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Training skills for practice with the simulator "Paul"

An interview with Dr Jens-Christian Schwindt

Dr Jens-Christian Schwindt

Simulators play a key role in the education and training of several professionals, from pilots and engineers to nurses and doctors. Even in neonatology, infant-like manikins have found their way into training and improving the treatment and care of preterm infants. Measuring 35 cm (about 15 inches) and with a weight of 1,000 grams (2.2 lb), *Paul* simulates a preterm baby, born in the 27th week of gestation. On the occasion of our topic of the month, Education and training, we spoke with the neonatologist Dr Jens-Christian Schwindt, who developed "Paul" together with further experts in the fields of neonatology, special effects design and animatronics.

Dr Jens-Christian Schwindt, What is special about Paul?

We started with the development of *Paul* due to an acute need: I wanted to train my own neonatal team in the provision of care to critically ill preterms. Unfortunately, there were no suitable simulators the size of a preterm baby and the simulators which were available lacked both, realistic external appearance and realistic internal anatomy. From the outset, our intention was therefore to develop a simulator which combined a highly realistic external appearance with highly realistic internal anatomy and, in addition, made it possible to realistically simulate preterm-specific pathologies. I believe we have achieved this with Paul.

What are his major benefits relative to traditional training manikins?

On the one hand, there is certainly the realistic appearance. This allows participants to get deeply involved in the training scenarios. The more realistic the training is perceived to be, the better will the participants be able to apply the learnt skills in real-life situations. On the other hand, we placed considerable emphasis on the development of a realistic airway.

The intubation of preterm babies has become increasingly rare even in large neonatal departments, which is making it increasingly difficult for young doctors to learn this skill. Every movement of the hand needs to be exact in these situations, particularly with preterms. It is of course not acceptable to "practise" on real patients. *Paul's* realistic airway means that it is now possible to practice intubation and also the new care concepts in preterm medicine, such as *LISA* (Less Invasive Surfactant Administration), under realistic circumstances. The simulation of respiratory pathologies, such as respiratory distress syndrome, allows the entire care process to be practised by a neonatal team without any risk to harm real children.

How much time and effort did you invest into the development of Paul?

The entire development of *Paul* has taken seven years and cost a seven-digit amount. Besides neonatal and simulation-related knowledge, we also required expertise in the areas of special effects design, software and hardware development as well as animatronics. Every single area of the skin, every circuit board and all the other components necessary for *Paul* has been developed and is made by us in-house. Only optimal collaboration within a multidisciplinary team made this possible. I am particularly delighted that Paul has been developed by a multidisciplinary team for the training of other multidisciplinary teams.

Which groups of healthcare professionals use Paul for their training?

Simulation training always aims to train an entire team. Modern concepts for adult education also acknowledge that it is completely pointless to train nurses and doctors separately as has been done for generations in the medical profession. At the end of the day, it is not the skills of individuals which are decisive in successful patient care but the performance of the entire team. Our aim is to train specialists to create specialist teams.

How does Paul work?

The entire simulation system consists not only of *Paul* but also a control laptop and a patient monitor. A team of trainers

initially defines the learning objective to be reached and then selects the appropriate training scenario. The control laptop is used to manage the clinical state of *Paul* which changes over the course of the scenario in response to the action taken by the team of carers (e.g. mask ventilation, intubation or the insertion of an emergency vascular access and the administration of drugs). *Paul's* vital signs, such as heart rate, respiratory rate and oxygen saturation, are displayed on the patient monitor.

A constructive debriefing takes place among the multidisciplinary team at the end of every scenario: How well did things go, where might have been problems and why did these problems arise. Training with *Paul*, under realistic conditions, with one's own team, one's own equipment and on site, where real children are cared for also acts as a form of system check. It is not possible even for the best nurses and doctors to provide top medical care with an insufficient system in place.

With Paul, the whole neonatal team can train their hard skills and their cooperation. What about the soft skills?

The main focus of multidisciplinary simulation training is also always on the non-technical skills, such as leadership, the optimal allocation of tasks within the team and effective communication. These are often referred to as "soft skills". From my point of view, however, this suggests that these skills are less important than the technical skills, i.e. the "hard skills". However, the opposite is true. The communication skills of medical personnel, both within a team and with patients and their relatives, are also decisive in terms of successfully treating critically ill patients.

I am totally convinced that appropriate communication with parents has a massive impact on the medical outcome of preterms because, among other things, this in turn has a major impact on the performance of the team. On the one hand, a trust-based relationship between medical staff of course relies on the medical performance of the team of caregivers, on the other hand, it is also decisive in terms of how we treat parents and how we communicate with them. In this regard, the training of medical teams is still in its infancy. From my point of view, training such as this is also essential and, I believe, the combination of realistic medical training scenarios and afterwards communication with the parents about the events opens up entirely new training options.

How many Pauls are in operation and where?

The first *Pauls* are currently mainly in use in Germany and Austria. However, we have already received the first international orders, form the USA, South Africa and Russia, for example. A highly technical product such as *Paul* of course has its price and therefore represents a major investment for a hospital. As long as training in the medical profession, unlike in the aviation industry, is not mandatory, Paul will always have to compete against other medical devices when it comes to investments. With budgets also tight in the area of neonatology, the decision is often in favour of an e.g. ultrasound device. That is why we are always delighted when we can hand over *Paul* to a hospital with the support of industry, associations or dedicated individuals.

But this is exactly what motivates me personally: every day, we put medical professionals in situations which they can't really handle because, in contrast to aircraft crews, Formula One teams and football teams, they don't regularly have the opportunity to train effectively in terms of what we expect from them: a safe flight, a tyre change in 1.73 seconds and scoring goals. We expect top-quality care from medical teams, both for us and our relatives. That is why we have to offer these teams the ideal infrastructure, the necessary human resources and allow them the possibility to regularly and effectively train how to manage critical situations.

Training session with Paul (c) SIMCharacters

Special thanks
Dr Jens-Christian Schwindt, SIMCharacters