

## IN PRACTICE

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**LARGE-SCALE MULTI-CASUALTY FIRE EVACUATION SIMULATIONS OF BARN THEATRES FOR SYSTEMS TESTING**

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**Introduction:** Fires within operating theatres are rare but can have grave consequences for patients and staff. Transferring an anaesthetised patient in an emergency carries significant risk. The recent 'Fire safety and evacuation guidelines' published by the Association of Anaesthetists, recommends multidisciplinary fire evacuation training be incorporated into annual mandatory training [1]. A purpose-built four table 'Barn operating theatre' opened in 2023 as part of transformation works at University Hospitals Dorset. Barn theatres are large open-plan surgical spaces. Each patient is operated on in a dedicated operating area, separated by mobile screens. Barn theatres are unique environments, with very few in the United Kingdom. Large-scale multi-casualty fire evacuation simulations of a barn theatres have not been conducted previously in the UK. The primary aim of this exercise was system testing and to identify any unknown latent safety risks.

This collaborative project was conducted with: the Fire Safety team, the Quality & Risk team, the Head of Emergency Planning, Resilience and Response, the Theatre Management team, the Theatre Educators, and the Simulation Team.

**Methods:** Fire simulations were conducted with three multidisciplinary theatre teams who each, simultaneously, had a patient who was at a different peri-operative phase. Two simulations were run with the "fire" occurring at different locations within theatre. Scenarios were designed to increase the risk of a failure occurring by increasing cognitive load on the staff involved. The end point was safe evacuation of patients. Each operating team had a debrief and then shared key points with the larger group. Switchboard was also engaged in this event.

**Results:** Teams completed timely evacuations without major challenges, but there were a number of near-misses. Findings highlighted:

- The importance of communication and co-ordination between neighbouring teams within the barn theatre.
- The need for vertical evacuation devices closer to theatre.
- The benefits of pre-packed transfer bags.
- The importance of making the 2222 fire call.
- An obstructed evacuation route.

**Discussion:** It would not be feasible to run practical sessions for all staff members, so the focus was on testing the new systems and processes. Each team brought a different perspective with

slightly differing agendas, such as, are we testing individual's knowledge, use of front-loaded education, and managing the interaction of simulation as an education tool versus enhancing fidelity for systems testing. This project generated several safety recommendations and provided evidence for additional funding and changes to procedure and infrastructure.

**Ethics statement:** Authors confirm that all relevant ethical standards for research conduct and dissemination have been met. The submitting author confirms that relevant ethical approval was granted, if applicable.

**REFERENCES**

1. Association of Anaesthetists. Fire safety and emergency evacuation guidelines for intensive care units and operating theatres: for use in the event of fire, flood, power cut, oxygen supply failure, noxious gas, structural collapse. 2021. Available from: Fire safety and emergency evacuation guidelines for intensive care units and operating theatres | Association of Anaesthetists.

