9HH POSITERS: Simulation
Location: South Hall, Level 0, MiCo

9HH1 (22571)
Effectiveness of Simulation for Cerebral Angiography Training

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Background: Computer simulation has been used in a variety of training programs, ranging from anesthesiology to general surgery. The purpose of this study was to assess the effectiveness of simulation for cerebral angiography (CA) training.

Summary of Work: Twelve physicians (6 residents, 2 fellows, 4 consultants) in Neurosurgery, Radiology, and Neurology at the London Health Science Centre completed simulated CA training on the ANGIO Mentor. After didactic instruction regarding CA and the use of the simulator, each participant performed 2 simulated cases – a ‘practice’ left-side CA and a right-side CA. The procedural time, fluoroscopy time, catheter errors, contrast volume and roadmaps utilized when performing the right-side CA were recorded. Upon completion of the 2 cases, consultants were asked to rate, on a 5-point Likert scale, the realism and usefulness of the simulated content, while trainees returned and completed the same set of procedures 4 additional times.

Summary of Results: Consultants reported that the simulator provided realistic simulation of CA, and is useful as a teaching and training tool. Compared to trainees, consultants completed the CA faster while committing fewer errors, and utilizing less fluoroscopy, contrast, and roadmaps. Over subsequent trials, all trainees were able to make significant improvements in their performance.

Discussion and Conclusions: Preliminary results suggest that simulation was effective for training CA, providing support the incorporation of simulation into interventional training programs.

Take-home messages: The implementation of simulation for interventional training would provide a no-risk environment for rehearsal of relevant technical skills, while optimizing patient safety by reducing trainee-patient exposure.

9HH2 (21985)
Identifying best practice in the teaching of large classes in a simulation laboratory

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Background: The use of simulation laboratories as learning environments is a common approach in health professions training. The Faculty of Health Sciences at the North-West University in South Africa has recently opened up a simulation laboratory for the training of pharmacy students. The challenge was to find an effective way to train the large number of pharmacy students (n=260) in the simulation laboratory with limited capacity (15 workstations) in a limited time period (1 hour per week for 8 weeks). In this study, three different teaching approaches were implemented and the effect on learning over time was measured.

Summary of Work: The study involved an initial survey to determine students’ previous experience with Information Technology Systems used in pharmacy practice. This was followed up with a practical pre-test done to determine their skills level with the Pharmacy Information Technology system. The students were then randomly divided into 3 groups, each group receiving a different teaching approach (lecturer guided; peer-teaching; self-study) during the course. A post-test to determine their skills level were administered after 4 weeks of training. Practical assessments were conducted after each practical training session to measure their improvement of knowledge and skills. over time. Student and lecturer reflections on the process and how it impacted on their teaching and learning were also included in the data.

Summary of Results: This research study is still in progress and will only be completed by the end of May when results will be available.

Discussion and Conclusions: The findings from this research will inform academic departments responsible for training health professionals such as pharmacy students on best practice regarding the use of simulations laboratories with large classes.

Take-home messages: Simulation enhance pharmacy students employability and workplace readiness in a country with a shortage of qualified pharmacists.
**9HH3 (21949)**

*Fillings In The Gaps, a simulation-based training approach to emergency preparedness in primary care dental surgeries*

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**Background:** By preparing for medical emergencies with the correct equipment, team response training and protocols, primary care dental practices can greatly decrease the risk of an unfavourable outcome. Patient simulators are useful tools to develop communication and teamwork training for clinical and non-clinical staff.

**Summary of Work:** We conducted a pilot programme to establish the extent to which primary care dental practices were ready and equipped to treat common acute care emergencies, and to strengthen their ‘preparedness’. We delivered a mobile medium-fidelity simulation-training programme over a 6-month period in three phases:

1. **Needs Analysis:** Site visits and questionnaire
2. **Medium-fidelity simulation team Training and System-Testing**
3. **Evaluation of Outcomes (including report & recommendations)**

We drew on socio-material models of organisational change to evaluate the impact of training.

**Summary of Results:** Our pilot programme covered 4 dental practice surgeries in SW London serving a combined population of 8,000 patients. Areas for strengthening emergency preparedness were identified at individual, team and system levels. Reiterative SMART plans with dental teams were negotiated for in-house development training at each phase of the study. Results showed changes in system organization, and improved perceptions of communication, teamwork and safety climate.

**Discussion and Conclusions:** Needs analysis, through a combination of self-reporting questionnaires and high-fidelity simulations exercises in situ, can raise awareness of communication, teamwork and system areas for improvement in dental practices.

**Take-home messages:** A programme of reiterative full-immersion simulation exercises involving dental practice response teams can increase confidence of clinical and non-clinical staff and reduce anxiety to perform life-saving care in rare emergencies.

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**9HH4 (21130)**

*Simulation based team training of endoscopy staff may improve patients' perception of colonoscopy*

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**Trine Christensen**, Aalborg University Hospital, Surgery, Aalborg, Denmark

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**Background:** Patient satisfaction is an important aspect of colonoscopy, a potentially unpleasant procedure usually carried out under minimal sedation. A well functioning endoscopy team able to take care of unexpected adverse events forms the basis for the patient’s perception of the procedure as safe and professional. This study aimed to see if simulation based team training of endoscopy staff could improve patient satisfaction with colonoscopy.

**Summary of Work:** The study was carried out in a surgical department, where colonoscopies were performed on an out-patient basis under minimal sedation. All endoscopy nurses and doctors participated. The course consisted of three short lectures followed by simulation training. The lectures dealt with technical aspects of colonoscopy, usage of medication and management of unexpected emergency events during the procedure, and finally with interprofessional teamwork and team communication. The lectures were followed by in situ simulation in an endoscopy room. A questionnaire based survey among patients and staff was carried out before and after the course.

**Summary of Results:** On a VAS scale from 1-10 (1 is best) patients described a median pain score of 4.3 before and 3.7 after the intervention (p=0.028). Doctors and nurses scored team-cooperation significantly better after the intervention (p=0.002 nurses, p=0.045 doctors). Poor evaluation of team-cooperation correlated with patients willingness to undergo a repeat colonoscopy (p=0.003).

**Discussion and Conclusions:** Simulation based team training of endoscopy staff may improve patients perception of colonoscopy. This may be due to improved teamwork.

**Take-home messages:** Patients’ perception of colonoscopy is influenced by the quality of teamwork in the endoscopy room. This may be improved by training.
**9HH5 (20473)**
Comparison of pig’s rib and mannequin on sensation of chest drain insertion

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**Background:** According to the World Health Organization report, in 2010 accidents in Thailand ranked the third in the world. One of the causes for first-hour death is chest injury. Teaching of insertion of chest drain is able to decrease the death rate. Mannequin is normally used for teaching of insertion chest drain. However, the mannequin is relatively expensive for economies like Thailand. Using pig’s rib in place of mannequin will help solving this problem. The objective of this study was to compare realistic sensation of insertion of chest drain between pig’s rib and mannequin.

**Summary of Work:** We enrolled sixth year medical students to learn chest drain insertion. We used visual analog scale to determine human similarity in anatomy, interest, sense of insertion confidence and value between pig’s rib and mannequin.

**Summary of Results:** 14 medical students were enrolled. Mean age was 23.5 years. Male was 42.86 percent. Median of sensation in pig’s rib was 9(9-10) vs 5.5(5-7) in mannequin, P=0.00. Median of interest in pig’s rib was 10(9.75-10) vs 7(5-8.5), P=0.00. Median of anatomy similarity was 9(7,75-10) in pig’s rib vs in mannequin was 6(5.825), P=0.02. Median confidence in pig’s rib was slightly more than mannequin 9(8-10) vs 7(5,75-8.25), P=0.02. Pig’s rib showed higher value than mannequin, 10(10-10) vs 8.5(5.75-10), P=0.04.

**Discussion and Conclusions:** Pig’s rib gave better human sensation of chest drain insertion, anatomy, value, and confidence when compared with mannequin.

**Take-home messages:** Pig’s rib was new choice for teaching of insertion of chest drain.

**9HH6 (20429)**
Teaching team resource management using in situ high-fidelity medical simulation

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**Background:** Medical simulation has been proposed as a technique to teach team resource management (TRM). In situ simulation offers a diagnostic method to review and reinforce the teamwork skills.

**Summary of Work:** TeamSTEPPS is an evidence-based TRM training system focusing on four competency areas: leadership, situation monitoring, mutual support, and communication. TeamSTEPPS is commonly used to deliver teamwork training for patient safety. We conducted in situ medical simulations after introducing the concepts of TeamSTEPPS by didactic lectures at medical wards. A resuscitation scenario was used to allow participants (residents, nurses, respiratory therapists) to demonstrate their teamwork skills and Mayo high performance teamwork scale was used for evaluation.

**Summary of Results:** Total 203 participants of 13 training sessions joined the activities. 98% of participants satisfied or very satisfied the training activities. The total scores of Mayo high performance teamwork scale increased significantly after training.

**Discussion and Conclusions:** Using in situ high-fidelity medical simulation after introducing the concepts of TeamSTEPPS by didactic lecture, TRM can be effectively taught to multidisciplinary team in a resuscitation scenario.

**Take-home messages:** In situ high-fidelity medical simulation is a powerful tool to teach TRM.
**9HH7 (20404)**
Identifying driving and restraining forces in introducing simulation training in a Swiss pediatric emergency department

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Ara Tekian, University of Illinois, College of Medicine, Chicago, United States

**Background:** High-fidelity simulation plays an important role in training pediatric emergency medicine (PEM) fellows in the United States and Canada, but not yet in European Countries. Some of the unique factors in Europe include educational environment, and the competence and leadership skills of decision makers. The current study explores these concerns in order to introduce simulation training at the University Children's Hospital (UCH) in Bern, Switzerland.

**Summary of Work:**
The situation at UCH was analyzed with the Force Field Analysis (FFA) model. Through focus groups, various driving and restraining forces were identified, with the objective of minimizing or neutralizing the restraining forces.

**Summary of Results:**
The major driving forces included improvement of team work, availability of Simulation Center, and better patient outcomes. The restraining forces included convincing the Department Head, time, cost, available resources, and fear of criticism. The prerequisite steps for the pilot phase focused on convincing the Department Head, and examining the true cost for introducing simulation training and its sustainability.

**Discussion and Conclusions:** Introducing change in a traditional environment is challenging. Using the FFA model we were able to clearly identify the restraining forces, conduct an in-depth discussion about strategies for overcoming these restraining forces, and plan an implementation strategy acceptable by the majority of the PEM faculty and fellows. Success of such a process depends on the willingness of the faculty to accept and introduce change.

**Take-home messages:** The FFA Model can be a useful technique in mining potential barriers for introducing and implementing change.

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**9HH8 (19235)**
Clinical significance after training with virtual laparoscopic training box

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**Background:** To define the ability of a training box simulator to reflect clinical skill in surgical residents, we compared clinical laparoscopic performance in staff of department of surgery in Rajavithi hospital.

**Summary of Work:** Six postgraduate year residents were assessed on a laparoscopic training box. Operative performance data were collected at the conclusion of procedures by Microsoft lifecam. During this period, all residents undertook iterative laparoscopic training box in three stations and laparoscopic training box data (mean time) were tested by Wilcoxon sign Rank test and compared with training box data of staff in Rajavithi Hospital by Mann-Whitney U Test.

**Summary of Results:** There was significant improvement in surgical skill performance after (post-test) training box programs. The statistical analysis showed reduction in all mean times (10.151,3.245,3.241) in three Training box stations and significance (p=0.028,0.028,0.028) in all stations after (post-test) Training box programs. We compared six postgraduate year residents with staff of Rajavithi hospital and the statistic analysis showed no significant difference (p=0.33,0.42, 0.150) after (post-test) training box programs.

**Discussion and Conclusions:** These data indicate that laparoscopic Training box simulator can improve surgical skill performance of six postgraduate year residents.
**9HH9 (22196)**

**An intercollegiate inter-professional hybrid manikin-based simulation**

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**Brenda Bray, Washington State University, Spokane, United States**

**Judith Knuth, Washington State University, United States**

**Kevin Stevens, Washington State University, United States**

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**Background:** Riverpoint campus in Spokane, Washington houses three state universities and multiple healthcare disciplines. The hybrid simulation exercise was designed for students from two universities and four healthcare disciplines to use knowledge of their own roles to assess and address the needs of the patient as well as communicate with other health team members.

**Summary of Work:** In April of 2013, thirty-four students including physician assistant (PA), nutrition and exercise physiology (NEP), nursing and pharmacy participated in an inter-professional clinical hybrid simulation involving a standardized patient (SP) and a high fidelity manikin (SimMan®). The scenario evolved from a SP with chest pain to a “cardiac event” involving SimMan®, Ventricular fibrillation was identified and using Advance Cardiac Life Support algorithm, the patient was stabilized.

**Summary of Results:** A 30-minute debriefing followed each of the 15-minute scenarios. Faculty members from all disciplines using the “plus delta” technique and a review of the scenario objectives facilitated each debriefing. At the end of the exercise the TEAMSTEPPS Teamwork Attitude questionnaire was administered to all 34 students. All students agreed or strongly agreed on the value of interprofessional training, learning environments and learning and performance. Additionally, a common theme emerged centering on lack of familiarity with each other’s roles.

**Discussion and Conclusions:** All students had a positive experience, were introduced to working as a team, and became more familiar with each other’s roles and responsibilities.

**Take-home messages:** Healthcare teams are the future of patient care. Teaching in teams reinforces working in teams.

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**9HH10 (22660)**

**Validation of a canine fundoscopic eye model from the perspective of veterinary educators and students**

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**Mary Mauldin Pereira, Ross University School of Veterinary Medicine, Biomedical Sciences, Basseterre, Saint Kitts and Nevis**

**Julie Williamson, Ross University School of Veterinary Medicine, Clinical Sciences, Basseterre, Saint Kitts and Nevis**

**Background:** A validated teaching model for canine fundoscopic examination was sought to improve day one fundoscopy skills at the same time as reducing use of teaching dogs. This novel eye model was based on a hollow plastic ball with a cut out for the pupil, a suspended 20 diopter lens and paint / paper simulation of relevant eye structures. The eye was mounted on a simulated dog head stand.

**Summary of Work:** Veterinary educators performed fundoscopy using this model and afterwards completed a survey regarding validity. Subsequently, veterinary students were randomly assigned to pre-laboratory training with or without the use of this teaching model. After completion of an ophthalmology laboratory on teaching dogs, student outcome was assessed using a survey regarding their experience and ability to see a symbol inserted on the simulated retina in this model.

**Summary of Results:** Overall, veterinary educators agreed that this eye model was well constructed and useful in teaching good fundoscopic technique. In addition, the students that received pre-laboratory model training were more confident, knowledgeable and skilled.

**Discussion and Conclusions:** This novel eye model is validated by veterinary educators and students as a useful tool to teach and assess fundoscopic techniques.

**Take-home messages:** Canine fundoscopy can be taught using a valid fundoscopic model.
**9HH11 (22782)**

Faculty development. Advanced Simulator Instructor Course

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**Background:** It is essential to have a continued program of faculty development to recruit high-quality simulator instructors. In the Central Region of Denmark, SkejSim Medical Simulation and Skills Training has educated approximately 200 simulation instructors. In a survey performed in 2012, the instructors were requested to define their needs. They reported reluctance to incorporate simulation-based team training in the clinical encounter and a need for developing debriefing skills as well as facilitator and instructor skills. The aim of this advanced simulator instructor course is to support the development and implementation of simulation-based initiatives on the participants’ home institutions.

**Summary of Work:** Design: Teaching methods are predominantly interactive including case discussions, lectures, hands-on with feedback. To allow for cumulative learning, practice skills and knowledge retention, this program spans six months. The program is a coherent framework that is structured into four phases.

Phase 1: Participants are requested to design a simulation scenario for team training. Faculty will provide written feedback.

Phase 2: Focus is on the difficult debriefing. To practice strategies to manage challenging debriefings we use the TeamGAINS tool (1).

Phase 3: All participants undertake an independent learning project; i.e. produce a video to be used for feedback.

**Summary of Results:** The evaluation of this course is process-oriented. We plan to develop a type of knowledge test, i.e. a situational judgment test, in a pre-post design with a follow up.

**Discussion and Conclusions:** This study holds promise for advanced simulator instructor courses.

**Take-home messages:** (1) Kolbe et al. BMJ Qual Saf 2013; 22(7):541-553.

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**9HH12 (23063)**

SimDonkey: Manikin Based Innovation For Veterinary Education

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**Background:** Teaching veterinary students the practice of anesthesia is fraught with many of the same concerns associated with teaching medical students, CRNA, and anesthesiology residents. There are also ethical, financial, and legal issues associated with keeping live animals for training purposes. The SimDonkey project seeks to develop a high-fidelity anesthesia simulator for our affiliated veterinary school to reduce cost and mitigate ethical implications related to teaching anesthesia on live animals.

**Summary of Work:** The SimDonkey manikin was built by heavily modifying a second generation Laerdal SimMan and repurposing of a life sized donkey toy. The stuffed donkey was stripped down to a steel frame and the SimMan was stripped down to component electronic and pneumatic modules (circuit boards, pneumatic distribution block, speakers, breathing, pulse and airway modules). The components were mounted in such a way that they retain their function but with new anatomical positioning. The simulator is currently undergoing beta testing at the veterinary school.

**Summary of Results:** The SimDonkey was deployed at the veterinary school and received positive qualitative analysis from faculty members. Although, only beta-version the simulator has met expectations from faculty and is currently undergoing planning for the next version.

**Discussion and Conclusions:** Innovative repurposing of a human simulator into large animal veterinary anesthesia is viable and produced positive results. Future work will include additional modifications to better reflect procedural fidelity.

**Take-home messages:** If they don't have it build it. Using existing resources to develop tools for new applications when there is a need can be beneficial. Repurposing human simulators for veterinary education can be done with positive results.
**9HH13 (22545)**  
**Augmented Reality: A tool for teaching Health Science students**

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**Background:** Traditional medical education relies on the patient as the primary source of teaching, this is unethical, places the patient in an unnecessary risk and influences negatively patients and students. True learning is experiential, humans learn better by doing, involving all their senses in learning, generating a more powerful learning environment by the introduction of technology. Our students are now called “Digital Natives, nowadays a first term student has spent less than 5,000 hours reading, over 10,000 hours playing videogames, more than 20,000 hours watching TV, has seen over 500,000 commercials and has sent over 200,000 emails.

**Summary of Work:** Our objective was to use an AR commercially available software to create an interactive and immersive environment for our Health Science Students providing different learning experiences, promoting engagement, self-study and objective learning. This technology will be used in the following undergraduate programs: Human Medicine, Veterinary Medicine, Nutritionists, Psychology, Physical Therapy and dentistry. We will be using human and animal anatomical models and simulators.

**Summary of Results:** The name of the Software that was use is Aurasma This software was used to create auras on human and animal anatomical models and simulators, 3D images, videos and animations were utilised.

**Discussion and Conclusions:** AR increases educational value by generating engagement, creates interactivity, increases retention, data dissemination and generates meaningful learning (Active, Constructive, Intentional, Authentic and Cooperative) It allows the students to immerse themselves and become involved in their own learning process.

**Take-home messages:** AR offers value to the learning experiences of the students. It also offers self-paced learning it is a motivational and memorable experience.

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**9HH14 (21127)**  
**Experience of high-fidelity whole ward simulation**

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**Background:** The use of simulated environments for training is well grounded in educational theory. It offers experiential and group learning and allows reflection and repetition. It allows predictable exposure to situations that are rarely accessible in clinical practice, whilst maintaining a ‘safe’, flexible environment and without compromising patient safety. High-fidelity simulations are those intended as a substitute for the ‘real thing’ and so help the student accept it as a replacement for the real situation. It has been suggested that the higher the level of fidelity the more transposable the performance to real life. It aids translation of theory into practice and offers permission to fail in a safe environment. We aimed to create a super high-fidelity, immersive simulation for medical undergraduates.

**Summary of Work:** We converted a disused hospital ward into a high-fidelity whole ward, ‘real-time’ simulation with actors and facilitators playing patients and staff. Patient scenarios were scripted in detail and students performed clinical skills on prosthetics. For two hours students followed their patients from admission and clerking, to investigation and initiation of treatment to the post-take ward round where they presented to a consultant physician.

**Summary of Results:** Feedback from students was overwhelmingly positive.

**Discussion and Conclusions:** At no other point during training do students have opportunity to so comprehensively manage a patient in a safe, supported environment.

**Take-home messages:** High-fidelity simulation can help prepare undergraduates for qualification and can highlight issues with patient safety, infection control and soft-skills. We can see future development opportunities for teaching multi-professional team working.
**9HH15 (19356)**  
**Clinical pharmacist simulation training in Japan**

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Yoshimi Kouzai, Okayama University, Simulation center, Okayama, Japan  
Toshiaki Sendou, Okayama University, Pharmaceutical, Okayama, Japan

**Background:** Clinical pharmacist training in Japan is undergoing a major change from traditional lecture-type clinical training to simulation training. We think that improvement of clinical skills connect directly with bedside problem-solving ability. We proposed a new clinical pharmacists training course (Clinical Pharmacist Okayama Simulation Training (CPOST)), and studied how clinical pharmacist training was able to change.

**Summary of Work:** 62 clinical pharmacists were in our hospital. We performed 4 times CPOST in 2013. Evaluation was enforcement of pre- and post self check test, and we conducted a questionnaire.

**Summary of Results:** Participation rate is 18-48%, and continued participation rate of more than once is 37%. Those training were able to recognize the significant difference between the pre- post self check tests. By realizing other co-worker working, attending pharmacists were able to understand the real time pharmacokinetics in the clinical situation and other co-workers working (i.e. physician, nurses).

**Discussion and Conclusions:** Clinical pharmacist simulation training was very effective. Furthermore, CPOST has a possibility of creating a new position of clinical pharmacists at the bedside.

**Take-home messages:** We may create new position for clinical pharmacist in Japan.

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**9HH16 (18511)**  
**Transdisciplinary small group simulation exercises for disaster management and post-disaster Infectious control**

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**Background:** Disaster management and post-disaster Infectious control education is rarely reported by using transdisciplinary small group simulation exercises model.

**Summary of Work:** Totally 125 students from various schools and different grades experienced a multidisciplinary elective course, to establish the general concept of disaster management and post-disaster disease prevention. We use 2 lectures, 4 case discussions and 10 simulation small group exercises to build the knowledge and skill for students. We used same questionnaire, totally 13 questions, before and after the course.

**Summary of Results:** Satisfaction questionnaire: total, expectation achievement, multidisciplinary, simulation exercise, and clinical practice were all > 4.8. Learning effect questionnaire: overall knowledge/skill, overall knowledge, understanding the importance of team communication/interaction, understanding individual role in team, understand transdisciplinary interaction importance, law knowledge much improved (P < 0.01). Transdisciplinary interaction skill, team mutuality, interaction ability, patient protect ability improved (P < 0.05). Overall skill, communication ability, self protect ability showed improved but did not reach statistical significance.

**Discussion and Conclusions:** This teaching model demonstrated improvement on all items of questionnaire. Some items did not get significant improvement. This means clinical exposure is important.

**Take-home messages:** We suggest introducing this model to students. Longitudinal study is suggested for evaluating the long term effects.
9HH17 (18428)
Palpation of the neck, Assessment of a novel high fidelity simulator

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Background: Training simulators provide a high-fidelity environment for trainees to develop new skills, while improving patient safety. We designed a cost-effective, high-fidelity neck simulator to improve the acquisition of technical skills related to the assessment of lymphadenopathy. This prospective randomised study evaluates the simulator as a tool for learning the procedure, while comparing it to the traditional standardized patient method.

Summary of Work: First year medical students with no prior procedure training will be randomized to receive training either using standardized patients, or the simulator. Examiners blinded to the intervention will evaluate the subjects in both groups before and after training. Performance will be measured using validated instruments- a global rating scale, and task-specific checklist. Learner confidence will be measured using pre-and post- questionnaires.

Summary of Results: We expect the simulator to be associated with positive educational outcomes, and that students working with the simulator will report greater confidence in physically examining the neck, as compared to the standardized patient group. At the time of abstract submission, subject enrolment is complete (n=60), data acquisition has begun, and results are pending.

Discussion and Conclusions: A palpable neck model allows insertion of pathology, reduced costs, and improved long-term access and standardization across distributed campuses. The global rating scale and task-based checklist are useful metrics for providing formative feedback, and longitudinally evaluating competency at stages of professional training.

Take-home messages: This is the first prospective randomized study of a high-fidelity lymphadenopathy simulator, evaluated with task-specific assessment tools. This simulator can be incorporated into undergraduate medical curricula, facilitating medical students’ training for assessment of lymphadenopathy in the neck.