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*Commentary*

# Simulation-based education: International collaboration and resource sharing in response to COVID-19

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**Abstract.** Throughout 2020, medical radiation science education and training was impacted by COVID-19 restrictions on clinical placement opportunities. While academic learning and assessment mostly continued using online learning methods, this was not the case for clinical skills training. Technical, professional, and interpersonal skills development is usually refined and practised via placement blocks in clinical departments. When these clinical placement opportunities stopped during the COVID-19 pandemic, training capacity was reduced, and alternative training solutions were sought. A recent international conference was convened to share resources and ideas related to simulation-based education in order to help address clinical training limitations. A range of themes emerged during the conference including use of bespoke online teaching tools, adaptation of existing solutions or use of sophisticated virtual reality software packages. Solutions included use of equine facilities, after-hours clinical equipment, phantoms, and video resources, with several presenters also showcasing virtual Objective Clinical Examinations. Delegate evaluation of the event was overwhelmingly positive included a desire to engage in similar events and engage in future collaboration. Sharing of simulation resources and ideas was adopted enthusiastically and this collaborative approach should continue to provide benefits to educators and learners in the future. Online or virtual simulation activities may well continue to play an important role post-COVID-19; additional work is needed to develop a pedagogical framework for optimal use of simulation and to identify how it can be used most effectively as partial replacement for clinical training time. The international collaborative approach embraced during this conference is likely to be an important aspect of ongoing pedagogical development in simulation-based education throughout the pandemic and beyond.

**Keywords.** Simulation; Medical radiation science; Education; Training; COVID-19; Collaboration

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## 1. Introduction

Like other health professions (Glasper, 2020), the impact of COVID-19 on education and training for both medical radiation students continue to be significant. While academic learning and assessment has mostly been able to continue using online learning methods, this is not the case for clinical skills training. Technical, professional, and interpersonal skills development is usually refined and practiced via placement blocks in clinical departments. These clinical placement opportunities stopped during the COVID-19 pandemic due to clinical workplace pressures and the need to reduce risks for students, staff, and patients. Although most placements are now continuing, training capacity is generally reduced and when combined with the need for social distancing, clinical skills training remains at risk.

The reduction in clinical placement opportunities has led to increased adoption of simulation resources to help provide some continuity in skills development. Use of

simulation-based education was a key recommendation of the American College Health Association (2020) "Considerations for reopening institutions of higher education in the COVID-19 era" guidance. Prior to COVID-19, simulation has long been used (Owen, 2016) to provide core skills training) in preparation for placement (Alinier, 2007). Published data from high quality studies in nursing (Curl et al., 2016), occupational therapy (Imms et al., 2018) and physiotherapy (Tuttle et al., 2019) have identified the increased confidence and skills gain arising from learning in a safe unpressured simulated placement. Criticism of simulation commonly relates to low levels of realism and the dangers of eliminating patients from the learning, yet these issues generally depend on flawed assumptions about the need for high fidelity simulation and the role of simulation. Previous work (Ketterer et al., 2020) has shown that key benefits associated with simulation were not directly linked to physical attendance and use of high-fidelity simulation resources, but instead arose from the interpersonal interactions scaffolded by the various scenarios. Findings from an extensive review (Shiner, 2018) also indicated that simulation provided excellent preparation for clinical placement that enabled learners to focus more on their patients and less on use of equipment. It can be seen, then, that delivering simulation-based education remotely is not only feasible but could potentially deliver genuine clinical skills training during temporary reductions in clinical department footfall.

One of the challenges presented by COVID-19 was the need for rapid development and deployment of simulation resources. Published data consistently reports the need for investment in resource development, staff training and debriefing preparation in order to maximise the value of simulation. The limited time frame caused by COVID-19 meant that the usual planning lead-in time and staff development were largely absent, and educators needed to hit the ground running. A potential solution to this was identified as resource sharing.

## 2. Method

In response to the challenges presented by COVID-19 restrictions, an international team devised an exciting free online conference that aimed to facilitate sharing of experiences of using simulation to augment or partially replace clinical training. The conference adopted a unique split session timing to accommodate delegates from both the Americas and Australasia and was delivered through Microsoft Teams hosted by The University of Liverpool. Feedback was gathered from delegates via an online anonymous survey tool after the event.

## 3. Results

The conference featured a range of over 40 speakers including simulation researchers, academics, students, and professional body representatives from around the globe keen to share ideas for how simulation could provide some capacity to teach clinical skills in the absence of clinical placement for the duration of the pandemic restrictions. Over 900 delegates registered for the conference and engaged through live questioning of presenters and panel plenaries.

A range of themes emerged during the conference including use of bespoke online teaching tools, adaptation of existing solutions or use of sophisticated virtual reality software packages. Solutions included use of equine facilities, after-hours clinical equipment, phantoms, and video resources. There was a strong theme relating to use of simulation for assessment of clinical skills with several presenters showcasing virtual "Objective Clinical Examinations" (OSCEs).

Delegate evaluation of the event was overwhelmingly positive and rated over 90% of sessions as "Valuable" or "Extremely Valuable". Over 95% of respondents expressed a desire to engage in another event and 95% of respondents expressed an interest in future collaboration. Qualitative feedback from the event triangulated well with the emerging themes and quantitative responses; these demonstrated enthusiasm for both simulation-based education and global collaboration and resource-sharing.

## 4. Discussion

Conference themes and feedback highlighted great enthusiasm for simulation-based education and some key benefits afforded by this. While the wider benefits of simulation have been eloquently summarised in prior publications (Owen, 2016), there were some themes arising from the conference participants that related specifically to the COVID-19 restrictions. One of these related to the issue of using simulated placements in lieu of clinical training time. Much of the existing evidence base in medical radiation science supports use of ad-hoc simulation activities (Shiner, 2018) but there is

little evidence relating to partial replacement of clinical training time with simulated placements.

With the withdrawal of placement opportunities, it was clear that many conference participants were seeking to plan alternatives to placement that would still afford learners the opportunity to gain clinical skills. Use of simulation as partial replacement for clinical time has met with some resistance in previous studies (Thoirs et al., 2011). A recent Delphi consensus study (currently under review), however, has suggested that there is now increased support for the concept of partial replacement of clinical training with simulation, and it will be interesting to see if the use of this technique during COVID-19 restrictions continues in the post-pandemic future.

A COVID-19 specific aspect of simulation discussed at the conference related to preparing students for future placements that would require their extended use of Personal Protective Equipment (PPE). The identified benefits of providing learners with practice at "donning and doffing" link well to previously published benefits of simulation and the provision of a safe environment for this. Being able to simulate realistic scenarios requiring effective use of PPE has been an important aspect of simulation-based education over the last 12 months.

Perhaps one of the most concerning educational consequences of lost clinical placement for many academic and clinical staff was the impact on assessment of clinical skills and achievement of standards of proficiency. Several of the conference presentations and feedback comments specifically addressed this issue and some innovative simulation-based solutions had been utilised. Some virtual reality solutions offer assessors the ability to observe student performance in terms of technical skill and with some products there is an option to gain metrics from this to measure technical accuracy. While these solutions omit the vital interpersonal skills, it is clear that many educators have been combining them with online activities using actors to assess communication skills. These OSCEs have been able to support assessment of some clinical skills but lack the ability for learners to showcase how technical and interpersonal skills can be combined in a realistic clinical scenario. For some tasks, however, such as radiotherapy planning, simulated placements can mimic most of the workflow and allow these competencies to be assessed with a degree of accuracy. There was general agreement that more work is required to identify which aspects of medical radiation science practice can be assessed through simulation and which demand assessment in a clinical environment with real patients.

With such a wealth of simulation-based education resources now developed, evaluated, and shared, it is hard to imagine placing these back into a box when clinical placements return to normal. It will be interesting to see if the academic and clinical communities continue to reap the benefits of some of these techniques and pedagogical developments post-COVID-19. In particular, it will be useful to identify which of the simulation solutions and scenarios take their place alongside clinical placement as an essential aspect of training and possibly assessment, and the impact that this will make on placement planning.

Alongside the evident enthusiasm for sharing of ideas and resources, the conference feedback also demonstrated a genuine desire for educators to form a community of practice to continue to collaborate and share post COVID-19. These awful circumstances in many cases have led to institutions abandoning their reluctance to share with "rivals" and to embrace a more open approach to resource development and sharing of expertise. Part of this may arise from the isolation imposed by remote working and social distancing, with educators keen to communicate and work together. It will be interesting, however, to see if this international collaborative approach to pedagogical development in simulation-based education continues after the pandemic. Certainly, delegate feedback indicated a strong desire for similar events in the future and hopefully this will lead to ongoing collaboration and a sustainable community of practice in medical radiation science simulation-based education.

## 5. Conclusions

Simulation-based education helped medical radiation science students continue clinical skills training and achieve standards of proficiency during the COVID-19 pandemic. Sharing of simulation resources and ideas was adopted enthusiastically and this collaborative approach should continue to provide benefits to educators and learners in the future. Online or virtual simulation activities may well continue to play an important role post-COVID-19; additional work is needed to develop a pedagogical framework for optimal use of simulation and to identify how it can be used most effectively as partial replacement for clinical training time. The international collaborative approach embraced during this conference

is likely to be an important aspect of ongoing pedagogical development in simulation-based education throughout the pandemic and beyond.

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## Conflicts of interest

The author/s report/s no conflicts of interest.

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