

## **Title Page**

Student acceptability of human patient simulators in undergraduate OSCE's.

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## **Introduction**

For many years the use of low, medium and high fidelity simulation within various undergraduate Health Care Professional (HCP) curricula, has been widely utilised in the provision of clinical education. Part task trainers, cardiopulmonary resuscitation (CPR) mannequins and human patient simulators (HPS), are now routinely used at varying stages of training, to allow learners to practice the required skills in a “safe environment”. Similarly, many of these educational establishments will use the same part task trainers and CPR mannequins to assess competency and performance of clinical skills. However, as the use of simulation in its various forms continues to rise in both undergraduate and postgraduate education, there still remains a sparsity of evidence with regards its acceptance in undergraduate degree examinations<sup>1</sup>.

This paper describes the development and subsequent use of an anaphylaxis/cardiac arrest scenario in a final year medicine objective structured clinical examination (OSCE) and the post-examination student acceptability of including a simulation based scenario in a high-stakes final year examination.

## **Methods and Station outline**

The objectives of the examination station were to test the student’s ability to perform a logical and rapid patient assessment and demonstrate clinical decision making in a resuscitation situation. An anaphylactic reaction was chosen for the clinical situation, as all of the students had undertaken a similar scenario during their mandated Immediate Life Support (ILS) course, delivered during their final year of medical school. The time allocated to complete the station was eight minutes to be consistent with all other final year OSCE stations.

The same mannequins used in the ILS courses (Laerdal – MegaCode Kelly Advanced) were pre-programmed with a starting point, which had an increased respiratory rate (38 breaths/min) an audible wheeze and stridor, and a palpable tachycardia (120 bpm). To further assist in enhancing the fidelity of the scenario, a widespread rash was simulated by printing an image of anaphylactic rash/wheals onto sheets of ‘Phototex’, (Landor UK) which were placed on to the torso’s of the mannequin’s and then covered by the hospital gown, until such time that the candidate exposed the chest for examination (*figure 1*).

In addition to the information, displayed and read by the student prior to commencement of the station, as they entered a ‘nurse helper’ reiterated that the patient had been admitted with breathing difficulties and that his lips appeared swollen. It was expected that the student would perform an initial assessment of the patient following the ILS approach and perform and provide any treatments required to manage the clinical situation. The nurse helpers facilitated by relaying clinical information and performing bedside procedures as and when requested by the candidate. After five minutes had elapsed, or sooner if the diagnosis of anaphylaxis had been made, the candidates were shown two concentrations of adrenaline (1:1000 and

1:10,000). They were then asked “in the treatment of anaphylaxis, which of these would be used? What is the dosage and route of administration?”

At this point the programmed scenario changed to a ventricular fibrillation (shockable) cardiac arrest, with the nurse helper indicating an abrupt change in the patient’s condition by stating that “the mask is no longer misting”. The candidates were then expected to confirm cardiac arrest, commence CPR, recognise a shockable rhythm and safely defibrillate. Throughout the station the student was marked by an experienced examiner using a criterion-based checklist with an additional global score depending on the overall performance.

To evaluate the student’s acceptability of including a simulation-based scenario in their final year exam all the candidates were contacted via email following the exam and invited to participate in an online four question survey.

### **Data collection and Results**

Of the 203 candidates examined in the anaphylaxis scenario 173 (85%) passed, with the pass mark for the station being set at 25.1 using borderline regression method, with a total of 34.5 marks being available, with the marks ranging from 17.5 to 33 with a median mark of 28 (IQR = 26.0 – 29.5).

To evaluate student acceptability of including a simulation-based scenario in their final year OSCE, all candidates who sat the examination were asked to complete a four question, Likert style, survey questionnaire. Of the 203 invited to complete the survey 72 (35%) replied and of those 63 (89%) agreed that the use of a simulation mannequin increased the fidelity of the scenario, with 67 (93%) of respondents agreeing that the station enabled them to demonstrate their assessment of a critically unwell patient. In addition, 61 (85%) agreed that through the use of simulation they were able to demonstrate management of a critical situation, while 47 (69%) agreed that the station helped the examiner to understand their clinical decision making steps.

### **Discussion**

The Association for Medical Educators in Europe (AMEE) guide to examinations<sup>2</sup>, suggests that simple and sophisticated simulators may be used to assess the skills of both physical examination and practical procedures. Though high fidelity simulation has played a key role in competence assessment for other ‘high risk’ industries, a similar simulated assessment has been slow to evolve in undergraduate healthcare examinations.

Throughout many HCP undergraduate curricula, HPS’s are widely used as a modality in teaching and students have become increasingly more accepting of them as, a ‘real patient’, in scenario-based education. As we strive to assess clinical management and decision-making, it therefore seems reasonable, that these simulators be used as part of the examination process. Indeed, it could further be suggested that the use of simulation in this way, increases the consistency and reproducibility and therefore potential validity of the station. As a scenario delivered with a HPS would be exactly the same over multiple OSCE sites, thus ensuring an equality of examination for all candidates.

While we acknowledge that the relatively low response rate typical of medical student questionnaires<sup>3</sup>, our results suggest that in general, students are accepting of simulation-based scenarios in high-stakes examinations. It is this acceptance that can open the way for future development of similar assessments in clinical management and decision-making across the healthcare professional spectrum.

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## References

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## Figures

*Figure 1:* Station equipment- MegaCode Kelly Advanced mannequin (Laerdal, Norway) with rash on Photex paper (Landor, UK) exposed and defibrillator.