Medical Education in 2020: Developing COVID Secure Undergraduate Hospital Placements

Joshua Caplan^{1,2} • Rachel Clements^{1,3} • Christopher Chadwick¹ • Joshan Kadirgamar¹ • Jacqueline Morgan¹ • Abhishek Rao¹

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Introduction

The COVID-19 pandemic is the greatest challenge the National Health Service (NHS) has faced since its inception. The NHS has adapted quickly to reconfigure services in response to evolving circumstances; however, the status of undergraduate medical education in the UK remains unclear. Clinical placements were curtailed in early Spring at the peak of the UK pandemic, but are planned to restart in the new academic year (September 2020). As hospitals begin their recovery phases with the restarting of elective work and other key services, medical educators must consider how best to provide high-quality teaching to the next cohort of clinical-based medical students.

Government guidelines advise good hand hygiene and social distancing as two key methods of minimising COVID-19 infection and transmission [1]. At the time of writing, the use of facemasks in situations where social distancing cannot be maintained, such as on public transport or indoor workspaces, has also been advised. The World Health Organization (WHO) recommends social distancing at a physical distance of one metre [2], which is followed in countries such as France, Singapore and China [3]. The UK government has opted instead for a two-metre social distancing rule, or if not possible, one metre plus other precautions [4]. There may be further relaxation of these restrictions over the coming

months; nonetheless, social distancing measures are likely to remain in place until the end of 2020 [5]. For close personal contact with patients where aerosol-generating procedures are taking place, full-body personal protective equipment (PPE) including respiratory protective equipment (RPE), a long-sleeved disposable gown, eye protection and gloves are required [6]. For non-aerosol-generating procedures, minimum PPE consists of a disposable apron, facemask, gloves and eye protection (if required) [7]. The sourcing of vast quantities of PPE and the logistics of organising teaching to comply with social distancing regulations poses a significant challenge to undergraduate medical education for the foreseeable future and any planning must take these factors into account.

The UK Medical Schools Council (UKMSC) released a statement on 1 May, acknowledging the challenge that restarting clinical placements brings, whilst emphasising the importance of students continuing to progress through medical school. This is essential to ensure continued flow of new doctors into the healthcare system. They stipulate that safe supervision of students, adequate provision of PPE and government advice on social distancing and travel must all be considered prior to restarting clinical placements [8]. A further UKMSC statement in July welcomed the decision to designate medical students as essential workers as this is key to ensuring the above criteria are met [9]. There remains, however, a degree of uncertainty for hospital trusts when planning clinical placements, due to the lack of more specific national or local guidelines. A consensus on how to ensure the safety of students on clinical placements has also not yet been reached.

Although advances in digital education have been largely supported in the medical community, the actual use of these technologies as an alternative to traditional teaching methods remains limited, particularly in hospital settings where small group sessions and bedside teaching predominate [10]. However, the requirement to socially distance, as well as challenges with room booking, availability of clinicians to facilitate teaching and the increased risk of going into clinical areas,

✉ Joshua Caplan
joshua.caplan@nhs.net

¹ Clinical Teaching Fellow, Sandwell and West Birmingham Hospitals NHS Trust, West Bromwich, UK

² Postgraduate Centre, City Hospital, Dudley Road, Birmingham B18 7QH, UK

³ Academic Foundation Year 2 Doctor, West Midlands Deanery, UK

means many conventional teaching methods may not be possible. In light of the current pandemic, organisations such as the Association for Medical Education in Europe have created webinars that advise specifically how to harness digital technology in medical education [11]. Further to this, the Association of American Medical Colleges has compiled a collection of virtual teaching resources to help maintain high-quality education, so that students can continue to be trained for their future roles as healthcare professionals [12]. These initiatives are promising, but they of course cannot replace the experience of interacting with other health professionals or encountering real patients.

Sandwell and West Birmingham Hospitals NHS Trust (SWBH) provides clinical placements for up to 500 medical students from years three to five, across two hospital sites over the course of an academic year. With thorough planning, we aim to ensure a high standard of undergraduate medical education is upheld during the COVID-19 pandemic, giving students the best clinical experience possible, whilst ensuring that the safety of patients, students and staff is not compromised. Early research has outlined the disruption COVID-19 poses to medical education more generally [13, 14]; however, specific challenges to medical education are yet to be explored comprehensively in the literature. In this article, we discuss some of the specific challenges the COVID-19 pandemic poses to our clinical teaching programme and outline possible solutions to ensure all teaching is COVID secure.

Patient-Facing Encounters

Traditionally, the primary role of clinical placements in medical degrees has been to expose students to patients in an authentic environment. This apprenticeship-style of learning

has underpinned medical education for centuries [15]. The ability to take a history and physically examine patients is the foundation of medicine [16]—skills that are extremely difficult to learn or refine in the absence of direct patient contact. For our students, patient-facing encounters take place in three main settings: hospital wards, outpatient clinics, and our unique simulated bedside teaching carousels. Both ward- and clinic-based patient encounters are likely to be reduced to minimise risk of COVID-19 transmission from students to patients and vice versa. This decision will also be dependent on the cost and availability of scarce PPE resources, the trust's capacity to fit-test medical students with RPE and the increased use of virtual clinics during the pandemic. Future planning must therefore acknowledge that more teaching will need to take place outside of these clinical settings.

Our education team already delivers a unique style of bedside teaching for its third-year medical students. Alongside ward-based bedside teaching, students are given the opportunity to examine real patients with clinical signs, who are brought in from the community as part of our weekly bedside teaching carousels. Each week, a different body system is covered during a four-hour session. Due to the large number of students at the trust, sessions are duplicated across the week with between 40 and 50 students attending each time. They are split into smaller groups of 8–10 students and rotate around 4–6 stations, each facilitated by a clinical teaching fellow or a volunteering junior doctor (Fig. 1). The purpose of these sessions is to give students an opportunity to identify clinical signs and develop their examination and communication skills in a protected environment, with opportunity for directed feedback. COVID-19 has meant that patients who previously volunteered to be examined in these sessions are now shielding at home, due to their underlying health conditions. It is also impossible in our current teaching spaces, for

Fig. 1 An example of a bedside teaching carousel prior to the COVID-19 pandemic. Each stick figure represents one student

groups of this size to stand around a bedside, whilst adhering to social distancing policy.

Our alternative programme proposes to deliver some of these missed clinical opportunities and ensures similar learning outcomes are met. Whilst replicating the exact experience of patient contact will be challenging, one solution is to utilise available technology. Simulation manikins such as abdominal and breast trainers and other equipment like heart-lung sound trainers are useful tools at our disposal, giving students exposure to clinical signs without the need for patient contact. Alongside technology, specialist nurse teams such as stoma nurses will be recruited to run stations, bringing in relevant equipment to showcase to students as well as offering a wealth of clinical expertise. Short interactive presentations with images can also accompany stations to provide theoretical context (Fig. 2). In order to navigate social distancing restrictions, alterations in group sizes and number of stations per carousel will also be made; for example, by halving the number of students per session and running four shorter identical sessions, 20–25

students can be accommodated each time. A disadvantage of this staggered format of delivering large group activities such as the bedside teaching carousel is that it will increase the burden on group facilitators. It will also require multiple room bookings and put a strain on equipment availability as well as potentially reduce the amount of contact time students will receive. PPE requirements for these sessions remain unclear, although it is likely that stations involving equipment will need to have vigorous hygiene rules, including regular wiping of manikins and use of gloves by participants.

Simulation

Greater focus on patient safety and a desire for standardised educational opportunities are just two of the factors behind the increased use of clinical simulation in healthcare education [17]. Simulation as a learning method also offers medical students the unique opportunity of interacting with a range

Fig. 2 A proposed example of a COVID secure bedside teaching carousel following the COVID-19 pandemic. Each stick figure represents one student

of healthcare professionals in a controlled setting, which studies suggest is a valuable tool in enhancing interprofessional team-working skills, even at the early undergraduate stage [18]. The undergraduate team at the trust has developed an extensive final-year simulation programme, made up of 15 weekly scenarios. Each simulation scenario runs four times over the course of two afternoons, splitting students into groups of 8–10, accommodating approximately 36 final-year students in total. This forms the backbone of their ‘Acutely Ill Patient’ module which they undertake at the trust and represents the largest undergraduate simulation programme run by our department. A parallel small-group teaching session on a relevant clinical topic, e.g. insulin prescribing for the diabetic ketoacidosis simulation, runs alongside each simulation scenario. Two groups of students come together for a concluding lecture after having participated in both the simulation and the small-group session. All sessions take place either in our purpose-built high-fidelity simulation suite or on our teaching ward with low-fidelity manikins.

Traditionally, two students participate in each scenario alongside a faculty plant. The remaining 6–8 students observe the scenario from the end of the bed or a small observation room, with all participating in the debriefing process afterwards. Although the group sizes are small, it again will not be possible in our current location for those observing to maintain adequate social distancing of 2 m, nor will it be possible for the participants (students and plant) to socially distance from one another as the scenario progresses. A further issue is that the small-group session and concluding lecture currently take place in spaces where social distancing is not possible. Compounding this, our simulation suite is likely to be used exclusively for postgraduate simulation in the coming months, which is also experiencing similar challenges to the undergraduate programme and therefore will be running extra sessions to accommodate mandatory postgraduate simulation. As such, our final-year students will have limited or no exposure to the high-fidelity simulation suite.

To tackle the above issues, we have created a temporary simulation suite in our undergraduate teaching ward. This involves using a high-fidelity manikin and live camera feed, enabling students to observe the scenario from a separate, larger area, whilst maintaining social distancing. This larger space can then be used for the debriefing process. The parallel small-group session will take place in an alternative large room elsewhere in the education centre and students will be asked to maintain social distancing whilst moving between the two sessions. Students and faculty members unable to physically distance themselves during the scenario and who will be touching the manikin or other equipment will be required to wear the minimum PPE of gloves and a face mask. Possible solutions for the small-group session and large-group lecture will be discussed below.

Lectures and Small-Group Teaching

Despite attempts to reduce the quantity of didactic, lecture-based teaching, large group sessions remain a key component of undergraduate medical education [19], primarily due to their efficiency and cost-effectiveness in the context of expanding medical school cohorts [20]. Due to the large number of students at SWBH, lectures still form a significant part of our undergraduate teaching programme and enable medical educators to deliver key curriculum topics to large groups of students. They now pose a significant challenge regarding room bookings and ensuring furniture are strategically laid out to ensure adequate social distancing. If large spaces are not available, face-to-face large-group tutorials will need to be repeated several times in order to accommodate the same number of students.

Many medical schools were successfully utilising online lectures prior to COVID-19 [21, 22], and use of e-lectures or online meeting software is an obvious and relatively straightforward solution to our challenge. Our trust has in place an existing e-lecture series which students are advised to watch regularly throughout the placement. This series will continue during the current pandemic and will likely be expanded if social distancing guidance remains in place. The disadvantage of relying on e-lectures is the reduced interaction between lecturer and student and the lack of opportunity for students to ask questions. Use of online meeting software and screensharing would more closely replicate what we currently offer students and would be ideal for both encouraging active participation and monitoring attendance.

Small group teaching has long been a core feature of medical education programmes [23]. They encourage more independent, student-directed learning and provide valuable opportunities for student feedback [24]. Small-group teaching raises similar issues to lectures and the provision of these sessions will be dependent on the size of the group and room availability. If large enough rooms are available to allow for adequate social distancing, minimal adaptation to these sessions will be required. As with large-group teaching, online meeting platforms can be used to deliver virtual sessions if room capacity is an issue, with learning materials emailed out beforehand. Students will therefore have an opportunity to ask questions and discussion can occur in a similar manner to a face-to-face tutorial.

The increased adoption of virtual teaching poses an interesting question that will need to be addressed prior to the commencement of the new academic year. General Medical Council guidance stipulates that medical students must demonstrate satisfactory attendance both at university and on their placements, with poor attendance potentially resulting in failure to progress [25]. A number of organisations, including our hospital trust, are still encouraging employees to work from home where possible and to only come into the workplace if

Table 1 Current teaching methods in use and adaptations required, including advantages and disadvantages of the teaching style

	Teaching method	Currently in use	Currently COVID secure	Adaptation required for COVID-security	Advantages	Disadvantages
Patient-facing encounters	Ward bedside teaching	Yes	No	PPE Decreased number of students allowed on the wards	Authentic patient experience Exposure to pathology	Risk of COVID contact to students Cost and availability of PPE Clinician availability
	Bedside teaching carousel	Yes	No	Removal of patient examination stations Specialist nurse input Smaller group sizes Simulation equipment PPE	Standardised learning environment Opportunity for feedback Exposure to simulated pathology	Reduced authenticity Cost and availability of PPE Reduced teaching time
	Clinic-based teaching	Yes	Yes*	Student expectations for virtual clinics	Opportunity for 1:1 teaching with specialist consultant Opportunity to see innovation in practice	Reduced authenticity Unable to practice examination skills Possible time constraints
Non-patient-facing encounters	Simulation	Yes	No	Live streaming Larger rooms PPE	Simulation of MDT working Ability to practice the management of acutely ill patients in protected environment	Faculty availability Cost and availability of PPE Cost of technical equipment
	e-lectures	Yes	Yes	None	High-fidelity Pre-existing programme Minimal facilitators required Can be accessed off-site	Students unable to ask questions Didactic form of learning Difficulty with monitoring attendance
	Small-group teaching	Yes	No	Larger rooms Online meeting software	Opportunity for group discussion Ability to ask questions Attendance monitoring Can be off-site	Limited room availability Facilitator availability
	Large-group teaching	Yes	No	Larger rooms Online meeting software	Ability to ask questions Attendance monitoring Can be off-site	Limited room availability
	Clinical skills teaching	Yes	No	Larger rooms Increased number of sessions Smaller group sizes PPE	High-fidelity practical experience Mandated for progression	Limited room availability Facilitator availability Cost and availability of PPE Reduced teaching time

*Most clinics are now run virtually

absolutely essential. What is deemed as ‘essential’ with regard to attendance will therefore need to be reviewed by medical schools, trusts and national bodies to ensure students are not penalised for virtual attendance in place of face-to-face. This is even more important if we as an education body are unable to safely provide such learning spaces on hospital sites. We must decide whether the provision of virtual teaching when possible is preferable, and whether this will impact student progression going forward.

Conclusion

The COVID-19 pandemic will change how we deliver medical education in the short term, and possibly forever. Online meeting software, which has become central to much of our work- and social-lives, is likely to take over from lecture theatres and tutorial rooms crammed with students. Reduced patient contact is inevitable; however, use of simulation technology and expert multi-disciplinary team members will help to bridge some curriculum gaps in the short term. Our bedside teaching carousels offer a viable solution to the challenges posed by the COVID-19 pandemic regarding large group activities and restrictions surrounding student-patient contact. Whilst this article has not explored all teaching modalities, Table 1 outlines potential challenges and solutions for the range of teaching provided at our trust. Unable to rely on the teaching methods of old, COVID-19 is forcing us to embrace the plethora of technology available to medical educators, which is a positive step towards more innovative virtual medical education in the long term. Teaching trusts and universities will need to adapt current undergraduate programmes to reflect latest government guidance and be malleable to evolving changes in restrictions.

As discussed in this article, a careful balance is required with regard to PPE. Provision of PPE for undergraduate students on clinical placement represents a significant cost to hospitals, particularly those with large cohorts such as ours. Novel teaching methods with minimum PPE requirements should be developed to ensure this precious resource is not wasted. However, where required, appropriate PPE use should be considered a necessary and valuable investment in our future doctors.

There is evidence that people from black and minority ethnicities are at increased risk of contracting COVID-19 and subsequently have worse clinical outcomes [26]. Future guidance for students must reflect this. Those with pre-existing health conditions and shielding students must also be considered when developing policy around returning to clinical placement. Without further guidelines from the government, the UKMSC or local medical schools, we have been unable to fully review these issues here. We suggest that before students return to clinical placement there needs to be a thorough

review process about how risk is assessed on vocational degrees such as medicine, where students are likely to be at higher risk of contracting COVID-19.

This article was designed to outline some of the current challenges facing SWBH in implementing an undergraduate clinical medical programme in a hospital environment, with a focus on ensuring COVID-security for all teaching activities. We propose closer working nationally and regionally between medical schools and trusts to share solutions and best practice, ensuring equity between students in their placement experiences. Further research is needed to analyse how best to deal with local lockdowns that may be implemented as a result of public health contact tracing as well as how universities and professional bodies plan to ensure undergraduate medical assessment is COVID secure in the future.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflicts of interest.

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