



The role of medical students in pandemics



Top: Nurses and in field hospital, circa 1918. Vintage_Space / Alamy Stock Photo

Bottom: Intensive care unit staff, coronavirus pandemic relief facility set up at the Jacob Javits Center in New York City, NY. Public domain

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When COVID-19 began spreading throughout the world, most countries, including the United States, appeared to be taken by surprise. Yet, 100 years earlier, the influenza pandemic of 1918 had killed an estimated 25 million to 50 million people.¹

1918 influenza pandemic

For medical students, and Americans in general, the fall of 1918 was much different from years past. The U.S. had entered World War I in April 1917, leading to massive changes in the lives of all throughout the nation. The first, mild wave of the influenza pandemic occurred in the spring of 1918, but it did not result in an appreciable increase in deaths.

As a second, more lethal wave of influenza spread during the late summer, medical students were unsure what role they would play in combating the illness. As F.C. Lechner shared in his submission to *The Clinic: Jefferson Medical College Clinic Yearbook*, “Late in the past summer, when popular interest focused itself on the influenza, life for us in our respective communities was rapidly becoming unbearable.”² Medical school students were questioned about whether the Spanish influenza was identical to the grippe or black fever, “just as if we knew,”¹ Lechner wrote. Despite their interest in the flu, medical students at the time did not expect “any active

participation in handling the disease—apparently we had been born just too late to get into the game.”²

As a large number of practicing physicians and nurses were away, serving in the war, there was a dire need for help in caring for patients. While many female physicians and retired physicians answered the call, further aid from students was needed due to the sheer volume of cases. In Philadelphia, Dr. Wilder Krusen, the director of public health noted, “the rapid increase in the number of cases and...many of the victims could get no medical attention, [it was] promptly decided that half a doctor is better than none.”²

Similar decisions regarding medical students were made throughout the U.S. Decisions about which medical students to involve and how to engage them in caring for patients varied from school to school, even within the same city. The University of Pennsylvania Medical School offered its students one lecture about influenza regarding its symptoms and treatments, and then canceled all classes for the third- and fourth-year students.³ Woman’s Medical College of Pennsylvania (WMCP) canceled all classes for three weeks beginning September 30, 1918, so that the faculty, staff, and students could focus on helping patients.⁴ Ultimately, most medical students were taking care of patients sick with influenza for three to six weeks during the fall of 1918.

Students at the University of Pennsylvania Medical School found themselves working in a temporary ward located in the remains of a partially demolished hospital, with fourth-year students acting as interns, and third-year students as nurses.³ As medical student Isaac Starr (ΑΩΑ, Perelman School of Medicine at the University of Pennsylvania, 1919), later a prominent Philadelphia physician, explained, “It was dreadful business” to watch patients become short of breath to the point of becoming



A ward at the U. S. Army Base Hospital in Toul, France during the Spanish Flu epidemic of 1918-19. Everett Collection Inc / Alamy Stock Photo

delirious and incontinent.³ Given the volume of cases, “many died without having been seen by any medical attendant” other than the medical student.³

The students’ attempts at treatment were often futile; despite having tanks of oxygen, they had no way to administer it.³ At WMCP, the college gymnasium became a hospital ward. Sheets from the Red Cross were used as curtains, lab stools were used as bedside tables, and “the nurses were merely camouflaged medical students.”⁴ The role of these medical students involved taking temperatures, making beds, administering medications, and helping with meals.⁴

Students at Jefferson Medical College also worked in hospital wards for three weeks. Lechner, as he reflects on his “vast clinical experience with influenza,” recalls diagnosing a patient as either flu or non-flu and feeling doubt when deciding to give an influenza patient aspirin, quinine, or a fever mixture.²

Medical students also cared for influenza patients outside of the hospital. Starr noted the multitude of patients and families that would crowd around the cars of medical students working in impoverished neighborhoods; senior students of WMCP participated in house-to-house visits in northern Philadelphia neighborhoods during this time.^{3,4}

Medical students outside of Philadelphia were also heavily involved in controlling the influenza pandemic with roles in both clinical practice and public health. While some fourth-year students at Harvard Medical

School (HMS) went to care for fellow students or patients in the towns and communities surrounding Boston, other fourth-year students worked with assistant professor George Minot (AQA, Harvard Medical School, 1911) in taking temperatures and inquiring about the health and possible exposures of each student.⁵ Similarly, when the influenza pandemic worsened in New York, third- and fourth-year medical students at Albany Medical College provided direct care to those who had contracted influenza both within the Albany institutions and surrounding cities.⁶

Though these students returned to their regular academic schedule after three to six weeks in the midst of the pandemic, the time they spent on the wards was meaningful. Lechner wrote about how different the clinical experience was compared to lectures and studies.² All the lessons about taking a thorough and complete history and weighing an extensive list of diseases in a differential were of little use in the face of crying babies and dying patients.²

Not only were students unprepared for the difficulty of caring for such a high volume of sick patients, they were also at great risk of contracting the illness. While masks, gowns, and handwashing played a role in minimizing the spread of infection, even Starr developed a mild respiratory illness as he cared for patients.³

At Albany Medical College,⁶ students caring for sick patients contracted influenza, and two of them, Lloyd E. Miller (fourth-year student), and George O. Gilman (third-year student) died from the disease.⁶ As mentioned in the *Albany Medical Annals*, “Of both these students it must be said that each gave of himself unsparingly in the fight against the pandemic, thinking only of the crying need for medical men; each thus markedly lowered his resistance to infection and allowed the factor of fatigue to play its important role in hastening the end.”⁶

Despite knowing the risks, medical students in 1918 continued to work in the wards and care for sick patients throughout the influenza pandemic.

Throughout the influenza pandemic.

2020 COVID pandemic

Though none of the other subsequent global health emergencies prior to the COVID-19 pandemic of 2020

were as life-altering as the influenza pandemic of 1918, medical students continued to be involved in health care during such emergencies. They participated in patient surveillance, immunization, education, and documentation and more during the H1N1 outbreak of 2011.⁷ There is evidence of fourth-year medical students acting as doctors in Kashmir after a devastating earthquake in 2005.⁷ With all the existing health care crises and the worries over a future pandemic, many studies in the 2000s and 2010s looked at the willingness of medical students to help in hypothetical and actual medical disaster situations.

A systemic review by Martin et al., assessing the response of medical students in these studies found that the percent of students willing to help in a hypothetical influenza pandemic ranged from 69.77 percent, 77.9 percent to 87.8 percent of students survey depending on the individual study.⁷ One study reported that “more than 59 percent of students were willing to help, but only 23.7 percent of students believed they have the skills to help.”⁷ Reasons that students were willing to help in a pandemic included altruism, social responsibility, professional and skill development, and reduced guilt. The reasons that students were against being involved included academic commitments, family health and safety concerns, inefficiency, lack of confidence and skills, and personal health concerns.⁷ Of those unwilling to participate, one study found that 44 percent cited inefficiency as their rationale, while only nine percent cited fear for their safety.⁷

Leading up to the COVID-19 pandemic, it appeared that medical students would be willing to help but were unsure of their skill level.

When the COVID-19 pandemic began to spread across the U.S. in early March 2020, the role of medical students in patient care quickly contracted. According to Dean Valerie Weber, Senior Vice Dean for Educational Affairs at Drexel University College of Medicine (DUCOM) (AΩA, Drexel University College of Medicine, 2016, Faculty), “The decision was made on a national basis” to pull students out of clinical rotations and convert the curriculum to an online format.⁸ The education deans of all the medical schools in the Philadelphia area held “frequent

planning meetings once or twice a week” to figure out the smoothest and safest way to make the changes.⁸

On a national level, the Association of American Medical Colleges (AAMC) directed the schools to suspend clinical rotations and recommended, “Unless there is a critical health care workforce need locally, ... medical students [should] not be involved in any direct patient care activities.”⁹

To quote Dean Weber, whereas medical students in 1918 were thrown into the pandemic as nurses, interns, and health trackers, “this time, we protected the students.”⁸

Given the sheer volume of patients overwhelming hospitals throughout the U.S., a great deal of thought was put into deciding what the role of medical students in the pandemic should be. Arguing that medical students should be allowed to fulfill their duties to patients, Miller et al., suggested that students could take histories, provide education, communicate lab findings, document visits, and answer patient questions about COVID-19. They even could work on services that did not have COVID positive patients.⁹ Adam Elwood (AΩA, Rutgers Robert Wood Johnson Medical School, 2023, Resident), who was a fourth-year medical student at DUCOM during the pandemic, suggested that he would have felt comfortable with triage, registration, and simple procedures such as IV placement.¹⁰ Weber believed that medical students would have been incredibly helpful by following up on laboratory results, talking to families had they been involved in direct patient care early in the pandemic.⁸

Ultimately, two major factors deterred Weber and



Hospital intensive care unit, COVID-19 pandemic, 2020. SFM Press Reporter / Alamy Stock

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other administrators from allowing student participation. One factor was the severe dearth of personal protective equipment (PPE). Involving medical students in direct patient care would add to the overconsumption of this precious resource. A second factor would be increasing the number of individuals exposed to COVID-19 who could then pass the infection along. Weber explained, “There were so many unknowns at first when the virus struck and started killing people that we didn’t want to put learners at risk.”⁸

Since the long-term effects of COVID-19 were unknown, questions arose as to whether it was ethical to expose a young person, who is not yet part of the fully trained workforce, to the disease.

In the early months of the COVID-19 pandemic, many schools echoed Weber’s comment that the best way a medical student “could volunteer was by isolating, and not contributing to the problem.”⁸ For first- and second-year medical students, their days consisted of lectures, group sessions, and activities as before, albeit through a virtual format. Third- and fourth-year medical students were taken out of rotations in the middle of March 2020. At DUCOM, faculty members quickly created online courses to try to substitute for the missed clinical education. Students assigned to rotations such as pediatrics and medicine participated in discussions of cases and standardized patient encounters via Zoom.^{7,9} As per Weber, “We couldn’t make it up all the way, but at least got everyone some experience.”⁸

Faculty created similar adjustments at medical schools across the country. Throughout the country, rising third- and fourth-year students returned to in-person clerkships during June 2020, after three months of virtual learning.⁸ Even then, restrictions remained. At DUCOM, PPE was required for all students, and no medical student was allowed to see a patient with known or suspected COVID-19 infection.⁸

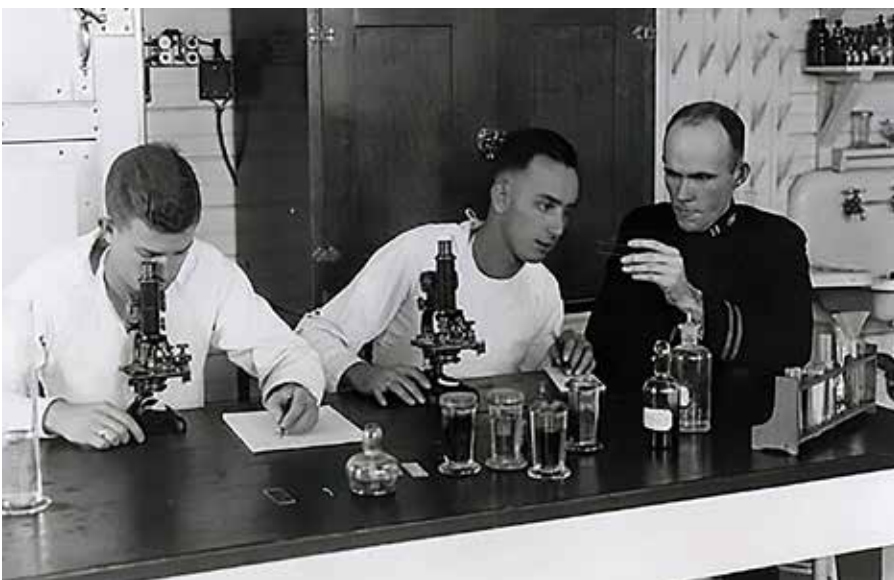
For fourth-year medical students, one possible opportunity to participate in patient care did arise in the early months of the pandemic. Some medical schools, such as New York University Grossman School of Medicine, offered students the option of graduating early so that they could receive their medical license faster and start their residency programs earlier to help on the COVID wards.¹⁰ While some students did graduate early to help care for the surge of patients, they were few and far between.⁸ Most residency programs did not want to have the added responsibilities of orientation and onboarding for early learners amid the existing crisis.⁸ Though a minority of fourth-year students joined the frontlines of patient care, the majority of medical students remained shielded from the brunt of the pandemic.

Different times and equipment

Medical students at the time of the influenza pandemic of 1918 were more directly involved in patient care compared to medical students in the present-day pandemic. What changed in the past 100 years that caused a shift

from utilizing medical students to the most of their ability to protecting them instead? Likely multiple factors spanning the realms of medicine, education, and cultural phenomena contributed to this difference in participation.

At the start of the COVID-19 pandemic, there was a serious shortage of the components of PPE, which includes a face-shield or goggles, non-sterile gloves, an isolation gown, and an N95 filtering facemask respirator. Surveys of nearly 23,000 health care workers across the U.S. from spring 2020 indicate that 87 percent of respondents had reused a single-use mask or N95 respirator, and 27 percent had cared for confirmed COVID-19 patients



During the 1918 Spanish Flu Pandemic Medical personnel researching influenza treatment. Vintage_Space / Alamy Stock Photo

despite not having access to the full arsenal of required PPE.¹¹ Given that there was not enough PPE for the most essential health care workers to see patients, medical students certainly would not have been able to safely care for patients.

In 1918, the criteria for PPE were certainly not as stringent as they are now. While N95 respirators were not available, measures were put in place for protection of those working in the wards. In recalling that most of the medical students and doctors caring for the flu patients did not get severely sick at the University of Pennsylvania, Starr suggested that “perhaps masks, gowns, and handwashing did more to protect us than we had a right to expect.”³ Similarly, Lechner commented that masks played a dual role in hiding the expressions of doubt on the faces of medical students caring for the influenza patients and in making the patients see how grave the situation was.²

Historian Catherine Arnold notes that the protective equipment available for health care workers in 1918 were “white robes and gauze masks” and that the extent of protection often involved dipping home-made masks with disinfectant before use.¹² While she refers to nursing staff creating makeshift masks for patients by stuffing sieves with newspapers, there is no obvious record suggesting that the lack of proper protection acted as a barrier to medical student involvement.

Medical students in 1918 were acting as nurses and interns, and were often the only health care worker that influenza patients saw before succumbing to death.² Was there something in their academic requirements or medical curriculum that allowed them to be more suitable or prepared for this work compared to present day students? With the caveat that academic catalogues tend to over promise the extent of their curriculum, first-year medical students in the academic year 1917-1918 learned “the study of normal,” primarily anatomy, physiology, histology, and embryology, which is similar to the content covered today at DUCOM in the first year of medical school.¹⁴

Second year curriculum in both 1917 at WMCP and contemporary times at Drexel include pathology, pharmacology, and bacteriology.¹⁴ Much like present day medical students, third-year students in the 1910s would primarily learn through patient encounters in clinics, wards, dispensaries, and the operating room, although they would



Researchers working during 2020 COVID-19 pandemic. Alamy

also do practical work on cadavers and learn postmortem technique.¹⁴ Fourth-year students had greater responsibilities than their third-year counterparts while working as clinical clerks on the hospital wards, reminiscent of present-day interns.¹⁴

The level of exposure for topics such as medicine, surgery, pediatrics, and obstetrics/gynecology appear equivalent between the two time periods.^{13,14} In many ways, contemporary medical student experiences are likely more robust. While curricular hours and fundamental teaching concepts are similar, some schools in 1918 did not have a hospital affiliation or strong clinical clerkships.¹⁵

With this difference, it might be expected that medical students in 2020 would be better prepared to provide patient care. Still, present-day medical students were less involved in the pandemic.

When the influenza pandemic struck the world in 1918, there were no available medications or procedures that could aid in curing the disease. Historians have argued that nurses were more valuable than doctors, stating that “The things that count in the general management of a case are absolute rest in bed from the first, fresh air, and good nursing.”¹⁶ A diet of warm liquids, or a mix of milk and lime water, was recommended as a part of treatment.¹⁶ While there was no drug used specifically to treat the influenza virus, aspirin and Dover’s powder were used to control fever and headaches, and moderate doses of heroin were used for the severe cough.¹⁶ If the patient

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had circulatory failure along with pneumonia, a tincture of digitalis was recommended.¹⁶ Even when resources like oxygen tanks were available, most hospitals had no efficient way of administering it.³

Because the primary treatment for influenza consisted of supportive care in the form of sponging, warm clothing, and good nutrition, medical students who did not have particularly vast technical skills were able to play a key role in caring for patients.

In contrast, the management of symptomatic COVID-19 cases was far more complicated and technically demanding. Along with antivirals, monoclonal antibodies, and other medications such as corticosteroids, complex procedural measures are involved in the care of COVID-19 patients. Depending on the patient's percent oxygen saturation, he/she may qualify for oxygen therapy with a face mask, high flow nasal oxygen therapy, or non-invasive ventilation using continuous positive airway pressure.¹⁷ In severe cases, invasive mechanical ventilation via endotracheal intubation or extracorporeal membrane oxygenation (ECMO) may be considered.¹⁷ Both ECMO and mechanical ventilation are challenging procedures to perform, monitor, and manage. For mechanical ventilation, providers must be able to make nuanced decisions about settings, such as tidal volume and positive end expiratory pressure, to optimize the patient's breathing. Such techniques are beyond the scope of medical students' experience.

Both past and present medical students had the skills needed to provide supportive care for patients in the influenza pandemic of 1918. However, the complicated nature of present management of COVID-19 patients limits the help contemporary medical students can provide in caring for this population.

Unity

The U.S. had been involved in World War I for 18 months by the fall of 1918. In that time, themes of patriotism, unity, and sacrifice resonated across the nation. Along with parades to raise money for war efforts, Americans were urged to reduce consumption of meat, wheat, and sugar while increasing fresh fruit and vegetable intake to supply the troops abroad.¹⁸ Teachers, and nuns, volunteered to nurse patients, while grocery stores distributed their goods to the poor.¹² Though there were persons who defied mask mandates or saloon closures, most people seemed to be focused on the public good. This mindset of making sacrifices and uniting for a common cause was present within the medical field as well.

As of April 1918, there were approximately 18,000 physicians in the Medical Reserves Corps, with thousands more, including many retired physicians, joining the ranks over the course of the year as the influenza pandemic spread.¹⁹ In a letter written to the grieving families of the two students at Albany Medical College who died while caring for influenza patients, Dean Thomas Ordway, wrote, "Though not wearing khaki and bars, nevertheless, like the medical men over there, with their self-same noble spirit, he gave his life that others might live. In this, our common bereavement, we can together be proud of his sacrifices."⁶

The existing concept of sacrifice and focus on the common good with regard to the war translated to the pandemic as well. Medical students being directly involved in patient care, despite risks and fears, aligns with the mentality seen overarchingly in the U.S. at the time.

In contrast, the U.S. in early 2020 did not exist in a similar state of turmoil. Whereas patriotism and a closer union were emphasized in 1918, the priority in 2020 seemed to be personal safety. This was seen throughout the country as individuals bought out and hoarded essentials such as toilet paper and masks. Even when medical media discussed the possible roles of medical students in the pandemic, arguments focused on concerns for personal safety, the safety of family members, and the risk of post-traumatic stress disorder.²⁰

The focus was on the individual, not the common good. Had the COVID-19 pandemic begun in the presence of a sacrifice-oriented mindset, perhaps there would have been less of an emphasis on protecting learners, and a greater emphasis on medical responsibility.

While the educational standards of the two time periods appear comparable, significant differences in the technical standards for protective equipment, treatment options for the disease, and the existing cultural climate contributed to the contrast in medical student responsibilities. Given the repeated occurrence of global disease outbreaks and the possibility of future pandemics, it is important to determine to what degree learners should be protected.

One of the most challenging components of navigating the COVID-19 pandemic was that many of these decisions were made in the moment. Particularly since medical students have participated in calamity events before, even at risk to themselves, there could be a benefit to establishing some guidelines in advance as preparation instead of making exigent decisions.

A preparatory range of possible roles including

triaging, taking histories, and communicating lab findings is necessary for medical students in future crisis situations. Given that some level of PPE is available, there is an option for direct patient care, where students could assist in supportive care as they did in 1918, perhaps as volunteers. If so, medical students would be able to have necessary clinical experience rather than a well-intentioned online substitution.

While it is impossible to be fully prepared for a pandemic, lessons from 1918 and 2020 indicate that there can be a vital role for medical students to contribute to medicine and public health.

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