

Increasingly throughout the world, military forces are investing heavily in combat medical simulation. The so-called ‘golden hour’ has now become the ‘platinum ten minutes’ as rapid medical responses can provide treatment at the point of injury, an approach that requires expert training. **By Joe Charlaff**

On a weekday morning, a shooting attack occurred inside Israel’s largest hospital, the Sheba Medical Center, near Tel Aviv, leaving three seriously injured. Fortunately, the victims were not humans, but simulator mannequins – high-fidelity dolls that mimic the circulatory and respiratory systems of a person. Within minutes, a doctor from the Israel Defense Forces (IDF)

and his team of four medics commenced treatment, administering intravenous fluids and medications. They stemmed the bleeding and stabilised the ‘wounded’.

This incident is typical of what occurs within the Israel Center for Medical Simulation (MSR), with the team’s progress monitored from a control room by trained instructors and medical specialists. Special effects are added,

such as screams from the mannequins, to make the scenario more realistic and to add to the level of stress for the trainees.

Simulation-based medical education (SBME) is a rapidly growing field that has become a powerful force in addressing patient safety through quality-care training. During a fully immersive medical simulation, trainees enter into a realistic healthcare setting where a high-fidelity patient mannequin is wirelessly operated by both educational and simulation technical staff.

Medical simulation can be used in the field for military medics or first responders like EMS and fire departments, or in hospital and medical centre environments for nursing, medical or other allied health professionals.

The imitation game



A mannequin being wheeled to the emergency room at the MSR. (Photo: MSR)

Leading programmes

Out of sheer need, Israel has become a world leader in medical simulation. The MSR is a 1,600m² virtual hospital that has developed a wide range of simulation-based programmes in collaboration with the country's civilian and military medical authorities to improve emergency preparedness for conventional and non-conventional threats. It was founded in 2001 by Prof Amitai Ziv, a veteran combat pilot in the Israeli Air Force and a world-renowned expert in the field of SBME.

The centre has attracted worldwide attention and has provided simulation-based medical group training courses to healthcare professionals from several territories, including Gaza, Equatorial Guinea, the USA and the West Bank.

Within the simulated hospital emergency room, participants from hospitals, military and police units as well as civilian paramedics are taught to respond to a wide range of incidents. These scenarios have included staged biological warfare exercises using actors cosmetically made up to appear as if they were exposed to anthrax.

Sound systems provide realistic effects, such as a helicopter flying overhead or noises of explosions and gunfire. Multiple cameras installed in the training rooms allow the medical teams to review the exercise afterwards to see where they can improve.

A host of factors can impact a victim's chances of survival, including the severity of the wounds, response time and distance from a hospital. Above all, speed is of the essence in saving a life – this is where simulation plays an important part.

For civilian doctors and paramedics, training exercises are helpful refreshers on the finer points of medicine and trauma care. The MSR is responsible for designing health professionals' educational programmes to expose them to challenging and extreme 'nightmare' scenarios in a safe environment, where they can gain experience and learn from their own mistakes in a constructive and formative atmosphere.

Military application

Due to the highly volatile situation in Israel, the army's West Bank medics are



IDF paramedics working on one of the MSR's numerous physiologically accurate mannequins. (Photo: IDF)

utilising the state-of-the-art hospital centre to hone their skills. The IDF began using the MSR to train for combat scenarios as the ongoing Palestinian situation gathered pace. Its doctors and paramedics are put through their paces and judged how they perform under simulated battlefield conditions. Army medical personnel practise triage and first aid on simulator mannequins in real-life scenarios to prepare them for actual casualties.

The medical officer of one of the six IDF brigades based in the West Bank, whose paramedics carry out simulated drills, explained that they work in conjunction with teams from the MSR. Events are staged to simulate terror- or war-related scenarios, in which the mannequins are prepared with appropriate 'injuries'. Procedures such as intubation can be practised by the paramedics, which would not be possible in a scenario that used live actors as victims.

The simulators respond as humans would; they have a pulse and eyes that open and close. They can be programmed to bleed from injuries and, as previously mentioned, scream. If the treatment would fail to save the patient's life, the mannequin's pulse weakens until it eventually disappears.

Every drill is recorded on cameras. Afterwards, in the debriefing room, the performance of each participant is reviewed and critiqued. This provides the opportunity to learn where improvement is possible.

'The drills are more focused on helping us to work together as a team,' said one paramedic, who reiterated that the scenarios provide a valuable opportunity for medical personnel to carry out procedures that they would not normally do on a regular basis. 'There is no doubt that the drills result in greater efficiency in using the tools at our disposal and also being tighter knit as a team, and [they] contribute in improving our self-confidence.'

The Chief Medical Officer of IDF's Central Command, Dr Hagay Frenkel, confirmed the value of the centre to the forces: 'The combination of the MSR training and on-the-job experience have improved the capabilities of the Central Command's Medical Corps.'

The MSR highlights the high levels of investment being made in training first responders and medical staff to save lives. Long may such investment continue. ■