"AAAAH!"
THE MAN LYING ON THE TROLLEY BEFORE ME MOANS AND WRITHES IN AGONY.

He’s been rushed to hospital after being stabbed in the side, explains the surgeon, who lifts the man’s shirt to show me, along with a group of other curious individuals, the bleeding wound. There’s a thud as the woman standing beside me falls to the floor in a faint.

The man, we’re told, urgently needs surgery. He needs to be opened up so that doctors can check whether there’s been any damage to his internal organs, particularly his spleen. We’re warned that should the spleen detach, the blood vessel supporting it will be free to “hose around”.

Moments later, we’re asked to put on gowns and hats and we shuffle over to the operating table, where the patient’s insides are on display. The surgeon probes the slimy large intestine and invites us spectators to join him in having a poke around. As my finger slides up underneath the man’s liver, the peckish feeling I had earlier evaporates.

Welcome to the world of simulated surgery. Thankfully, the man is an actor and his convincing injury is merely an artistic prosthetic. The surgeons are real, as is the fainting member of the audience, but the injuries and internal organs subject to our prodding are not.

Roger Kneebone, new Professor of Surgical Education at Imperial, has developed these simulations to improve the training provided for surgeons. Now he is also using them to give members of the public, like myself, a flavour of what really goes on inside an operating theatre.

It certainly feels like a real operating theatre. Inside an igloo-like inflatable half-shell of a room, the dummy patient lies on a hospital bed, hooked up to a blood bag and an anaesthesia machine while his heart monitor continually bleeps. Most of the body is covered by a blue sheet, but the bloody face and matted hair are so lifelike that they momentarily distract me from the surgeon’s description of his innards.

The prosthetic organs have been developed in collaboration with Max Campbell, the artist behind many of the medical models seen on hospital television drama Holby City. Creating fake organs for surgeons is more of a challenge though, as it’s vital that they feel as lifelike as they look.

Thermodeals also provide an opportunity for Roger’s team to engage public audiences with surgery more generally. “We want to raise public awareness of surgical training,” says Roger. “The truth is that people tend to have mixed feelings about surgery. It’s scary but it’s of great interest – people are repelled by it but they’re also fascinated.”
The ‘theatre’ has been put together by a team of surgeons, psychologists, designers and industrial engineers Matt Harrison (MEng Mechanc- ial Engineering 2002) and Cian Plumbe (DIC Mechanical Engineering 2004). While the overall impression is that of being at the heart of a surgical procedure, a second glance at the backdrop reveals that the trolley of surgical equipment is actually a poster, and that the heart monitor consists of two iPads mounted on a wheeled cabinet. The fact is that when your nose is centimetres away from a bleeding spleen, the background details lurking in your peripheral vision don’t have to be quite as realistic.

As a result, the entire set up can be put together quickly and cheaply, and can even be carried around in a few backpacks. Members of Roger’s team have just started taking their portable simulation set-up to hospitals around London to train surgeons from other places as well as Imperial, by giving them the chance to experience a simulation.

Installing the surgical set-up at public venues is a more recent line of work for Roger and his team. At one event, the group put together a simulation at Imperial’s Reach Out Lab, for London schoolchildren who had been affected by knife crime. “All the children knew they had been involved in a knife attack, but they had no idea of what happened once the injured person had been taken off in an ambulance,” says Roger. “It was the perfect way for them to find out.”

So far, Roger’s team has put on simulations for young and adult audiences at London venues including the Wellcome Collection, the Natural History Museum and the Science Museum, as well as the Cheltenham Science Festival.

It must be stressed, though, that the gory nature of the events rules them out for the faint-hearted. “We have processes in place to look after people who feel squeamish,” says Roger. “At the same time, the occasional pair of weak knees helps confirm that things are genuinely convincing.”

Training with models and actors gives everyone a much better idea of what a real operation is like. “When I came to Imperial 10 years ago, surgical skills were taught with an emphasis on the technical,” says Roger. He recalls that while students were honing their stitching skills, it was only on pieces of latex. “It doesn’t give you an idea of what it’s like to treat someone who has been stabbed, had a few drinks, or just come off their bicycle,” he says. This is where the actors come in. “Having a real person there gives the clinician a sense of urgency,” Roger says. “You need to be able to respond to people who are very anxious and very sick.”

Meanwhile, there are plenty of real, wincing members of the public recovering from their close-up encounters with the medical drama they have just witnessed. When the actor comes back on stage at the end of the performance, I am impressed with the long, red signature of his emergency surgery that’s been artfully painted down his belly in place of the original bleeding wound. While the surgeons remove their masks to take a breather, I can see the student is still working hard. “You still have to respond to a real, wincing person,” says Roger.

JESSICA HAMZELOU was taking part in the Top-up Anaphylaxis Seminar, produced at Wellcome Collections by The Full Ensemble as part of their Performing Medicine Anatomy Series. You can hear more about Professor Kneebone’s work at his inaugural lecture on 23 May 2012 at Imperial’s South Kensington Campus, and on iTunesU shortly after.