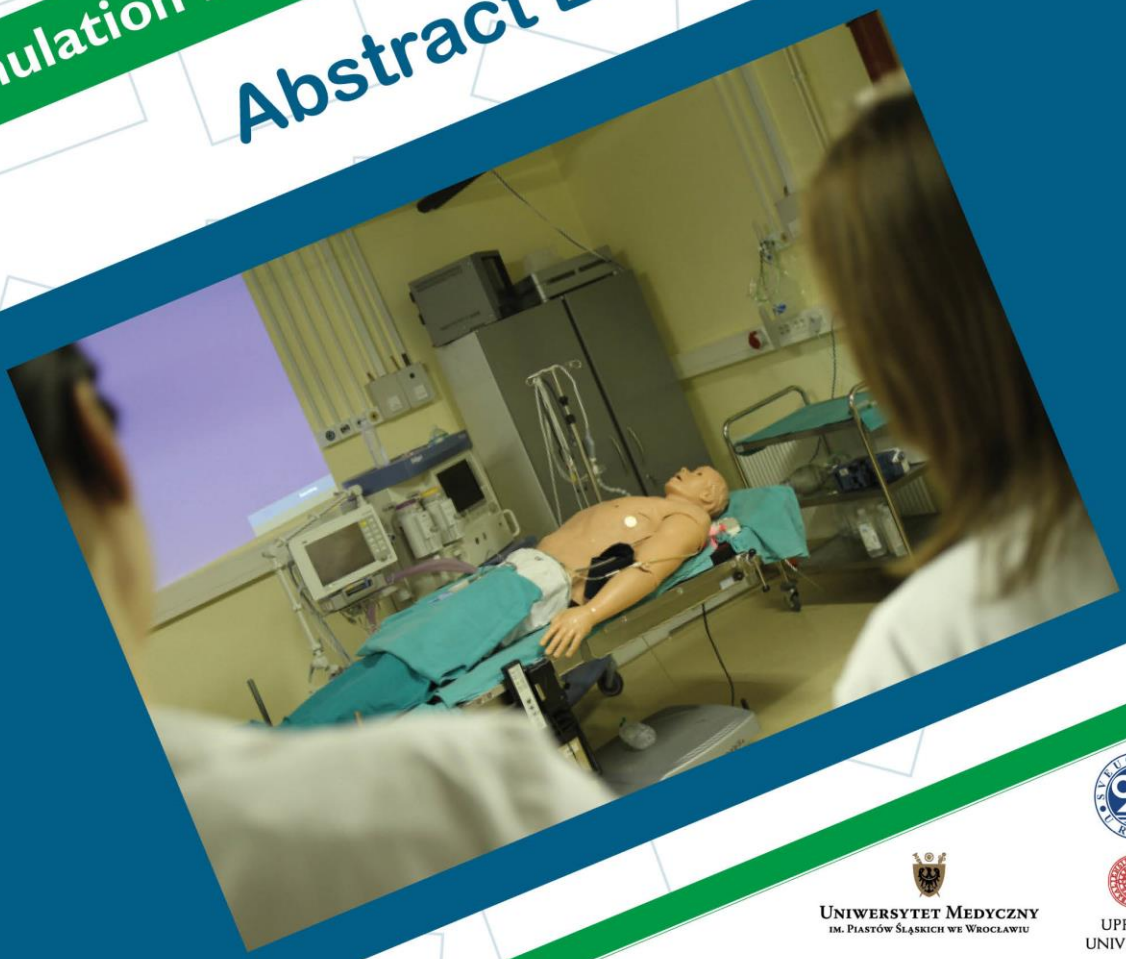
University of Maribor
Faculty of Medicine

ERASMUS
INTENSIVE PROGRAMME
Simulation in Clinical Practice: Virtual Medicine
Abstract Book



Uniwersytet Medyczny
im. Piastów Śląskich we Wrocławiu

UPPSALA UNIVERSITET

UKC MARIBOR Univerzitetni klinični center Maribor

Lifelong Learning Programme

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Erasmus Intensive Programme: Simulation in Clinical Practice

ABSTRACT BOOK

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ABSTRACT 1: SIMULATION IN MEDICAL EDUCATION AT UNIVERSITY OF RIJEKA

Authors: *Iva Majurec, medical student, and Erika Super-Kucina, medical student*

School of Medicine, University of Rijeka, Croatia

Background: Simulation in medical education at School of Medicine in Rijeka at the Department of anaesthesiology, reanimatology and intensive care is organized through Skills lab – Simulation center. Our courses, First aid and Anaesthesiology, reanimatology and intensive care, cover all medical, dental, radiology, physiotherapy and nursing students.

Summary of work: First aid simulation classes consist of basic life support (BLS) with automatic external defibrillator (AED) based on the latest ERC guidelines, airway management using manual manoeuvers, quick status assessment of a patient based on "ABCDE" system, immediate care of severely injured patient, education in specific trauma situations, wound and haemorrhage management with fracture immobilization.

Anaesthesiology, reanimatology and intensive care simulation classes have similar basis, but are more complex, including identification of cardiac rhythms as shockable or nonshockable using classical defibrillator to determine when to deliver shock; airway management using standard professional equipment; patient assessment and management using MicroSim Inhospital software. They also acquire skills necessary to obtain intravenous and intraosseous access.

Discussion: BLS is taught through four steps approach, with or without AED. Airway management includes ventilation, oro- and nasopharyngeal airway, laryngeal mask and endotracheal tube placement. "ABCDE" system includes assessment of airway, breathing, circulation, disability and exposure. Students are taught how to recognize different conscious states using Glasgow Coma Scale and AVPU system (alert, to voice, to pain, unresponsive). They learn how to collect important information from a patient, using SAMPLE algorithm.

ERC guidelines are also used to learn how to treat a trauma patient in various situations, such as traffic incidents, explosions, falls, penetrating injuries etc. Triage system is also a part of the skills acquired. One of the main things when dealing with a trauma patient is how to assess whether there has been a neck injury. Furthermore, students learn how to deal with specific trauma situations such as patient with a helmet, patient lying on his abdomen and how to remove a patient from a vehicle as quickly as possible.

MicroSim Inhospital software is used to demonstrate how to manage patient from the moment he walks into the hospital. Software does not offer any guidance, leaving students alone to manage the situation. They have to talk to the patient, ensure IV access, administrate drugs, open airway and perform resuscitation if necessary, etc., all in purpose of ensuring his welfare and deciding upon his further treatment.

Equipment we use is mainly made by Laerdal, such as ResusciAnne Torso, Airway Management Trainer, ALS Skillmaster and Laerdal IV Torso; Zoll's defibrillators and Medtronic's AEDs. Latest

addition to our equipment is SimMan, which will be used for education of Anaesthesiology, reanimatology and intensive care residents, as well as in classes held for medical students.

Conclusion: Medical simulation center can teach and prepare students through a variety of exercises for their further education and professional work.

Take home message: Whether a medical professional or not, one should know the basics of first aid and resuscitation and be willing and prepared to help the others.

ABSTRACT 2: PRESENTATION OF EDUCATION AND MEDICAL SIMULATION CENTER IN KATOWICE (POLAND)

Authors: *Dziubaltowska Aleksandra, medical student, and Skorupska Elzbieta, medical student*

Wroclaw Medical University, Wroclaw, Poland

Medical Simulation Center in Katowice ensures teaching students of medical, dental, pharmacy and biotechnology faculties in a better way giving them better skills. Additionally, it provides education of graduates who are able to study throughout their whole lives. They can improve their practical skills, knowledge, the center helps them to assess a medical situation and make quick decisions about treating. They learn how to communicate in stressful situations with other people from their team. Finally, they are able to recognize their powers and limitations because they see immediately results of their work: successes and mistakes. They learn simply and more complicated intervention and guidelines in certain medical cases according to ERC, AHA, ESC etc.

Education and Medical Simulation Center in Katowice was opened in November 2012. Project was realized by means of European Union (85% of cost) and Regional Development Found (15%), together 30 065 985.63 PLN (about 7.5 million euros).

The Centre is an intra-faculty unit, used by four departments of the Silesian Medical University. In the Centre there are six simulation rooms (operating room, intensive care unit, two ER rooms (four stations), paediatric room, labour room) as well as an area designated for simulation of pre-hospital emergencies with an ambulance simulator.

The Centre is equipped with ten high fidelity patient simulators (seven adult patient simulators, child simulator, infant simulator and labour simulator with newborn baby simulator). Simulation rooms are provided with necessary medical equipment (e.g. anaesthetics devices, ventilators, defibrillators, patient monitors, laryngoscopes) as well as audio-video systems for recording of simulation sessions. Thanks to three debriefing rooms available in the Centre participants of simulation can analyse what they have done. Moreover, the Centre provides two practice rooms, in which students may train manual skills using a large number of less advanced manikins and models.

Besides simulation part there are also rooms equipped with infrastructure allowing for a comprehensive use of information and communication technologies in education multimedia rooms equipped with computers with stereoscopic 3D displays, two auditoria equipped with projectors. The multimedia library gives access to the internet and digital resources of the University. The Centre also provides e-learning platform and a video-conferencing system that enables live coverage from operating rooms as well as two cameras (one 3D), thanks to which it is possible to record movies to be used for didactic classes.

The Center is a modern, effective tool in training students and young medical doctors. They will be more self-confident in their future work and this will bring a lot of benefits to their patients.

ABSTRACT 3: SIMULATION IN MEDICAL EDUCATION AT UPPSALA UNIVERSITY, SWEDEN

Authors: *Måns Stefansson, medical student, and Gustaf Hummel, medical student*

Faculty of Medicine, Uppsala, Sweden

Background: Simulation is introduced to the medical students from the third year of the medical program at Uppsala University and recur the sixth year. Both simulators and standardized patients are used in clinical scenarios. Multi professional teams are often simulated and medical students act both physician and nurses. Students also have tasks as observers (using predefined categories and variables) and are encouraged to participate in the debriefing. Clinical scenarios with progressive degrees of complexity (regarding medical difficulty and setting) and length (5-15 min) are featured. Focus is on emergency care (including trauma), anaesthesiology and communication skills.

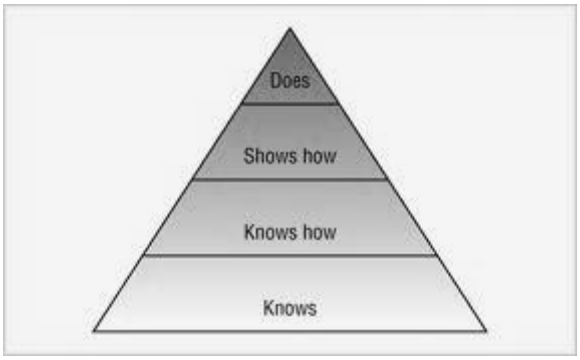

Figure 1: Miller's Pyramid

Discussion: Simulation drives the medical students to act the role as leading medical professional under controlled and safe conditions and allows the student to test his or her skills in handling an acute medical scenario. This enables students and teachers to learn and assess skills and knowledge at more than one level in Millers pyramid (above). Direct feedback is given in formalised debriefings. Positive actions can be affirmed and reflections of actions can improve the handling of the patient in repeated similar scenarios. Simulations are also a learning platform for peer learning where students learn from each other.

Conclusion: A strong opinion amongst the medical students at UUH is that they wish even more simulation exercises during their studies. Simulations prepare and assure the students for their coming role as physicians. Learning takes place and can be assessed in higher levels of Millers pyramid.

Take home message: More simulation is requested by both medical students and teachers at Uppsala University.

ABSTRACT 4: SIMULATION IN MEDICAL EDUCATION AT FACULTY OF MEDICINE UNIVERSITY OF MARIBOR

Authors: *Eva Senica, medical student, Tamara Todorovic, MD, Marko Zdravkovic, MD, Sebastjan Bevc, MD, PhD*

Simulation laboratory, Simulation Centre, Faculty of Medicine, University of Maribor, Slovenia and University Clinical Center Maribor, Slovenia

Background: Simulation as a learning method has been used at the Faculty of Medicine in Maribor since 2009 and has significantly developed over the last two years. It now represents an important part of our medical curriculum and effective learning methods for all the healthcare workers, especially medical students. Practice on the simulators enables them to improve their competence and confidence, consequently reducing the risk of mistakes and improving patient safety.

Summary of work: Our simulation activities are currently divided into two major divisions: Clinical Skills Laboratory and Simulation Centre.

The Clinical Skills Laboratory is equipped with manikins for basic clinical procedures (venepuncture, rectal examination, bladder catheterisation etc.). Beside its use in different subjects (emergency medicine, anaesthesiology, first aid and internal medicine), it is also a primary site for our clinical peer teaching. In the academic year 2012/2013, we had 20 peer tutors involved in the teaching process. They participated in clinical skills training in the field of internal medicine: they delivered a student selected component "Selected topics and novelties in propaedeutics" and trained Year-3 students on clinical examination and history taking in obligatory Internal medicine subject. They also organised an objective structured clinical examination (OSCE) for both the obligatory subject and the selected component.

The Simulation Centre is equipped with high-fidelity simulation equipment, among others a complex Human Patient Simulators (HPS) in adult, adolescent and child size. HPS possesses a unique technical and mathematical model of human physiology and enables the exchange of respiratory gases, the introduction of anaesthesia and monitoring of cardiac, respiratory, neurological and pharmacological components. The manikins are the opportunity for teamwork, thinking, learning from our mistakes and allowing us repetition, analysis of results and gaining experiences without the harmful effects to the patient. The Simulation Centre also enables simulation of specialised procedures for example laparoscopic surgery, radiologic procedures, coronary interventions, endoscopic examinations/procedures, labour management.

Simulation has also been a base for many researches, primarily concerning the quality of medical education and peer teaching system. Our results have shown that peer teaching based training can be used in early undergraduate clinical years and that students can successfully transfer clinical skills to their colleague students.

We have also successfully hosted a full day workshop entitled Quality and Economics of Peer Teaching at an international medical education conference - AMSE 2011.

Conclusions: Simulation in medicine is widely used at the Faculty of Medicine University of Maribor and it shows great results in the field of medical education and clinical skills training. In the future, we aim for a future improvement of our activities and intensive connections with Faculty of Medicine in Ljubljana with consistent development of both centres.

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SECTION 2

STUDENT PRESENTATIONS ON SIMULATION

1. Simulation in the Swedish Military Forces
2. Simulation of Accident – Medical Emergency Response Training
3. Basic Life Support and Airway Management in Medical Simulation
4. Stress Response in Acute Coronary Syndrome Simulation

ABSTRACT 1: SIMULATION IN THE SWEDISH MILITARY FORCES

Author: *Federico Centurion, medical student, former 1st lieutenant Swedish Amphibious Corps*

Faculty of Medicine, Uppsala, Sweden

Background: Military simulation has a long tradition and has been developed for many reasons, one obvious being peace. During peacetime many military skills cannot be practiced without simulation. War is ultimately about life and death and the need to simulate war conditions is therefore imperative. Another obvious reason is that war is in itself too dangerous for ”learning by doing”. Examples of military simulation education are flight training, shooting exercises, medical training in the field, staff exercise and air defense exercise. The presenter is an officer in the Amphibious Corps, and also a last year medical student, and have trained soldiers, officers and medical personnel in many aspects.

Discussion: The world of medicine and the military complex are alike in some ways and different in others. In the Swedish armed forces there is a strong tradition of learning by teaching. Simulation doesn´t necessarily involve expensive equipment. It is not necessarily time consuming. Not all simulations require an expert, also a student can learn a lot from just leading a simulation/exercise. Equipment is expensive regardless being a military or a civilian. There are ways to simulate without simulators or equipment. In the Swedish armed forces skill exercises are traditionally used to a higher extent compared to the Swedish modern university environment. Why is this so?

Conclusion: Most people would agree that simulation is essential for both civilians and soldiers. If it is too complex and expensive, we risk losing quantitative training. Personnel acting as injured and observers also learn during simulation.

Take home message: Military and civilian education can learn from each other.

ABSTRACT 2: SIMULATION OF ACCIDENT - MEDICAL EMERGENCY RESPONSE TRAINING

Authors: *Agnieszka Rafalska, medical student, and Agata Szczurowska, medical student*

Wroclaw Medical University, Wroclaw, Poland

Accidents are listed among 10 leading causes of death worldwide according to the World Health Organization. The three most common types of accidents resulting in death are car accidents, falls, and unintentional poisonings. Simulating such injuries is one of modern methods of medical training. It allows students and doctors to encode some quick response schemes in emergency situations and to perfect their skills in providing first aid and teamwork coordination. It is also useful in assessing the clinical competence of emergency medicine physicians.

The range of simulations in emergency medicine is wide, including large-scale disaster and mass-casualty accidents. To perform a simulation, a case synopsis, standardized patients or phantoms, trainees, observers, specialized equipment and supporting files, as well as a suitable place are necessary. A final evaluation should also be conducted.

More recently, computer-screen simulations, high-fidelity mannequins, and virtual-reality simulators have been introduced to effectively simulate a variety of situations.

Being the organizer of European Football Championship in year 2012, Poland was in need of mass accidents training. One of such events took place at the Medical University of Wroclaw. We describe the preparation and performance of this simulation.

ABSTRACT 3: BASIC LIFE SUPPORT AND AIRWAY MANAGEMENT IN MEDICAL SIMULATION

Authors: *Danijel Knezevic, medical student, and Ana Piculjan, medical student*

School of Medicine, University of Rijeka, Croatia

Background: Medical simulation is essential in teaching medical students how to provide basic life support (BLS) and manage obstructed airway and it prepares them to react properly in real life situations.

Summary and discussion: BLS consists out off several steps that include ensuring a safe environment for the rescuer and the victim, checking for response, asking for help, looking for signs of life (breathing and pulse) while the head is tilted backwards. If both are normal and present, the victim should be placed in recovery position; if either is lacking, the rescuer should proceed with CPR after calling 112. CPR is given through compression to ventilation ratio of 30:2. The aim of compressions is to push to a depth of at least 5 cm at a rate of at least 100 compressions per minute, to allow full chest recoil, and to minimize interruptions in chest compressions. The current ventilation recommendations are for rescuers to give each rescue breath over about 1 s, with enough volume to make the victim's chest rise, but to avoid rapid or forceful breaths. The time taken to give two breaths should not exceed 5s.1

BLS simulation training is based on the 4-step procedure:

1. Real time demonstration by an instructor
2. Demonstration with explanations
3. Demonstration guided by students
4. Demonstration by students + practice

Airway management consists out of removing the obstruction in the airway and proper ventilation. There are 3 basic manoeuvers that may improve obstruction by tongue or other upper airway structures. Those manoeuvers are head tilt, chin lift and jaw thrust.

Besides from the mentioned above, there are various devices used for airway management. They are divided into supraglottical airway devices (SADs) and tracheal devices (TD). The tracheal tube (TD) is considered optimal in providing and maintaining the airway open and secure. Laryngoscopy and intubation should be attempted without interrupting chest compressions, a brief pause may be needed when the tube needs to pass through the vocal cords, and the pause should not exceed 10 seconds. After intubation, rescuer should confirm correct tube position and secure it adequatly.2 The SADs can be used by people who are not fit to do tracheal intubation, including nasopharyngeal and oropharyngeal airway, I-gel, laryngeal mask and laryngeal tube. They are easier to insert and provide a certain degree of airway protection which may help in prolonged resuscitation if person isn't trained to do a tracheal intubation or fails to do so. Ventilation is done by a bag-mask (BMV).

Conclusion: The importance of BLS lies in studies which show that 40% of deaths in Europe are caused by cardiovascular diseases3 and 60% of them are caused by sudden cardiac death2. Airway

management on the other hand is important because tongue and improper head tilt is cause of obstructed airway in 70% of cases.

Take home message: Knowledge of BLS and airway management can save lives if performed as soon as possible and the basic principles can be easily taught even to laics.

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ABSTRACT 4: STRESS RESPONSE IN ACUTE CORONARY SYNDROME SIMULATION

Authors: *Jure Fluher, medical student, Jure Auda, medical student, Tadej Zorman, MD, Sebastjan Bevc, MD, PhD*

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Background: Stress response results from the interaction of the demands of an individual's environment with the individuals' resources to meet those demands and it provokes different physiological and psychological responses. It can also influence cognition and learning in medical simulation. We evaluated the stress response of our students during a large scale acute coronary syndrome (ACS) simulation on a Human Patient Simulator.

The assessment was performed in two different studies with two different groups of students: the first group with Year-3 students (N=39) in the scope of an elective course – *Selected topics and novelties in propedeutics* in the academic year 2011/12 and the second group with Year-6 medical students (N=25) as part of their Internal Medicine practical course in the academic year 2012/13. Our research question in both cases was: *Does ACS simulation elicit a stress response in Year-3/Year-6 medical students?*

Method: The participants faced the task in smaller groups of 4-9. Moments before the simulation, their blood pressure (BP), heart rate (HR) and arterial oxygen saturation (SaO_2) were measured and the skin on their palms and forehead was evaluated (warm or cold and sweaty or dry). Mean arterial pressure (MAP) and pulse pressure (PP) were calculated using BP measurements. The same was performed immediately after the simulation which in all instances ended successfully with a transfer of the patient in stable condition to a coronary care unit. Students were given only minimal guidance by the supervising clinicians during the simulation. We used the SPSS Statistics program and Excell 2010 for the statistical analysis.

Results

Table 1: Results of the Year-3 group.

	Pre-simulation	Post-simulation
MAP (mmHg)	100.4	98.9
HR (bpm)	93.1	88.5
SaO_2 (%)	98.0	97.5
PP (mmHg)	55.4	50.2

With the Year-3 students, the simulation lasted averagely 26.2 minutes. Student's T-test shows no significant difference in pre- and post-simulation MAP ($p=0.317$), but a significant decrease in HR ($p=0.014$), SaO_2 ($p<0.001$), systolic blood pressure ($p=0.029$) and PP ($p=0.016$) values.

Most students with signs of physical distress (cold, sweaty skin) before simulation had no such signs after. Only a few students developed these signs due to the simulation.

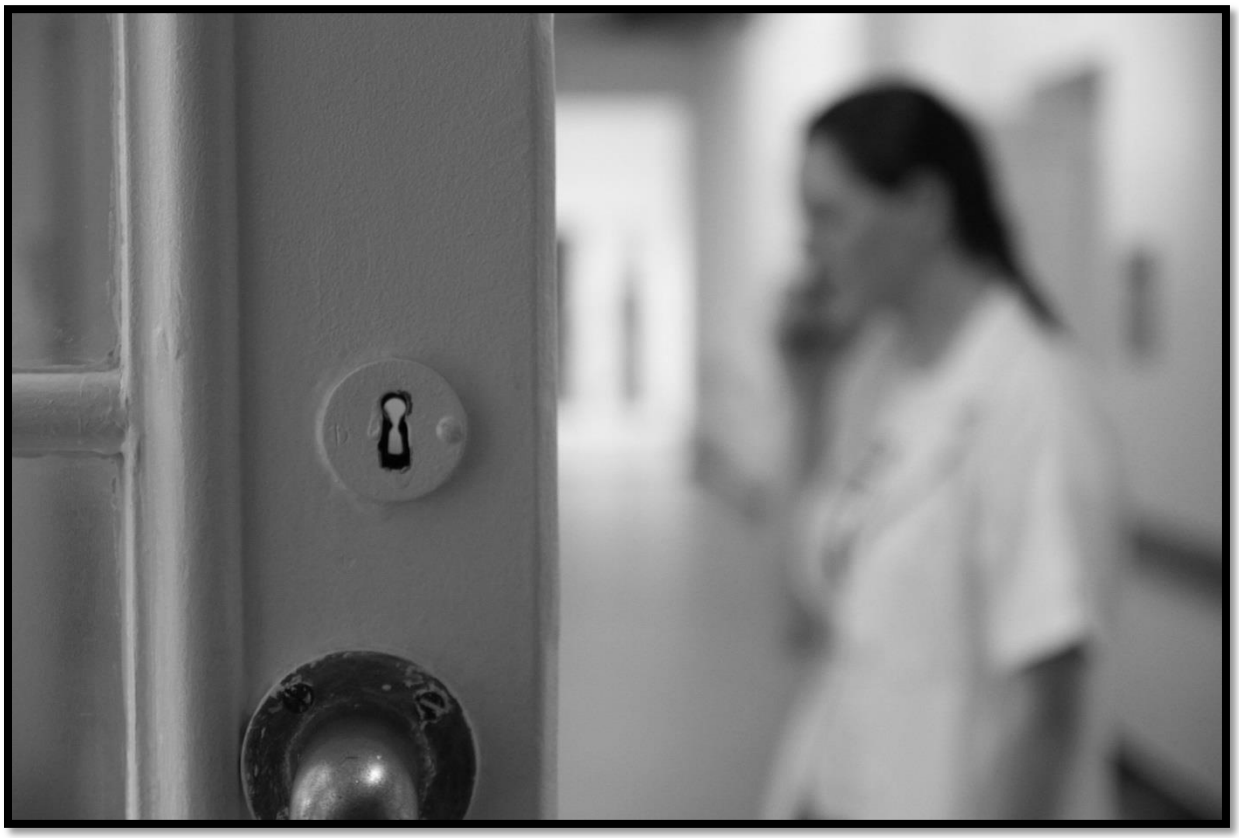
Table 2: Results of the Year-6 group.

	Pre-simulation	Post-simulation
MAP (mmHg)	100.36	100.44
Mean systolic BP (mmHg)	131.48	130.68
Mean diastolic BP (mmHg)	84.8	85.32
SaO_2 (%)	98.36	98.16
HR (bpm)	84.2	80.0

In the group of the Year-6 students systolic BP, diastolic BP, MAP and SaO_2 show no statistically significant difference (p=0.671; p=0.737; p=0.956; p=0.558, respectively). Only HR values show a significant decrease (p=0.033).

Discussion and Conclusions: To sum up, ACS simulation does not elicit a stress response in Year-3 students per se. According to the results, students experienced more stress before the simulation than after. This can be attributed to anxiety before an unfamiliar and demanding activity which an ACS simulation undoubtedly is. Our research also failed to demonstrate that Year-6 students experience stress during the simulation. Our explanation is that neither the simulation itself nor the simulation environment presented significant stress for the students.

SECTION 3



TEACHER PRESENTATIONS ON SIMULATION

1. Digital Rectal Examination for Beginners – Theoretical Background and Technical Considerations
2. Importance of Team Work in Trauma Simulation by ERC Guidelines
3. Interprofessional Simulation with Medical and Nursing Students in Sweden
4. Acute Coronary Syndrome Simulation in Medical Student Education – Our Experience

ABSTRACT 1: DIGITAL RECTAL EXAMINATION FOR BEGINNERS – THEORETICAL BACKGROUND AND TECHNICAL CONSIDERATIONS

Author: *Dorota Ksiadzyna, MD, PhD*

Department of Pharmacology, Wroclaw Medical University /Out-patients' Gastroenterology Clinic, Wroclaw, Poland

Background: Although digital rectal examination (DRE) may not be necessary in every case, it is an integral part of the complete abdominal examination. DRE must be approached sensitively and with due attention to the patient's feelings about what is potentially embarrassing and threatening to them, preferably in the presence of a chaperone.

Summary: The nature of DRE should be always explained clearly to the patient prior to the procedure. Verbal consent documented in the medical history of the patient ought to be gained. In general, DRE does not require any specific preparation or sedation, although in some cases local anaesthetic gel or examination under general anaesthesia may be needed. The examination is usually performed with the lubricated gloved index finger in the left lateral position of the patient with his/her knees drawn to the chest as much as possible. Essential parts of the examination are inspection and palpation of the following: perineum (abscess, external haemorrhoids, fissure, fistula, scars, skin tags, etc.), anal sphincter (intact sphincter, tone on squeezing, etc) and rectum (abnormal texture, polyps, masses, prostate gland in males). After withdrawal of the finger, colour and consistency of the faecal traces on the examining finger should be assessed for the evidence of blood, parasites or any other pathological constituents of the stool. The findings of DRE should be always explained to the patient.

Conclusions: DRE is a relatively simple, brief and invaluable examination of the anorecal region, including prostate gland that may disclose potentially life-threatening lesions and guide further tests and investigations.

Take home message: DRE must be performed whenever necessary, always with due attention to the patient's comfort and dignity.

ABSTRACT 2: IMPORTANCE OF TEAM WORK IN TRAUMA SIMULATION BY ERC GUIDELINES

Authors: *Ivana Jurincic, MD, and Davorka Lulic, MD*

School of Medicine, University of Rijeka, Croatia

Background: Team work and good organization are very important steps in approaching and efficient managing of a traumatized patient. While managing airway, breathing, circulation, disability, exposing and immobilizing the patient, there are a lot of tasks that trauma team has to address as soon as possible in order to ensure proper management of a trauma patient.

Summary of work: European Resuscitation Council (ERC) in its guidelines, as main teaching goals through European Trauma Course (ETC) based on medical simulation, presents organization and functioning of a trauma team, systematic approach to the patient and how to recognize and treat life threatening injuries. Good team work consists out of four key elements – team functioning, team management, organizing team members and their tasks, where the word "TEAM" stands for "Together Everyone Achieves More". Team functioning covers recognition and management of life threatening and other injuries, ordering adequate diagnostic procedures and treatment and arranging transport of trauma patient to the nearest hospital. Team management includes orders and control through resources, "five seconds round", dealing with inevitable problems; coordination through appointing assignments and their performance, interventions and dealing with people outside of the team; communication with team members, pre-hospital team, patient and patient's relatives and other medical staff. Team leader does not have to be the oldest in the team, but has to be the most experienced one. Team organization and task appointment include ensuring that the tasks suit team member's competence, respecting and valuing each member's contribution, anticipation of possible necessities during the patient management and possibility to widen the roll of team member, if necessary.

Discussion: Medical simulation through trauma scenarios in which patients have suffered severe injuries enhance not only medical knowledge of trauma team members, but they teach them to perform time saving procedures through rehearsed hypothetical situations and prepare them for all the outcomes that are possible in real life events in and out of the hospital. A member of such team learns how to cooperate with other members in order to stabilize the patient as soon as possible, so that errors in real life situations are brought down to a minimum.

Conclusions: Rehearsed scenarios provide trauma team members with diversity of real life outcomes so that the team can react in the best possible way in order to stabilize severely injured patient.

Take home message: Medical simulation in trauma patients improves outcome in severely injured patient.

Reference:

1. Driscoll P, Gwinnutt C (eds). European Trauma Course Manual.

ABSTRACT 3: INTERPROFESSIONAL SIMULATION WITH MEDICAL AND NURSING STUDENTS IN SWEDEN

Authors: *Jan Larsson MD, PhD, and Martin Wohlin MD, PhD*

"This has taken me closer to my future clinical reality." (last year medical student on IPS)

Background: Interprofessional training is becoming increasingly important in healthcare education. To respond to the justified claim for such training, a programme for interprofessional training in a simulator setting was started at Uppsala University in spring 2011, with last term medical and nursing students as participants. According to WHO "Interprofessional education occurs when students from two or more professions learn about, from and with each other to enable effective collaboration and improve health outcomes." In our presentation we will give a summary of recent research on interprofessional training with special focus on interprofessional simulator training (IPS). We will also present the result of a study on students' views on IPS at Uppsala University.

Summary of results: We will report about a pilot study, consisting of: 1) a literature search for studies on interprofessional education 2) a questionnaire study and 3) a focus group interview. The participants were last year nurse and medical students. The literature search yielded 18 articles on interprofessional training on a basic health educational level. Most of these were about clinical training units; no report about studies on simulator interprofessional training was found. Questionnaires were sent to students before and after IPS, with questionnaires returned from 24 and 20 students respectively. Three students took part in a focus group interview. The results, both from questionnaires and the focus group show that students value the IPS highly and high scores were given on questions about knowledge gained during the IPS. The long term effects of IPS concerning knowledge and attitudes are not known and should be the object of future studies. Nurse students and women in general were more positive to IPS compared to medical students and men respectively.

Discussion: Interprofessional training in a simulator setting is compulsory for all medical and nursing students at Uppsala University, which is unique for Sweden. The IPS is seen by most students as one of the most important element of their professional education and many of them ask for more of the same. The setup of the IPS is constantly under discussion in our group and we want to emphasize the need for more research in the field.

ABSTRACT 4: ACUTE CORONARY SYNDROME SIMULATION IN MEDICAL STUDENT EDUCATION – OUR EXPERIENCE

Authors: *Tadej Zorman, MD, Sebastjan Bevc, MD, PhD*

Simulation laboratory, Simulation Centre, Faculty of Medicine, University of Maribor, Slovenia and University Clinical Center Maribor, Slovenia

Background: Acute coronary syndrome (ACS) is a sudden and potential life-threatening manifestation of coronary artery disease with high mortality and morbidity. During education, medical students are provided with lots of theoretical knowledge but many times lack enough clinical experience and knowledge application despite clinical rotation. Integrating simulation scenarios of emergency situations in medical curricula is becoming an acknowledged and popular method of student education. Human patient simulation (HPS), utilizing computerized, physiologically responding mannequins, has become an important innovation in medical education very well accepted by students.

Summary of work: At our faculty, ACS simulation scenario using HPS has been an obligatory part of student education during their internal medicine clerkship at the last study year since 2010.

To maximise the education value of the scenario students have to study the basics of ACS and pass a written examination before taking part at the scenario. Before the scenario, students are given a 45-minute orientation course about the available equipment and specialized features of the simulation. Students take part at the simulation in small groups, preferentially no more than 6 students, so they can actively participate in the scenario.

Simulation scenario is based on a real clinical case with a 55-year male having typical chest pain accompanied with nausea. His condition gradually worsens with increasing pain, emesis and cardiogenic shock development. Students have to take correct action and use appropriate medication to prevent patient's death. An instructor assists students with tasks and provides general guidance when needed. After the simulation, the entire group is convened for debriefing of the case to review correct management of the case and point out positive team and individual performance.

Discussion: ACS simulation scenario using HPS simulates realistic patient encounters and gives real-time, physiologically accurate feedback. Students are able to practice care of critically ill patients in a realistic setting without risk of harm to actual patients. It provides students with experience and skills they might not otherwise encounter in a clinical rotation and offers an experience during which the time is suspended, thus affording students time to think critically, make decisions and act, as opposed to the fast-paced hospital environment where students may have neither a clear picture of the situation nor adequate time to act. It allows students learning from own mistakes. This type of experience immerses the student in an interactive situation that encourages development of problem-solving and critical-thinking skills, as well as interprofessional team training and self-confidence.

Based on a short anonymous questionnaire answered by students after simulation (N=102), 38 (37%) had few and 47 (46%) had some experience with simulation during their education, 60 (59%) valued

simulation as very and 31 (30%) as quite important for their internal medicine education and 68 (67%) as very and 28 (27%) as quite important for their internal medicine clerkship.

Conclusions: ACS simulation provides a unique learning opportunity for students to apply learned principles in a context that realistically mimics patient care, an overall treatment of the patient-model, team work and thinking, while providing a safe and controlled learning environment. Based on our 3 year experience, ACS simulation scenario is of great acceptance and popularity by students.

Take home message(s): HPS is the golden standard for medical student simulation training. It provides a unique opportunity for students to apply what they have learned in classroom and internal medicine clerkship and allows them to practice problem-solving and critical-thinking skills.