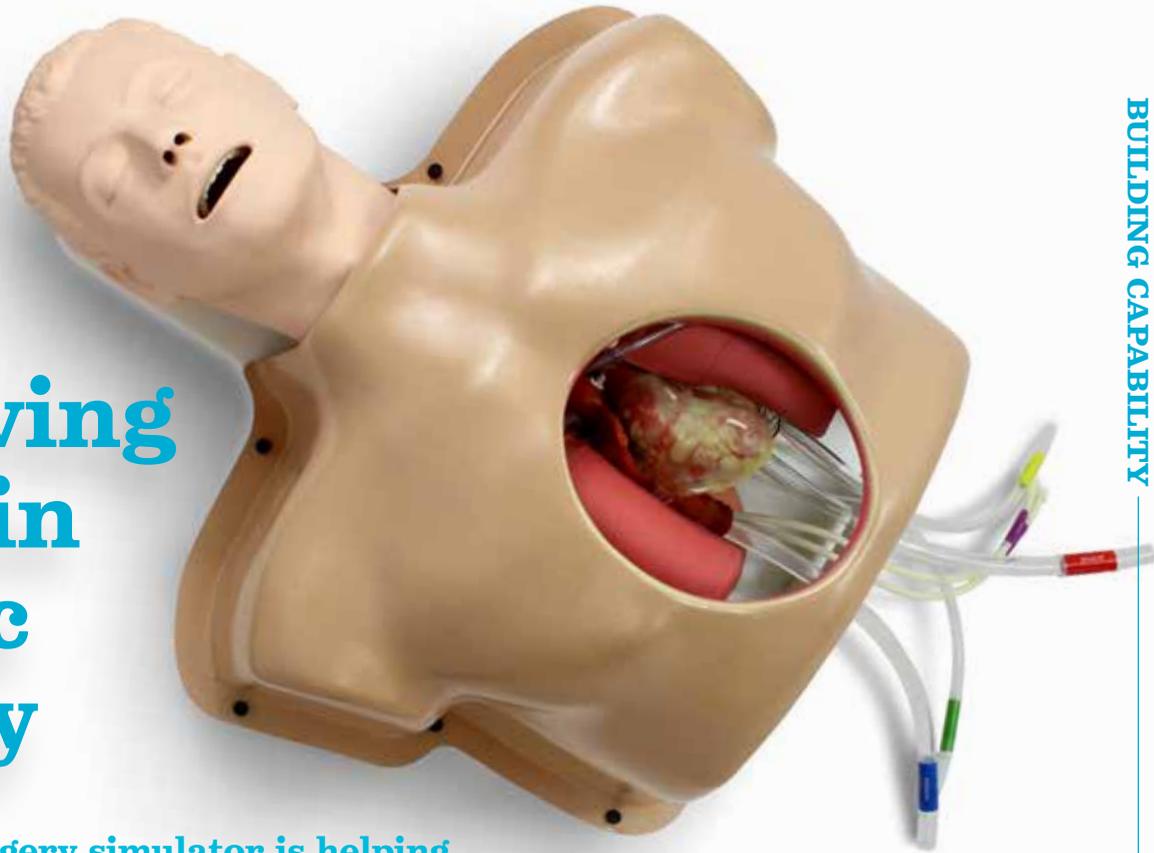


# Improving safety in cardiac surgery



**A new cardiac surgery simulator is helping surgical teams enhance their teamwork skills and improve patient safety. Simon Davies investigates.**

*Training on the beating heart simulator will enhance the ability of surgeons to manage rare complications during operations*

**T**he fully immersive cardiac surgical training simulator, believed to be the only one of its kind in the world, was designed to help cardiac surgical teams at UH Bristol improve training to manage rare complications that can occur during high risk procedures.

David Grant, chair of Bristol Medical Simulation Centre and paediatric intensive care consultant, says: "The simulator comprises two devices that have been integrated to create a fully immersive realistic environment for all members of the team. The first device is a cardiopulmonary bypass perfusion simulator, Orpheus. It creates physiological parameters such as heart rate, blood pressure and central venous pressure that mirror that of a real patient.

"The second device is the beating heart simulator. It has three components: a head with airways, a chest cavity that houses the beating heart and lungs and a chest piece with skin and a ribcage including a sternum. The heart contracts and has uniquely designed, detachable components that allow surgery to be performed on the heart multiple times."

The Orpheus connects to the beating heart simulator to form the fully immersive

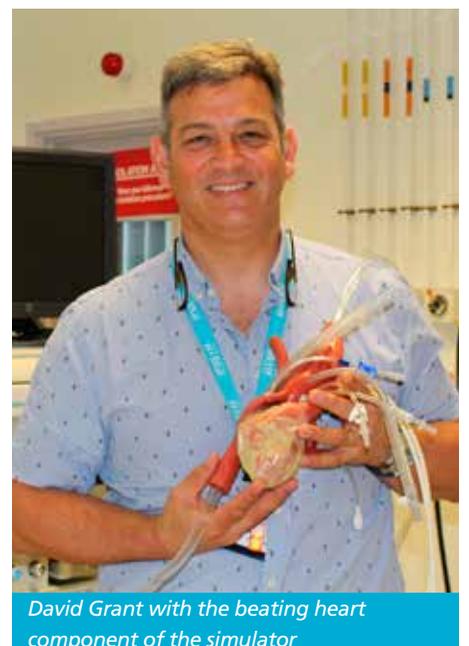
cardiac surgical training simulator. The equipment provides the physiological and anatomical features of a real patient, enabling the multi-professional cardiac surgical team to rehearse their roles.

David adds: "The two simulators together are like operating on a real patient. It all adds up to taking a highly proactive approach to patient safety, helping move the steep part of the learning curve away from the patient."

The training sessions consist of a three hour tutorial where the team discusses communication and teamwork. This is followed by the simulation itself, creating a 'real life' situation in which complications occur, so the team can practise managing problems and working through the situation. A debrief takes place afterwards. David says the training allows staff to gain an insight into human factors and teamwork.

"The simulation is carried out within the team's native working environment in a theatre, as this allows us and the surgical team to test the environment as well as the people, and identify anything about the environment that may need to change to ensure everything is working as well as it can be."

The team that led the development of the device includes perfusionist Daniel Bone and consultant cardiothoracic surgeon Franco Ciulli. The equipment was designed by the Chamberlain Group, a medical simulation device specialist from Massachusetts, USA. Clinicians at UH Bristol worked with the manufacturer to customise the equipment for their needs, making it the only such device of its kind in the world.



*David Grant with the beating heart component of the simulator*