More simulation!

The mandatory course package for doctors specialising in anaesthesiology was recently revised. We are the arrangers of one of the courses, Basic Course 2, in which simulation and skills training are key pedagogical tools which give the participants the opportunity to get training in non-technical skills. It is a costly and resource-intensive course to arrange, but we believe that the gains in the form of greater learning benefits and inspired course participants far outweigh the resources invested. We hope our experiences may encourage greater use of skills training and simulation in further training and continuous education in all specialities.

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Simulators were introduced as a pedagogical tool in aviation as far back as the early 1920s. The aim was to standardise training of risky procedures and reduce costs and risk to pilots and passengers.

The first medical patient simulator was not introduced onto the market until 1960 (1). It was called Resusci Anne, and was the result of pioneering work initiated through a collaborative effort by Asmund Lærdal and Peter Safar. Resusci Anne was a simple manikin that was designed for training in basic heart and lung rescue.

Since then, medical simulators have assumed a number of different forms. There is everything from simple models for training in insertion of vein cannulas to monitor-based software and sophisticated human-like manikins. The most sophisticated manikins are life-size and can be programmed or remote controlled to mimic pathological conditions and respond to different types of intervention.

Over the past 15 years we have seen an explosive growth of centres that are specially geared to medical simulation. Stavanger Acute medicine Foundation for Education and Research (SAFER) is one such simulation centre that was opened in Stavanger in 2006.

Non-technical skills

Simulation as a method provides medical personnel with a unique opportunity to train practical skills and technical procedures and to practice clinical diagnosis and treatment. However, good technical and clinical skills are not sufficient to ensure optimally safe and reassuring patient treatment. Research has shown that human error related to inadequate non-technical skills is a contributory cause in up to 80 % of incidents in anaesthesia and intensive care medicine (2). Non-technical skills can be defined as «cognitive, social and personal skills that complement technical skills and contribute to safe and effective task performance» (3). Examples of key non-technical skills are situation awareness, decision-making, communication, teamwork and leadership. Simulation is particularly appropriate for training non-technical skills (3).

Specialist training in Norway does not put much emphasis on training and evaluation of doctors' non-technical skills.

Revision of the course package

Anaesthetists have been constantly involved in improving patient safety (4). In 2006, the Specialty Committee on Anaesthesiology initiated work on revision of the mandatory course package for doctors specialising in anaesthesiology (5). The intention with the revision was first and foremost to improve the learning benefits to course participants by introducing extensive use of small group teaching, skills training and simulation. Other goals were to improve patient safety, apply the resources invested more appropriately and at the same time reduce the overall course costs (5). A prerequisite for achieving these ambitious goals was for course participants to prepare for their courses more thoroughly than in the past in order to create a common platform of knowledge, as no time would be set aside purely for literature studies during the course.

To make the preliminary studies more effective, extensive use was to be made of e-learning. Each course has been given a dedicated website where the participants have access to practical information about the course, links to recommended reading, assignments and instruction videos. E-learning also facilitates communication among the participants and between course participants and the instructors of the various subjects.

As part of the work to improve quality, the Specialty Committee on Anaesthesiology has taken the initiative to build a common internet portal for all courses in the mandatory course package. The portal is intended to make various administrative tasks simpler, and in the longer term will also be made available for the course packages of all specialities.

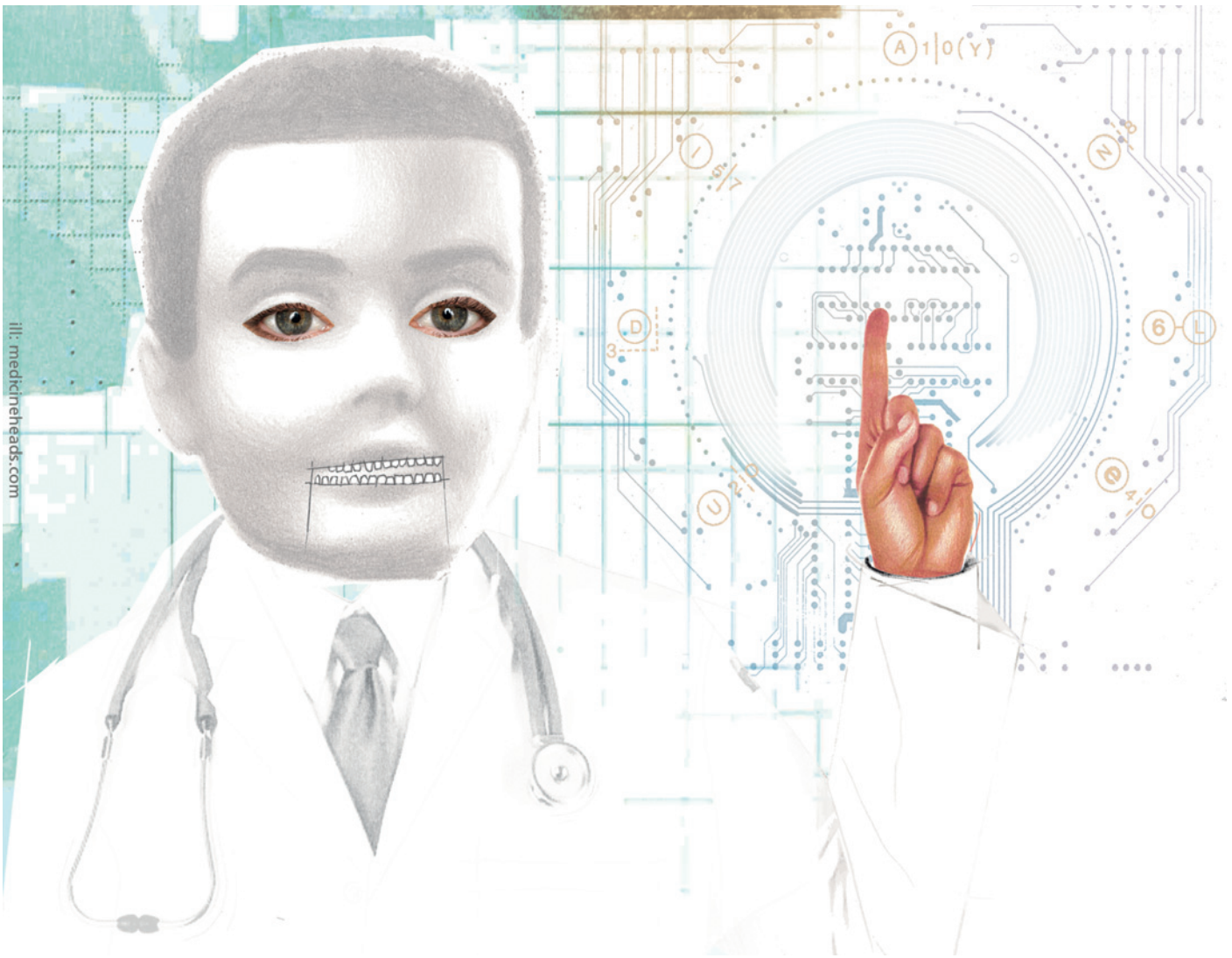
Basic Course 2

The new anaesthesiology course package consists of a total of seven courses that build upon one another. The first two are basic courses intended to provide an introduction to anaesthesiology and qualify the course participants to take independent duties. BC 2 is being arranged as the second in the series, with a maximum of 30 participants each time. The Department of Anaesthesiology and Intensive Care at Stavanger University Hospital has been given the responsibility of arranging this five-day course. BC 2 was first arranged in spring 2009, and since then has been held twice a year.

The course is intended to provide the basic principles and knowledge of and the practical skills for handling vital functions in critically ill and injured patients. Selected problems that are typical of the work of duty anaesthesiologists at hospitals are illustrated through 16 simulations, 13 skills stations and some work in small groups.

The situations at the simulation stations are a mixture of situations that have traditionally been frequently used in simulations, such as cardiac arrest and algorithms for handling difficult airways, and situations that at first glance do not appear to lend themselves to simulation, such as exacerbation of COPD, sepsis and making decisions on treatment limits.

At the skills stations, the participants have the opportunity to practice inserting thoracic drains into pig's ribs, perform



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emergency tracheotomies on the throat of a lamb, practice intraosseous cannulation on chicken bones and plastic models, and to practice inserting umbilical vein catheters into human umbilical cords.

Traditional lectures have been virtually eliminated from the course programme, with the exception of more interactive presentations of some topics that are more appropriate for discussion than simulation, such as reporting procedures for adverse events.

Most instructors have formal training in the form of the course Train-The-Trainer (TTT). This is a three-day course with theory on pedagogics for adults, learning strategies, communication and supervised training in operating simulation scenarios. The TTT course is based on a similar Danish course and the aim is to develop the ability to stimulate the course participants' self-reflection and to give constructive feedback. This creates a secure learning environment which is a prerequisite for leading or facilitating small group instruction and simulation. All these factors contribute to creating a reassuring learning environment.

Experience

Simulation and skills training are types of learning that require engagement and considerably more active participation from the course participants than has traditionally been usual in lecture-based courses. Many students may find this unaccustomed and challenging initially. It is also our experience that doctors in particular are sceptical about exposing themselves professionally and personally to colleagues and course arrangers. We have therefore attempted to build up the course in a pedagogical manner, so that the participants get a gradual introduction into what simulation and skills training are, and what is expected of the individual. The purpose of this is to establish a sense of reassurance around the concept and a confidence that the individual's performance in the simulation rooms will not be the subject of conversation in the next coffee break.

In order to be able to evaluate and continually improve the course, we have developed a detailed evaluation form for each of the course days. All simulations, skills stations, interactive lectures and the overall impression of the whole course are awarded points on a ten-point Likert scale with space for comments. The forms are required to be completed anonymously and continuously to increase their validity.

After each course, the course committee has systematically analysed and compiled the information that has emerged in the evaluation forms. On the basis of the feedback, we have actively attempted to improve the course with respect to the medical content, pedagogical tools, logistics and social programme.

The first courses that were arranged covered for example training in both basic heart-lung rescue with the aid of the life-saving manikin Little Anne and advanced heart-lung rescue (A-HLR). Most of the participants regarded this as elementary knowledge of limited value, and many had already had experience of organised training in both basic and advanced heart-lung rescue in their respective departments. We therefore decided to drop basic HLR training from the course programme. We have

retained the A-HLR training, but with the emphasis on diagnosis and treatment of more specific causes of cardiac arrest, such as pulmonary emboli, drowning and intoxication with local anaesthetics. In addition, the participants have the opportunity to practice A-HLR with the addition of disruptive elements such as noise and emotionally unstable bystanders, which is a relatively common pre-hospital scenario. In the aftermath of the simulation, the potential effects of so-called socioemotional stress on the quality of the resuscitation are discussed (6). All the scenarios are supposed to be realistic and are based on the facilitators' own clinical experience.

BC 2 is an extensive and intensive course, for both facilitators and, not least, course participants. The logistics are particularly demanding because there are a number of simultaneous simulations and skills stations. On each course day, a number of persons are engaged as facilitators and operators, and several of the stations require a great deal of preparation and equipment. As well as releasing several doctors from our own Anaesthetics Department in Stavanger, cooperation has also been established with other hospitals, both to raise the professional quality and to ease the personnel situation locally. All these factors make BC 2 a relatively expensive course to arrange, as previously mentioned, but we believe nonetheless that the gains in the form of greater learning returns more than outweigh the resources invested.

Conclusion

Our experience as arranger of BC 2 in Stavanger is that medical simulation in combination with skills training and small group instruction is an appropriate and effective pedagogical tool that both engages and encourages further learning. Simulation makes realistic training possible on everything from simple everyday problems to sophisticated, high-risk procedures that are seldom used. The training can proceed within a secure framework, without patients being exposed to risk.

In addition, acute medical teams get the opportunity to train together and to practice key non-technical skills for which there is as yet no established specialist training in Norway. The tools for evaluating these skills are now available to surgeons, theatre nurses and anaesthetists (3), and more are being developed. This type of tool makes it possible to establish standardised requirements for both technical and non-technical skills in doctors. Simulation is a method of training these skills.

The Helsinki Declaration on Patient Safety in Anaesthesiology urges that there be increased focus on patient safety (4). An important step along the way will be to ensure that doctors in specialist training get a solid basic training and develop sound attitudes to patient safety.

In the light of our experience, we believe we can safely recommend a concept analogous to BC 2 to other medical specialties as well.

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