The CPC team – top row (L-R): Mr Calvin Tan, Assistant Manager and Mr Wilson Xin, Standardised Patient Programme Trainer, bottom row (L-R): Dr Mara McAdams and Ms Abegail Fernandez, Standardised Patient Programme Trainer

The Sims: Medical Education

Students undergo interactive simulation-based learning at the Clinical Performance Center (CPC) in Duke-NUS Graduate Medical School, as part of the clinical training skills programme which prepares them for actual clinical practice. Dr Mara McAdams, the Medical and Operations Director of the CPC, introduces their patient simulator, Sim Man, to *SMA News*.

SMA: Tell us a bit about your background, and your journey towards becoming Assistant Professor and Medical and Operations Director of the CPC.

Dr Mara McAdams – MM: I received my medical degree from New York University in the US, and stayed on for my residency in Internal Medicine – Primary Care. The education in the residency programme emphasised communication skills, teaching skills and holistic patient care. In my final year, my husband was offered an irresistible job in Singapore; I declined my position as Chief Resident and we moved to Singapore soon after I completed residency.

I considered a job that involved seeing patients, but I pursued Duke-NUS because I was interested in and eager to gain more experience with medical education. Being involved in a start-up medical school was pretty enticing. My training in Internal Medicine, teaching and communication skills made me a good fit for the CPC. I think the school was also happy to have a graduate of an American medical school on faculty. I was able to adapt my experience in teaching small groups to our simulation sessions, and we have grown a large Standardised Patient Programme to give the students opportunities to learn communication skills starting in their first year of medical school. We have also expanded the number of simulators we have so that students have ample opportunity to practice important and invasive skills before performing them on real patients.

SMA: How did the idea of using the Sim Man come about, and how does using a fake body prepare students for real patients?

MM: Simulators such as Sim Man have been around in medical education for dozens of years. Simulators are also widely used in other industries such as aviation to provide professionals with opportunities to practice important skills in a safe environment. Medical educators looked for ways to allow trainees to practice such skills more regularly under observation and with feedback. In order to perform a task well, students and doctors need to practice. Simulation makes it possible for students to practice before they encounter patients.

Many dangerous medical conditions are rare. Not every student will see every condition on the wards. Simulation makes up for the opportunistic nature of clinical training with scheduled learning, as it is possible to plan the curriculum in advance. Of course, we cannot train students without real patients, but simulations augment what students learn during patient care.

SMA: How do the students react when they find out that they will be practicing on Sim Man?

MM: Most students are able to treat Sim Man like a real patient. They get anxious when his blood pressure or heart rate becomes unstable; they ask him questions and examine him just as they would a real patient. Of course, Sim Man is not real and we do spend some time before each simulation reviewing his capabilities and addressing the "unauthentic"

feeling that some students have. Once the simulation gets going, most become immersed in the scenario.

We have set up the Sim Lab to look like a patient room, and we have the same medical equipment and devices that Singapore General Hospital uses in emergencies. Although it might not be completely real, the scenarios and simulators are authentic enough to allow us to reach our learning objectives.

SMA: Has Sim Man been successful in teaching students the management of various medical conditions?

MM: Yes, one notable example is the second year module on critical care. Faculty members have designed simulation scenarios based on common cases the students encounter in the ICUs. During the simulation, the students have a chance to be the ones to make decisions, perform procedures and then receive feedback from observing consultants; in the real ICU, such decisions and procedures fall to the experienced consultants. By making learning hands-on and asking the students to make medical decisions, they learn better. They consolidate the learning points of the critical care module during the simulation exercise. This type of experiential learning is what the experts say is best for adult learners; so far the student feedback agrees with the experts.

SMA: Can you tell us a interesting occasion when Sim Man was used for teaching?

MM: In 2007 when the school was opened, we conducted a breast exam teaching session with the inaugural batch of students. We have various task trainer devices that provide students with opportunities to locate a breast mass. Some are handheld breast models and one is a strap-on pair of breasts that can be worn by a real person or attached to a manikin. We connected the strap-on trainer to Sim Man so the students could practice the exam on a patient lying on the exam couch. Thirty minutes or so after the session began, we heard a roar of laughter from the exam room with Sim Man. The faculty member and students had discovered what we had overlooked when setting him up for the session: Sim Man had the male genitalia in place and it was a bit incongruous with the breasts and wig we had attached to him. (Sim Man has interchangeable genitalia to improve realism, and also to allow students to practice skills such as urine catheterisation.)

SMA: Do you have any advice to share with the Duke-NUS Class of 2015?

MM: My advice for the Class of 2015 would be to use the resources in the CPC as much as possible during these four years. The more practice they have, the more confident and capable they will be as interns. SMA

Duke-NUS medical students learn resuscitation techniques through hands-on management of Sim Man's medical condition

Five questions on Sim Man

1. Is the Sim Man… really a man? Isn't there a Sim Woman?

   Sim Man can be a Mr or a Ms. If we want the head of the simulator to illustrate that the simulated patient in the scenario is a woman, we add a wig; some centres even use make-up and false eyelashes. We haven't done that yet. If it is important for the case that the patient has accurate genitalia, Mr Sim can become Ms Sim with the help of interchangeable genitals.

2. Can one really resuscitate the Sim Man?

   Yes, Sim Man can be fully resuscitated. The simulator responds to defibrillation ("shocking"); it recognises medications that are given and CPR can be performed.

3. Does anyone find Sim Man creepy?

   So far we haven't had any complaints of creepiness. Most students are used to working with manikins and Sim Man is one of the more realistic ones. However, lay visitors to the CPC are sometimes surprised when Sim Man starts to cough or moan (on our command).

4. Has anyone ever damaged Sim Man through vigorous CPR or other ways, and how does one ensure that he is always in top form?

   Sim Man is tough. He is built to allow learners to practice various procedure skills and CPR over and over again. The manikin doesn't really need much maintenance; just a simple clean up after every session. To keep Sim Man in top form, we have contracted our vendor to perform routine maintenance on Sim Man annually.

5. Will Sim Baby be introduced to Duke-NUS?

   The KK Women's and Children's Hospital (KKH) has a well-stocked and well-run Paediatric Simulation Centre that our students have access to during their clinical postings. For the foreseeable future, KKH will capably conduct the students' paediatric simulation training.