities. Finally, innovative assessment methods that have been adopted for off-site students may provide additional opportunities to conduct ongoing student assessment even when students are back in clinics and hospitals. So, like many other activities permanently reshaped by COVID-19, positive lessons learned will be embraced by medical schools to create a new normal in medical education that includes more virtual learning and assessments in both classroom and clinical settings.

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