

Harnessing unique experiences to build competence: Medical student engagement in frontline care during the COVID-19 pandemic

Klasen Jennifer M.^a, Bingisser Roland^b, Meienberg Andrea^{c*}, Bogie Bryce J. M.^{d*}

^a Department of Visceral Surgery, Clarunis, University Centre for Gastrointestinal and Liver Diseases, Basel, Switzerland

^b Department of Emergency Medicine, University Hospital Basel, Switzerland

^c Medical Outpatient Department, University Hospital Basel, Switzerland

^d MD/PhD Program, Faculty of Medicine, University of Ottawa, Ontario, Canada

The year 2020 was dominated by the coronavirus disease 2019 (COVID-19) pandemic. Besides the complexities of providing appropriate medical care to patients and protecting the global population against disease transmission, government policies aimed at combating the pandemic have had a profound impact on the activities of daily living [1]. As a result of international lockdown orders, a large number of frontline healthcare providers were redeployed to different hospital units, such as emergency departments, intensive care units (ICUs) and/or newly created triage test centres (TTCs) [2]. Although medical students represented a motivated group to fulfill evolving healthcare needs, medical student engagement was largely ignored in many countries, at least in the beginning of the pandemic. Indeed, most medical schools reacted by swiftly removing medical students from all in-person clinical and non-clinical activities [3]. Such withdrawal of students was reasonable as an initial response since it effectively addressed many concerns among educators and hospital administrators, which included increased risk of viral transmission, limited personal protective equipment (PPE), insufficient capacity to supervise students and concerns surrounding ethics and liability [4]. However, as the pandemic intensified and endured, medical schools began reintegrating students into clinical learning environments [3], albeit with a continued paucity of in-person clinical encounters. The global response to the reintegration of medical students into clinical learning was multifaceted, with each institution responding differently to suit their local demands (table 1). Most strategies focused primarily on virtual learning formats, wherein medical students received clinical teaching through physician-guided or preceptor-moderated sessions [6–8].

TTC administrators at the University Hospital Basel (USB), Switzerland decided early on to recruit medical students to become voluntary frontline workers on the aptly named “SWAB teams” [11]. Here, medical students assumed the responsibilities of supervised administrative work, history taking, evaluating clinical risk scores, measuring vital signs and performing clinical testing with nas-

sopharyngeal and oropharyngeal swabs. To ensure patient and student safety, accurate instructions and supervision regarding the handling of PPE was given top priority. As the pandemic persisted, administrators at the USB subsequently incorporated medical students into mobile SWAB teams, who supported the staff of the inpatient wards. Colleagues at the Aalborg University, Denmark responded similarly to staff shortages and trained students in ventilator therapy and nursing assistance to support their ICU professionals [9].

Table 1: Summary of medical education strategies used to reintegrate medical students into clinical learning environments during the COVID-19 pandemic.

Response category	Description	Example
Grass roots responses	Medical student-led and/or self-organised initiatives to supplement lost clinical encounters; e.g., community service via public health education call centres, contact tracing, etc.	Machado (2020) [5]
First-person, point-of-view clinical skills teaching	The use of live, interactive sessions with real-time video from the point-of-view of the physician during surgical procedures and/or physical examinations. Procedures and examinations are performed on real patients and are led by the physician.	Chao, Frost and Newman (2020) [6]
Telemedicine	The incorporation of medical students into telemedicine clinics.	Pellegrini, Danis III and Levi (2020) [7]
“Web-side” clinical skills practice	The use of virtual platforms to allow medical students to guide the interviewing and physical examination of real patients through an on-site preceptor.	Tsang et al. (2020) [8]
In-person clinical exposure	The integration of medical students into local healthcare facilities to gain in-person clinical training, with potential incorporation within the frontline workforce.	Rasmussen et al. (2020) [9]
Fast-track graduation of medical students	Fast-tracking the graduation of senior medical students and integrating them into the frontline workforce to help mitigate local healthcare challenges.	Harvey (2020) [10]

* Contributed equally to this work and share the last authorship

Correspondence:
Dr Jennifer M. Klasen, MD, Department of Visceral Surgery, Clarunis, University Centre for Gastrointestinal and Liver Diseases, Spitalstrasse 21 / Petersgraben 4, CH-4031 Basel, [jennifer.klasen\[at\]clarunis.ch](mailto:jennifer.klasen[at]clarunis.ch)

The incorporation of medical students into the frontline workforce during the first wave of the pandemic fulfilled multiple purposes. First, emergency and other departments such as ICUs or intermediate care units faced a shortage of frontline workers that could not be filled by the redeployment of other medical specialists alone. Second, all clinical activities for medical students were postponed or transformed into virtual formats, which meant that students missed valuable bedside learning opportunities. Therefore, the inclusion of medical students as frontline workers allowed them to contribute to patient care, support future colleagues and replace some of their missed clinical experiences [12]. It also served as an innovative opportunity for these students to further develop and hone competence within each of the CanMEDS Roles that are inherent to an effective physician [13].

The issues of social distancing continued to be a challenge that affected the well-being of all frontline healthcare providers [14]. Despite this, we observed that medical students working on the frontline built new connections with other students and staff; having social contacts might have added to their well-being. The students also used the clinical situations provided as opportunities to learn about disinfection, hygiene, swabbing and infectious diseases. Finally, given that many students' jobs were cancelled due to the local lockdown policies, frontline work also represented an opportunity to overcome some of the financial barriers associated with the pandemic. However, potential negative aspects associated with the approaches described must be recognised. First, working shifts in full PPE can be strenuous, exhausting and unpleasant, and clinical encounters with infected patients can demand much energy, both physical and psychological [15]. This is an important negative component of the current approach, especially as these conditions deviate significantly from those that occur in traditional learning environments. Finally, "swabbing" may appear somewhat narrow in scope, easy to learn and may have quickly become routine. Although, the possibility to rotate duties during daily work to improve soft and technical skills, and the opportunity to observe experienced medical staff, may have compensated for this limitation.

One of the intriguing aspects of having medical students participate in frontline work was that they did not act as silent workers; instead, they quickly identified themselves as a self-organised team with an unexpected ability to dynamically analyse problems and provide reflective solutions [9, 11]. They formed chat groups to address organisational issues surrounding their shifts, redefined standard operating procedures for their colleagues, and devised and implemented ideas for improvement.

Caring for patients under the circumstances of a pandemic may influence the development of medical students' professional identity as future physicians. Indeed, a pervasive concern within the medical education community during COVID-19 has been the effects of the pandemic on medical students' access to in-person bedside teaching [3]. Several innovative solutions to these concerns have been developed worldwide; in some cases, students were actively integrated into the frontline workforce (see table 1). Reflecting on the observed consequences of our approaches, it is clear that medical student engagement in pa-

tient care on the frontlines of a pandemic is possible given adequate PPE and safe working conditions. Medical students are sufficiently competent to effectively contribute to the responsibilities of a well-defined frontline workforce, and their active engagement in frontline care serves as invaluable experience to help further develop their clinical competence and confidence [9]. The implementation of a contract that includes insurance coverage and payment should thus be a mandatory component of this approach. We suggest all universities give medical students educational credit for such engagement, and to consider integrating this type of engagement into the curriculum as a supplement to course-based learning or in replacement of lost practical/clinical training. General learning about epidemic and pandemic challenges, disease surveillance and containment should also be integrated into the medical curriculum of universities worldwide to prepare physicians-in-training to better handle the current (and any future) public health crises [16].

In general, we acknowledge that it might be difficult to consider all of the recommendations regarding the well-being and resilience of frontline workers in the midst of a pandemic [17]. Although we cannot foresee how our specific approaches will influence medical students in the future, the impacts of their clinical experiences on their emotional well-being and clinical competence merits further investigation.

Conclusion

Medical students have chosen a career dedicated to helping and healing. Their integration into frontline care provides unique learning conditions wherein they can further develop clinical competencies during a time of unprecedented uncertainty regarding the nature of their future training. The specific responses by the medical education community to the pandemic may prove to be a valuable resource to guide decision-making and policy in the event of a future public health crisis. To create optimal conditions for their service on the frontlines, teaching about such public health crises should be integrated into every medical curriculum. Voluntary work should be rewarded with educational credit and adequate compensation. As countries experience subsequent pandemic waves and identified variants of SARS-CoV-2, the lessons learned from the current interventions may help guide medical education leaders across the globe in their decisions concerning how to promote medical student engagement in frontline care during a continuing public health crisis.

Disclosure statement

No financial support and no potential conflict of interest relevant to this article was reported.

References

- 1 Haleem A, Javaid M, Vaishya R. Effects of COVID-19 pandemic in daily life. *Curr Med Res Pract.* 2020;10(2):78–9. doi: <http://dx.doi.org/10.1016/j.cmp.2020.03.011>. PubMed.
- 2 Mansella G, Rueegg M, Widmer AF, Tschudin-Sutter S, Battegay M, Hoff J, et al. COVID-19 triage and test center: Safety, feasibility, and outcomes of low-threshold testing. *J Clin Med.* 2020;9(10):3217. doi: <http://dx.doi.org/10.3390/jcm9103217>. PubMed.
- 3 Klasen JM, Meienberg A, Bogie BJM. Medical student engagement during COVID-19: Lessons learned and areas for improvement. *Med Educ.* 2021;55(1):115–8. doi: <http://dx.doi.org/10.1111/medu.14405>. PubMed.

- 4 Miller DG, Pierson L, Doernberg S. The role of medical students during the COVID-19 pandemic. *Ann Intern Med.* 2020;173(2):145–6. doi: <http://dx.doi.org/10.7326/M20-1281>. PubMed.
- 5 De Sá Dias Machado MB. On the frontlines, behind the computer screen. *Acad Med.* 2020;95(11):e10–1. Available at: <https://doi.org/doi:10.1097/ACM.0000000000003601>. PubMed.
- 6 Chao TN, Frost AS, Newman JG. Interactive virtual surgical education during COVID-19 and beyond. *Acad Med.* 2020;95(11):e9. doi: <http://dx.doi.org/10.1097/ACM.0000000000003609>. PubMed.
- 7 Pellegrini WR, Danis DO, 3rd, Levi JR. Medical student participation in otolaryngology telemedicine clinic during COVID-19: A hidden opportunity. *Otolaryngol Head Neck Surg.* 2020;194599820970964. <http://dx.doi.org/10.1177/0194599820970964>. PubMed.
- 8 Tsang ACO, Lee PP, Chen JY, Leung GKK. From bedside to website: A neurological clinical teaching experience. *Med Educ.* 2020;54(7):660. doi: <http://dx.doi.org/10.1111/medu.14175>. PubMed.
- 9 Rasmussen S, Sperling P, Poulsen MS, Emmersen J, Andersen S. Medical students for health-care staff shortages during the COVID-19 pandemic. *Lancet.* 2020;395(10234):e79–80. doi: [http://dx.doi.org/10.1016/S0140-6736\(20\)30923-5](http://dx.doi.org/10.1016/S0140-6736(20)30923-5). PubMed.
- 10 Harvey A. Covid-19: medical schools given powers to graduate final year students early to help NHS. *BMJ.* 2020;368:m1227. doi: <http://dx.doi.org/10.1136/bmj.m1227>. PubMed.
- 11 Klasen JM, Meienberg A, Nickel C, Bingisser R. SWAB team instead of SWAT team: Medical students as a frontline force during the COVID-19 pandemic. *Med Educ.* 2020;54(9):860. doi: <http://dx.doi.org/10.1111/medu.14224>. PubMed.
- 12 Farber ON. Medical students can help combat Covid-19. Don't send them home. STAT. Available from: <https://www.statnews.com/2020/03/14/medical-students-can-help-combat-covid-19/> [accessed 2020 September 20].
- 13 Frank JR, Snell LS, Cate OT, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: theory to practice. *Med Teach.* 2010;32(8):638–45. doi: <http://dx.doi.org/10.3109/0142159X.2010.501190>. PubMed.
- 14 Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N, et al. Factors associated with mental health outcomes among health care workers exposed to coronavirus disease 2019. *JAMA Netw Open.* 2020;3(3):e203976. doi: <http://dx.doi.org/10.1001/jamanetworkopen.2020.3976>. PubMed.
- 15 Gupta S, Sahoo S. Pandemic and mental health of the front-line health-care workers: A review and implications in the Indian context amidst COVID-19. *Gen Psychiatr.* 2020;33(5):e100284. doi: <http://dx.doi.org/10.1136/gpsych-2020-100284>.
- 16 Klasen JM, Vithyapathy A, Zante B, Burm S. “The storm has arrived”: the impact of SARS-CoV-2 on medical students. *Perspect Med Educ.* 2020;9(3):181–5. doi: <http://dx.doi.org/10.1007/s40037-020-00592-2>. PubMed.
- 17 Aebischer O, Weilenmann S, Gachoud D, Méan M, Spiller TR. Physical and psychological health of medical students involved in the coronavirus disease 2019 response in Switzerland. *Swiss Med Wkly.* 2020;150(4950):w20418. doi: <http://dx.doi.org/10.4414/smw.2020.20418>. PubMed.