



# COVID-19: experience and development of simulation for training in a London District General Hospital

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## ABSTRACT

The world is facing an unprecedented crisis in the form of the coronavirus disease-2019 (COVID-19) pandemic. Clinicians and their working environments are under considerable pressures that have not previously been encountered. Consequently, clinicians have had to change their practice significantly to enable safe care for their patients, whilst ensuring their own safety. The majority of COVID-19 simulation to date has been either virtual or in-situ, with the aim of training specific departments. With this in mind, as the Hillingdon Hospital Education Team, we developed a simulation that would provide generic training on COVID-19 for staff across our Trust in various departments and roles. Our aim was to teach staff how to manage patients whilst protecting themselves during this pandemic.

## INTRODUCTION

The world is facing an unprecedented crisis in the form of the coronavirus disease-2019 (COVID-19) pandemic. Clinicians and their working environments are under considerable pressures that have not previously been encountered. Consequently, clinicians have had to change their practice significantly to enable safe care for their patients, whilst ensuring their own safety.<sup>1</sup> The majority of COVID-19 simulation to date has been either virtual<sup>2</sup> or in-situ,<sup>3</sup> with the aim of training specific departments. With this in mind, as the Hillingdon Hospital Education Team, we developed a simulation that would provide generic training on COVID-19 for staff across our Trust in various departments and roles. Our aim was to teach staff how to manage patients whilst protecting themselves during this pandemic.

## DEVELOPMENT PROCESS

The Situated Cognition Theory proposes immersing learners in an environment that reflects the situation in which they will require their new skills and knowledge.<sup>4</sup> With focus on contextualising the learning of new concepts and methods in practice, this provided an ideal framework for our simulation. The aspects of learning within this theory, including social constructivism and cognitivism, coincide with aspects that inform the ADDIE instructional design model. Therefore, we utilised this model for the development of our simulation. This model encompasses the processes of Analysis, Design, Development, Implementation, and Evaluation.<sup>5</sup>

## ANALYSIS

We assessed our learners' prior knowledge and needs to determine the learning required from our simulation. As healthcare staff had not encountered a pandemic of this nature, they required training on

managing the condition, whilst also learning how to protect themselves with personal protective equipment (PPE). Our target audience was the clinical staff of Hillingdon Hospital, including those redeployed to acute medicine from other specialities and community teams. Participants included doctors, nurses, healthcare assistants and therapy staff. With this multi-disciplinary team approach, we needed to direct relevant teaching for individual team member roles.

## DESIGN

We initially trialled an in-situ simulation in Accident and Emergency (A&E), based on the following learning objectives:

1. Understanding how to don and doff PPE.
2. Assessing and managing a COVID-19 positive or suspected patient, both on wards, and in cardiac arrest scenarios.
3. Understanding and locating new local guidelines for patients with COVID-19, including treatment, palliative care and death verification.
4. Developing awareness of support sessions and resources available to patients, their families and staff members.

With the variety of clinical staff that could engage in our simulation, we altered sessions from our typical simulation structure. Rather than one participant completing a simulation followed by a debrief, learning points were discussed throughout the scenario, following the model of continuous feedback. We invited all participants to enter the room at the same time, with two volunteers participating as nurse and doctor. The simulation was based on an unwell COVID-19 positive patient. The nurse would assess the patient and escalate to the doctor, as necessary. The patient later deteriorates and arrests. To assess and improve our simulation, we obtained informal verbal and formal written feedback from participants after each session.

We foresaw several challenges with our simulation. One challenge was the limited workspace in A&E and maintaining social distancing during sessions. To counter this, we limited the number of participants per session. Another challenge was the constant revision of guidelines, both nationally and locally. To keep abreast of these changes, we attended medical handovers, liaised with our COVID-19 Command Team, and created a group between consultants across the hospital, ensuring clear assimilation of new information for incorporation into our simulations.

## DEVELOPMENT

After a week of in-situ simulation in A&E, we moved sessions to a high-fidelity simulation suite. One reason included the swiftly increasing COVID-19 caseload,



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**Table 1** Summary of Likert scale feedback

| COVID-19 simulation teaching feedback form   | Strongly disagree | Disagree | Neutral | Agree | Strongly agree |
|--|-------------------|----------|---------|-------|----------------|
| <b>Content</b>   |                   |          |         |       |                |
| There was a clear introduction   | 0                 | 0        | 2       | 21    | 47             |
| The content was at an appropriate level  | 0                 | 0        | 0       | 24    | 46             |
| The content was relevant to my training  | 0                 | 0        | 0       | 24    | 46             |
| <b>Simulation</b>  |                   |          |         |       |                |
| The course was well organised and realistic  | 0                 | 0        | 3       | 22    | 45             |
| <b>Feedback</b>  |                   |          |         |       |                |
| The facilitator appeared enthusiastic about the subject  | 0                 | 0        | 0       | 18    | 52             |
| Audience participation and interaction was encouraged  | 0                 | 0        | 2       | 18    | 50             |
| <b>Overall</b>   |                   |          |         |       |                |
| The faculty supported a safe learning environment that advocated active learning                   | 0                 | 0        | 1       | 22    | 47             |
| The knowledge gained through the simulation experiences can be transferred to the clinical setting | 0                 | 0        | 0       | 24    | 46             |
| The simulation prepared me for COVID-19 in clinical settings                                       | 0                 | 0        | 3       | 25    | 42             |
| Overall, this teaching session was useful  | 0                 | 0        | 0       | 23    | 47             |

and therefore the requirement of the resuscitation bay for patients. Additionally, due to the volume of staff requiring training, the session needed a larger space. Sessions used a Laerdal SimMan 3 G with the accompanying LLEAP software. This model allowed us to adjust parameters such as verbal feedback, vital signs and being able to be put the SimMan into cardiac arrest.

## IMPLEMENTATION

We ran two to three sessions daily, each lasting ninety minutes. This allowed for ample simulation time, and fielding of questions throughout. Facilitators, comprised of clinical educational staff, introduced the session by outlining the learning objectives. Participants were orientated to the simulation model, its capabilities and the patient monitor. Participants were also orientated to the environment and resources available to them for simulation use.

One factor that needed consideration was the uneven spread of clinical staff in the sessions. Topics such as death verification and treatment guidelines were not applicable to all staff members and could be excluded, whilst other subjects based upon the participants' usual roles needed to be included, such as chest physiotherapy for physiotherapists.

## EVALUATION

We developed a feedback form using the Likert scale to evaluate our simulation and various aspects of the session, alongside open-ended questions to determine our participants' perspectives of what was done well and what could be improved. An example of the feedback form can be found in online supplemental file. We received feedback from approximately 25% of participants. The low response rate was primarily due to clinical commitments, resulting in staff not having time to complete the forms post-session.

Table 1 demonstrates a summary of our Likert scale results. From the verbal and written feedback received, staff valued the simulation, finding it informative and interactive, and reported improved confidence with approaching and managing patients with COVID-19. Themes of improvements to the session included demonstration and practice of PPE application, and local guideline information. Due to PPE shortages and to minimise wastage, we signposted demonstration videos. We printed guidelines and signposted participants to the relevant resources.

## CONCLUSION

To date, we have provided COVID-19 training to over 300 clinical staff members at Hillingdon Hospital. Our simulation allowed

staff to practice and address issues in a safe, open environment. These sessions highlighted how simulation is valuable in providing training during this pandemic, and how the aforementioned theories and models can be used to develop such simulation training.

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