



# Educational purgatory: Medical education in the era of COVID-19

The global pandemic's effect on medical students varies depending on their year of study—some are relatively unaffected, some are floating in educational limbo, and some are encountering serious challenges to their educational experience.

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**ABSTRACT:** Medical education and technological adaptations in the time of COVID-19 affect medical students at all levels of training, though in different ways. First- and second-year students have fully transitioned to online learning with minimal disruption. Third-year students are likely the most affected due to major restructuring of their curriculum and the sudden halt in clinical activities on core rotations that may be critical to their residency choice. Fourth-year students' medical school education component stands to be least affected; however, disruptions to their training will extend into their first year of residency. Technological adaptations will likely play a larger role in medical education and practice in the months ahead.

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**L**arge-scale public health crises offer unique challenges in adaptive practices. Medical education in the time of the COVID-19 pandemic is no exception. SARS in 2003 is one of the most recent examples where important lessons were learned in preparing medical schools for potential disruptions. In Hong Kong medical schools, faculty responded with flexibility in their curricula, planning four potential academic structures for various scenarios in the uncertain time.<sup>1</sup> Authors in the UK commented on selecting medical student applicants who had a strong baseline of professionalism, who could later be taught strategies to handle crises without faltering when they became physicians.<sup>2</sup> Canadian medical schools recognized a need for curricular flexibility to allow for unforeseeable changes to strict deadlines and a need to incorporate a degree of redundancy so that students continue to graduate with the complete set of competencies, even in the event of reduced curricular time.<sup>3</sup>

## First- and second-year medical students

Local response has included adapting the entire preclinical education, which is classically classroom-based, into an online format; lectures are recorded to be delivered remotely and small-group sessions are conducted through videoconferencing technologies. Clinical sessions for physical exam skills, which are a foundational component of medical education, have been cancelled or, in some medical schools, converted to online with feedback from preceptors conducted over video calls.<sup>4</sup> For some students, this abrupt transition is a source of stress, while for others who prefer and have already been engaging in remote learning, these changes have been minimally disruptive.<sup>4</sup> A recent systematic review by Pei and Wu suggests online learning is at least comparable to traditional teaching methods in terms of test score outcomes.<sup>5</sup> The authors note that more favorable outcomes for online learning

were seen if student engagement was high. Another systematic review by Looyestyn and colleagues proposes gamification as a strategy to temporarily increase student engagement with online teaching, which may augment its intended effect. Gamification refers to the use of video game design elements in nongame settings to incorporate feelings of enjoyment and external reward, thus increasing student motivation to engage.<sup>6</sup> Studies included in the Looyestyn review used gamification elements such as awarding points for correct answers, having leaderboards to incite healthy competition between students, or awarding badges and trophies. Although the effects of gamification on student motivation were short-lived, this may be a method to maximize educational engagement in quarantine settings.

### Third-year medical students

For clinical clerks, the third year of medical training involves the radical transition from classroom to practical learning on hospital wards, in operating rooms, and in outpatient clinics. Because of COVID-19, these avenues of direct patient care came to a complete halt in mid-March, with no defined return date. As a result of the imposed educational limbo, curricula have been rearranged to place nonclinical scholarly activities earlier, while students are independently leading initiatives to substitute lost clinical learning experiences.<sup>7</sup>

The clinical clerk role during an infectious disease pandemic poses a unique problem: medical students are an added vector of viral transmission in clinical settings, as well as being nonessential workers. They consume resources, namely personal protective equipment (PPE) and nasopharyngeal swab testing meant for essential hospital personnel.<sup>8</sup> Additionally, students in clinical settings during a pandemic endanger their own health, safety, and education. Beyond the obvious risk of infectious exposure, students may find themselves in unsafe situations and may take on potentially harmful tasks in order to impress preceptors who are too busy to ensure strict adherence to infection control precautions.<sup>8</sup> These preceptors have a significant impact on the students' letters of recommendation, residency applications, and success of matching. Students may also be limited to

clinical learning focused on viral illness, which may be less helpful to the majority of students who will be pursuing fields outside of infectious disease and public health.<sup>8</sup>

Third-year medical students also face a pressing challenge in that the spring, which coincides with the last quarter of their clerkship year, is a critical period for completing core rotations and making elective choices that will ultimately shape their final residency match.<sup>9</sup> This is even more pertinent for specialities that are not mandatory rotations during the core

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year. Elective time is not only an important opportunity for students to develop interest in a field they may wish to apply for, but also a way for them to discover specific sites and cities they envision themselves training in for their residency, which ranges from a 2- to 6-year commitment.<sup>9</sup> It is also the sole opportunity for programs to assess prospective residents and provide letters of recommendation, which are important to students' getting interviews. If elective time is sacrificed to make up lost core-rotation time, specialties that students may not have seriously considered due to lack of exposure to the field may potentially lose out on applicants.<sup>9</sup>

Finally, significant restructuring of curricula for third-year medical students will likely result in delayed interview dates, compressed interview and program ranking periods, and possibly even delayed Match Day and the start of residency itself.<sup>9</sup> The Association of Faculties of Medicine of Canada is considering converting the Canadian Resident Matching Service (CaRMS) interview process from an in-person to an online format. Together with the cancellation of out-of-province electives

due to COVID-19, this may be a disadvantage to students who are more comfortable with in-person interviews and result in biases toward the in-province applicants whom specialty programs are already familiar with from core rotations and in-province electives.<sup>10</sup>

Conversely, it may be argued that pandemics offer a rare opportunity to learn principles of ethics, policymaking, and resource allocation in a rapid and meaningful way.<sup>7</sup> Contributing directly to patient care in crisis situations may strengthen students' identity in altruism and duty to society, clarifying that there are inherent risks involved with the profession.<sup>7</sup>

Because of missed clinical learning opportunities, the effects of prolonged suspension due to the pandemic may have a profound impact on the competencies, or at the very least the confidence, of the incoming 2021 residents. Most senior medical students recognize this and are seeking opportunities to contribute in ways that maintain clinical skills while limiting risk to personal and public health. Medical students across Canada have been staffing phone lines to disseminate COVID-19 information and test results, involved in contact tracing, championing public health awareness initiatives, gathering up-to-date clinical data and recommendations for providers, obtaining PPE donations, supporting front-line health care workers by delivering groceries and offering babysitting services, phoning senior citizens who currently need extra social supports, and hosting activities online to maintain a sense of community and connectedness.<sup>11</sup>

### Fourth-year medical students

For Canadian medical programs delivered in a 4-year format, final-year students' medical school education is perhaps the least affected, given that the sudden withdrawal from clinical duties occurred just after their match and in the middle of their last elective of medical school, which has no bearing on their matched residency program. This may not be the case for 3-year programs like those at the University of Calgary and McMaster University, which may have had core rotations, rather than electives, suspended. At the time of writing, there is no anticipated delay to the start of the 2020 cohort's residency training,<sup>12</sup> which typically begins each July.

However, the impact of COVID-19 on their year will bleed into the first year of residency, which is notorious for being one of the most challenging years in all of medical training. The oral component of their spring 2020 certification exams has since been canceled, and the Medical Council of Canada Qualifying Examination Part 1 will be postponed until September this year or possibly later.<sup>13</sup> Those who do not pass will have to juggle rewriting their exams while contending with the grueling demands of their first year in residency.

### Looking forward

Medical education will undoubtedly be changed after the COVID-19 pandemic. The abrupt switch to online learning to fulfill curricular goals, coupled with rapid development of new learning technologies, will likely become the norm.<sup>14</sup> There will be a need to supplement traditional medical education with remote learning due to increased demand for clinical experiences as more students across multiple years are accommodated within a limited number of clinical placements, and as preceptors become inundated with patients who are currently refraining from coming to see them due to fear of the coronavirus.<sup>15</sup> With the sudden widespread adoption of telehealth driven by COVID-19, medical students who are becoming well versed in technology in medicine may have an advantage when they transition to practice.<sup>4</sup>

However, each advancement warrants evaluation to ensure continued quality of medical education, some of which cannot be adequately learned without direct patient interaction.<sup>4</sup> As of now, the extent to which changes are accepted into curricula depends on a number of unpredictable factors, including economic stability, availability of technologies and professionals to develop them, buy-in from curriculum developers, and acceptability for medical students. Increased flexibility in curricula, research protocols, and clinical approaches will likely be the future.<sup>14</sup> By documenting these lessons as they are learned, we can contribute to an enhanced response to the next public health crisis that challenges medical education. Our ability to rapidly adapt is proving to be a key attribute in these unprecedented times. ■

### Competing interests

None declared.

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