R1 - **In-situ simulated disaster – does it have to be a disastrous simulation?**

*Vered Gazit; Kathy L. Johnston (IWK Health Centre, Halifax, NS)*

**Objective:** To identify effective strategies to facilitate in-situ Multiple Casualty Incidents involving simulated pediatric casualties.

**Methods:** A Multiple Casualty Incident (MCI) exercise involving contaminated patients took place in a tertiary care pediatric health centre emergency department. There were a total of 26 simulated casualties who presented to the emergency department via self-referral or via ambulance. The patients were represented by mannequins or child volunteers with simulated injuries. There were also a number of volunteers simulating family members. The exercise delivery team consisted of 51 volunteers. Patients were managed by a multidisciplinary team of 32 health care providers. The exercise ended after all casualties had been triaged, emergent lifesaving interventions provided, urgent investigations ordered and/or performed and disposition for each patient determined. Assessment data for the exercise was collected through direct observation, debriefing of health care providers and simulated patients at the end of the exercise, collection of video and photographs, and feedback from the evaluation team during and after the exercise.

**Results:** Challenges in in-situ disaster simulation included: staff recruitment for the response team, insufficient resources allocated for the exercise, potential interruption to regular operations and patient care, meticulous pre-exercise equipment preparation and organization, recruitment and preparation of pediatric simulated patients and ensuring their wellbeing and safety throughout the exercise. Feedback from volunteers and health care providers was excellent. All staff agreed that the exercise was valuable. The children volunteers indicated that meeting the exercise director and watching the videos of previous exercises increased their comfort and excitement and they felt confident in what they were asked to portray. They appreciated having a coach shadowing them during the exercise.

**Conclusion:** The exercise provided good opportunity to test the Code Orange and Decontamination protocols and procedures, identify gaps and make the necessary revisions. This exercise allowed staff to practice in a safe environment and maintain their competency and confidence in managing a mass casualty incident. Maintaining this competency requires an ongoing commitment to didactic education and exercising.
R2 - Causes for pauses during simulated pediatric cardiac arrest
Yiqun Lin (KidSIM Simulation Education and Research Program, University of Calgary, Calgary AB); Adam Cheng (KidSIM-Alberta Children's Hospital, Calgary, AB); Dawn Peterson (Children's of Alabama, Birmingham, AL, USA); Elizabeth Bragg (Children's Hospital Los Angeles, Los Angeles, CA, USA); David Kessler (New York Presbyterian Morgan Stanley Children’s Hospital, New York, NY, USA)

Objectives: The quality of cardiopulmonary resuscitation (CPR) directly impacts outcomes from cardiac arrest. Interrupting of chest compression is a common pitfall. Little is known about factors contributing to pauses in CPR during pediatric cardiac arrest. The objective of this study is to determine the frequency, duration, and causes for pauses during a simulated cardiac arrest.

Methods: We reviewed video of 26 simulated pediatric cardiac arrest scenarios. Each pediatric cardiac arrest scenario lasted 12 minutes. Two independent reviewers reviewed the videos to describe events surrounding each pause in chest compressions. Frequency, duration, and factors associated with each pause were collected. We use descriptive statistics (median/IQR for numeric variables; number/percentage for categorical variable) to report pause frequency and duration.

Results: A total of 256 pauses were identified during the 26 simulated cardiac arrest scenarios, with a median of 10 pauses (IQR: 7-12 seconds) per 12-minute scenario. The median duration of each pause was 5 sec (IQR: 2-9 sec) and median no flow fraction was 9.4% per scenario (IQR: 6.2 – 11.7%). Amongst all pauses, 134 (52.3%) of them lasted less than 5 seconds, 72 of them (28.1%) lasted 5-10 seconds and 49 (19.1%) of the pauses lasted greater than 10 seconds. The three most common tasks initiating the pauses were change of compressors (25.4%), pulse check (23.8%) and rhythm check (14.8%). Amongst the 172 pauses involving these three tasks, only 32/172 (18.6%) of pauses involved all 3 tasks with an additional 45/172 (26.2%) of pauses involving 2 of these 3 tasks being performed at the same time. 95/172 (55.2%) of pauses involved only one of the three tasks being performed. Tasks associated with a longer pause duration (>10 sec) included: shock delivery, rhythm check and pulse check (p< 0.001). The reason for the pause was verbalized in 191 out of 256 pauses (75%). When a shared mental model was cleared articulated, pauses were significantly shorter (MD: 4.2 sec, 95%CI: 1.6–6.8 sec).

Conclusion: Pauses in CPR occur frequently during simulated pediatric cardiac arrest, and vary both in cause and duration. Healthcare providers should improve team coordination to minimize pause frequency and duration.
R3 - Collaborative care in action: building interprofessional competencies through simulation-based Education and Novel Approaches to Team Training
Alyshah Kaba; Mirette M. Dube (Alberta Health Services, Cochrane, AB)

Interprofessional collaboration (IPC) is integral to patient safety and team effectiveness. There is a myriad of learning resources that exist for interprofessional education and collaboration (IPE) and teamwork training, for example: Crisis Resource Management (CRM), TeamSTEPPS and the Canadian Interprofessional Health Collaborative (CIHC) National Interprofessional Competency Framework etc. Although these frameworks and models exist, there is a paucity of opportunities for practicing healthcare professionals to gain proficiency in IPC competencies and team effective behaviors through deliberate practice followed by reflection, especially outside of clinical care areas. Evidence suggest that using simulation-based learning coupled with experiential activities, followed by skilled debriefing and guided reflection we can improve collective team performance. Funded by the government of Alberta, the Health Workforce Action Plan (HWAP) included a 1.15 million dollar provincial grant to address this gap. The objective of this funded initiative was to deliver a competency based interprofessional simulation intervention for frontline physicians, nurses and allied health professionals (n= 75), based on the stakeholders identified baseline needs assessment and the CIHC Framework. The intervention included a flipped classroom pedagogical approach including 4.5 hours of asynchronous eLearning, and 2 – 4.5 hour workshops. During the workshop participants applied their knowledge through a series of four simulations and two experiential learning activities, each followed by an Advocacy Inquiry debrief with a focus on the CIHC competencies. Changes in preceptors’ and mentors’ interprofessional knowledge, attitudes and behavior were assessed before and after the simulation-based education intervention. The changes to the three competency measures were assessed with validated teamwork questionnaires (Teamwork Attitudes Questionnaire, Mayo High Performance Teamwork Scale, McMaster-Ottawa TOSCE) and a specifically developed knowledge test. This results of this flipped classroom approach of using simulation and experiential activities has shown to significantly positively change individual knowledge, attitudes and collective team performance (p < 0.05). Staff also reported changes in participant attitudes specific to awareness around the importance of team structure, leadership, situational monitoring, mutual support and communication. The findings from this project have informed the development of a new provincially wide interprofessional simulation based education and team effectiveness-training curriculum across Alberta.
R4 - The Managing Emergencies in Pediatric Anesthesia (MEPA) Global Rating Scale is reliable and valid for simulation-based assessment in anesthesia: an international multicentre study

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Multimodal assessment is the focus of much attention in medical education and research currently. We previously designed, piloted, validated and reported tools for simulation-based assessment of readiness for independent practice in anesthesia. In the current study we sought to seek further evidence for the reliability and validity of our curriculum and assessment tools following worldwide dissemination and implementation of the Managing Emergencies in Pediatric Anesthesia (MEPA) simulation course. We obtained REB approval at nine centres in Canada and UK. Participants from junior residents to veteran staff engaged in the MEPA course which consists of seven simulation scenarios covering high-stakes, low-frequency crises in pediatric anesthesia. We have previously reported the process of design and rigorous validation of the scenario content. Performances were video recorded. Five expert raters were trained to use two tools for rating each scenario - a scenario-specific checklist (CL) and a global rating scale (GRS). A large random sample of the total video pool were rated by all the raters in order to establish their inter-rater reliability. The remaining videos were divided between the raters for solo rating. Correlations were sought between grade of practitioner and performance, in order to make arguments for the validity of our tools in this context. Over 18 months, we recorded 469 simulation encounters. 140 videos (twenty of each of seven scenarios) were rated by all the raters. Despite the slight variation in reliability by scenario, the reliability of the CL and GRS is substantial and overall is near-perfect (ICC=0.91, p=0.001). Importantly, the GRS which eliminates scenario content specificity (and designates readiness for practice) shows excellent reliability. There was a correlation between practitioner grade and performance scores and a significant difference between the performance of junior residents, senior residents and staff, with each grade outperforming the last. Both demonstrate that our tools are well-placed to distinguish novice from expert and stratify those grades in between. The MEPA GRS has been adopted as the principal outcome measure for the Canadian National Anesthesia Curriculum. This study provides further validity evidence for its use in the context of simulation-based summative assessments of Residents' readiness for practice.
R5 - High-fidelity simulation-based learning through the eyes of African nurse educators: A transformative learning theory perspective
Maria J.J. Phillips (University of the Free State, South Africa)

The purpose of the study explored and interpreted educators’ learning experiences as novices implementing high-fidelity simulations (HFS) at a single centre in South Africa in order to inform the future development of educators in the use of high-fidelity simulation successfully. A qualitative, interpretative phenomenology analysis (IPA) study method was employed to collect data from seven nurse educators by means of individual, in-depth, semi-structured interviews, reflective journals and reflective notes of the researcher. Participants were exposed to HFS for at least one year and some up to four years. The results indicated that educators experienced high-fidelity simulation as both stressful and exhilarating. Their existing clinical skills were not sufficient and new skills and strategies had to be developed. Developing new skills to implement HFS resulted in a disorienting dilemma. Initially educators observed the HFS process and gradually increased their exposure to it under supervision. Mentoring educators helped in the beginning but most of the learning resulted from critical reflection on learning experiences. Critical reflection on their simulation learning experiences and student feedback transformed their classroom and clinical education strategies. Participants mentioned that reflecting with peers on their learning experiences and consequent experimentation with other educators’ strategies initially led to smaller and eventually bigger successes. Learning from mistakes contributed to their learning and a willingness to change. Transformative learning of educators ensued from the final phase of critical self-reflection on perspectives. Based on the result it can be concluded that the development of educators’ HFS skills requires awareness of the literature, but more so, practising and sharpening their skills within a supportive environment, together with peer mentoring. Simulation educators developed through a cyclic experiential learning process. The process includes critical reflection on experiences, a willingness to change, and critical self-reflection on personal perspectives. The process and final product of learning differ from educator to educator. The outcome of educators’ learning to implement HFS resulted in personal and practice transformation.
R6 - Does publication of simulation related scholarly work improve subsequent clinical learning?
Ian Gallant (Memorial University of Newfoundland, St. John’s, NL); Desmond Whalen (Memorial University-Tuckamore Simulation Research Collaborative, Paradise, NL); Adam Dubrowski (Memorial University of Newfoundland, St. John’s, NL)

Over the past three years, we have been exploring the concept of learning through scholarly publications. Several pre-clerkship undergraduate medical students have been paired with faculty mentors to develop a number of technical simulation scenario reports, including cases of infant trauma, ectopic pregnancy, drug overdose, rural transportation and burn management and published them in a peer-reviewed journal. We hypothesized that the peer-review process and publication will serve as external motivators to learn and develop learning strategies that can be applied in clinical learning. When surveyed immediately after the experience these students reported that their experiences allowed them to develop competencies related to the core roles in the CanMEDS framework for medical education. These are medical expert, communicator, collaborator, leader, health advocate, scholar and professional. The objective of this phase of our work was to follow up with these students in order to explore how these experiences have contributed to their approach to learning as clinical clerks. Focus groups composed of undergraduate medical students that have completed core clinical rotations were provided with a series of discussion questions. Participant comments were consolidated by the author and reviewed by the students for approval. Themes that emerged from student discussions relate to how the process of developing technical simulation scenario reports helped to prepare them for the expectations and learning opportunities of clerkship rotations. By creating a clinical situation in order to simulate a real patient encounter, students needed to take responsibility of their own learning in order to produce a scenario that would be acceptable to the medical community (i.e. peer-reviewed publication). The template for developing scenarios promotes students to think through the clinical context of a situation, present a history and physical, to determine appropriate actions and their outcomes, and anticipate inappropriate actions and cues to realign learners with the learning objectives. The application of this process is supportive of integrating CanMEDS competencies and developing the skills necessary to become a life-long learner.
R7 - Simulation-based training for surgical instrument recognition- a training initiative for perioperative nurses

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There is growing economic pressure to have perioperative nurses competent in a wide variety of surgical environments. The objectives of this study were to determine the effect of tablet-based simulation for instrument recognition in learning appropriate instruments for a surgical procedure. We also examined whether simulation-based learning is translated to real instrument recognition and whether this learning is retained. A randomized trial of perioperative nurses from the QEII Health Sciences Centre in Halifax was conducted. The intervention was game-based simulation training for learning neurosurgical instruments and the application of this knowledge to identify instruments during a simulated burr hole surgery procedure and from a real surgical tray. Participants were divided into Groups A and B. On day 1, Group A performed simulation tasks using PeriopSim(tm) prior to identifying real instruments from a surgical tray, whereas Group B was asked to identify real instruments prior to performing the simulation tasks. On day 7, knowledge recall was assessed on real instruments. Primary outcome measures were accuracy and speed during simulation training and in recognizing real instruments. A repeated-measures ANOVA was conducted to assess the change in simulation performance over three testing sessions and to compare real instrument recognition at day 1 and day 7. This study recruited 80 participants. On day 1, all participants showed significant overall improvement in total score, time saved, and reduction in the number of errors over repeat testing on simulated tasks. Group A demonstrated significantly better accuracy and speed of identifying real instruments than Group B (p<0.001). Furthermore, during knowledge recall testing on day 7, all participants demonstrated improved accuracy and speed in identifying real instruments compared with day 1 (p<0.001). This is the first study to assess the effect of tablet-based simulation training on instrument recognition for perioperative nurses. Our results show that recognition of surgical instruments by perioperative nurses improves with repeated use of the PeriopSim(tm) platform as an educational tool. Moreover, instrument knowledge acquired through simulation training results in improved identification of real instruments, knowledge that is retained at least one week following initial training.
Objective: Desirable difficulties improve learning transfer and retention by increasing the cognitive work of learning. The objective was to determine the effect of “chronometric pressure,” in the form of a verbal prompt, on the speed-quality trade-off.

Methods: We conducted a single-intervention interrupted time-series study enrolling surgery residents and medical students from two institutions. Participants completed ten repetitions of a simulated blood vessel ligation. Placement of two ligatures 1cm apart constituted one repetition. Between repetitions five and six we verbally encouraged participants to complete the next (sixth) repetition 20% faster than their previous (fifth) time. We timed all repetitions and measured ligature placement accuracy and tightness. We analyzed the resultant learning curves using random coefficients spline models.

Results: 77 participants completed the study: 16 first-year residents, 36 senior residents, and 25 medical students. Time per repetition decreased from the first (mean [SD], 39.8 [18.4]) to the last (29.6 [12.5]) repetition. Time decreased between repetitions 5 and 6 by an adjusted 8.6 seconds (95% CI 6.1 to 11.1) with a corresponding decrease in ligature placement accuracy and tightness (illustrating a speed-accuracy trade-off). No other adjacent repetitions had statistically significant differences in any outcome. Training level was statistically significantly associated with faster speeds (adjusted for repetition number) with medical students’ marginal means (41.4s ± 12.6) slower than those of junior (34.9s ± 11.5) and senior residents (27.7s ± 9.0; see figure). Senior residents demonstrated relatively larger decrements in accuracy and tightness when speeding up than did junior residents and medical students (more pronounced speed-accuracy trade-off).

Conclusion: Simple verbal instruction can significantly alter the learning curve for a simulated procedural task. Chronometric pressure pushes trainees out of their comfort zone (i.e., speeded execution exposes areas for improvement in performance). This effect seems particularly salient for senior residents. Impact on retention and transfer requires further investigation.
**Objective:** Junior residents can be apprehensive when starting call because new responsibilities are assumed, and they are called upon in acute situations that they may not yet have encountered in their training. We created a series of simulations and workshops to prepare them with the knowledge and skills to manage these situations with the primary goal of making them more comfortable going on-call.

**Methods:** We facilitated a needs assessment with junior and senior residents to capture concerns, and generate key outcomes and evaluation checklists for the following low-fidelity simulations and workshops: Crisis Resource Management & Code Blue, Difficult Airway, Neuro-induction, Cardiac Anesthesia, and Neuraxial Anesthesia. Five junior residents participated in these sessions receiving personal feedback in a group setting, and completed pre- and post- boot camp questionnaires where they were asked to rate their confidence in 18 areas of competencies used on-call.

**Results:** The pre-boot camp questionnaire revealed interest in learning skills to approach Code Blue’s, traumas, and Out-of-OR intubations. In particular, they wanted to know their role in acute situations, where to find equipment and medications outside the OR, and the appropriate drug and dosages to use. They also wanted an approach to Acute Pain Service (APS) issues, and how to prepare for cardiac and neurosurgery ORs. The post-boot camp questionnaire showed that all participants felt more comfortable, prepared, and confident going on call, and were able to apply their knowledge during actual on-call situations. They felt comfortable having their simulation performance evaluated in front of their peers, liked the personal feedback, and found that watching their peers go through similar scenarios re-enforced their learning. Sessions they would like to see in the future included Ultrasound-guided IV and femoral line insertion, and more content in troubleshooting APS issues. There was a lot of information, and they felt that direction for pre-reading, and handouts afterward would be helpful. Confidence improved on average 28% (range 4% to 56%) in the 18 identified on-call competencies.

**Conclusion:** The boot camp was successful in improving the comfort and confidence of Junior Anesthesia residents starting call responsibilities. The repetitive simulation teaching method was well received.
**E1 - Iterative design and evolution of a Mobile Tele simulation Unit (MTU) for rural and remote training**

Michael H. Parsons (Memorial University, St. John's, NL)

**Objective:** to produce a mobile tele simulation unit (MTU), capable of utilizing tele-health technologies – allowing a mentor to provide efficient and effective real-time instruction from a geographically separated base location. Constrained only by where a data connection can be maintained, the MTU utilizes a rapid deploying inflatable tent to be quickly tele simulation ready.

**Methods:** Utilizing the Ask – FineTune – FollowThrough design methodology, a multidisciplinary team, with medical, engineering, simulation, and teaching experience, developed a common design language. With this, the team is using iterative, cyclical design methods to produce and evaluate an initial prototype of the MTU, with benchmarking outcomes at each step of the process.

**The initial MTU prototype:** Methods of optimal light, temperature and noise level control will be implemented to ensure a comfortable user experience. Cameras, monitors, and microphones facilitate effective two-way communication between the mentor and learners. For prototyping purposes, a chest tube insertion simulation is taught to the learners by the mentor utilizing tele-health technologies. The MTU has many more potential applications and can be tailored to other learning needs both within medicine and in non-medical fields.

**The mentor experience:** Financial and time constraints can prove limiting when connecting a mentor to a remote learner; a physician travelling to rural communities to teach low frequency-high stakes procedures being a driving example. The use of two-way audio-visual communications between the MTU and mentor base location enables otherwise non-available instruction and feedback time to the learners, as the mentor remains working at their base location, only stopping to teach when the MTU is on location and ready.

**The learning experience:** The learners will be able to interact with the mentor, have access to relevant instructional materials, and experience hands-on learning in a supervised environment. With real time instruction and feedback, the MTU aims to provide a comfortable learning environment, comparable to in-person instruction on an equivalent simulator.

The MTU targets a range of learners, from urban students to remote professionals. With data access as the only location constraint, the MTU will provide a comfortable and consistent learning environment for participants anywhere it is deployed.
E2 - A hi-fi simulation-based sedation course improves the performance of non-anesthesiology residents for the management of airway complications, compared with self-learning. A randomized, controlled, single blinded trial
Issam Tanoubi (Université de Montréal, Montréal, QC)

**Background:** Sedation is a depression of consciousness ranging from anxiolysis to something less than general anesthesia. It is used by non-anesthesiologists to facilitate stressful or painful diagnostic tests and minor surgeries. The primary complications of procedural sedation impact the airway and respiratory system. Early diagnosis and adequate management of airway complications may prevent negative outcomes such as hypoxic brain damage or death. We investigated whether a simulation-based sedation course improved the performance of non-anesthesiology residents for the management of airway and respiratory complications during sedation, compared with self-learning.

**Methods:** Thirty-two residents, without prior airway management experience, underwent a pre-test revolving around a HI-FI scenario of a complicated procedural sedation case. Residents were subsequently randomized to either attend an oriented debriefing including a theoretical course and a practical workshop with a low fidelity mannequin (Group E) or to simply view a video on sedation management (group C). A post-test that included a different sedation Hi-Fi scenario with airway complication, was carried out 21 days later. All scenarios were adapted to include realistic elements for all students from the various participating specialties. Resident’s performance was assessed by two evaluators who viewed the recorded scenarios without knowledge of the order in which they were conducted or of the participants’ group. It was rated according to a pre-established performance grid that was developed by simulation experts using the Delphi technique. Repeated measures ANOVA followed by Holm-Sidak post hoc test when appropriate.

**Results:** A significant improvement in performance was noted by both evaluators in group E (Evaluator A: 14,31±2,30 vs 17,00±1,59. Evaluator B: 12,38 ±1,96 vs 14,94±1,48. p<0.0001). A slight performance improvement was also noted in the control group, but this was not statistically significant (Evaluator A: 14,63±1,40 vs 15,81±1,79. Evaluator B: 13,31±2,21 vs 14,75±1,88). There was a significant positive correlation between the results of the evaluators.

**Conclusion:** Our sedation crash course, based mainly on high-fidelity simulation, has allowed non-anesthesiology residents to improve their performance, and provided them with a safe way of managing procedural sedation and related airway and respiratory complications, compared to self-learning.
R10 - From ‘transmission of knowledge’ to ‘integration of knowledge’- secrets from the dirty laundry list of the sim goddess
Vered Gazit; Kathy L. Johnston (Izaak Walton Killam Health Centre, Halifax, NS)

Objective: To ensure that lessons learned during in-situ simulation are translated effectively and in a timely manner into clinical practice.

Methods: Interprofessional in-situ simulation sessions were conducted in a tertiary care women’s and children’s health centre over a 10 year period. The scenarios replicated complex, resource intense “low volume, high risk” events. Quantitative and qualitative data from each session was gathered to evaluate both clinical care of the patient and systems response. A database was constructed, with the goal being to identify trends, system gaps and recurrent themes which affect patient care. By collaborating with the centre-wide cardiac arrest committee, administrative and clinical leaders as well as educators, the simulation program ensured that lessons learned during in-situ simulation are translated effectively and in a timely manner into our clinical practice.

Results: Data was organized into three categories; systems, education and equipment. Systems issues such as inaccessibility of locked units for code teams were identified during a mock code blue. In response, Protection Services issued card access for the code blue team. Education concerns identified in simulation involved lack of knowledge of policy and procedure as well as initial steps of resuscitation and resource management. All orientation programs now have a presentation on code blue response and an education program targeting the first five minutes of emergency response is offered to care area staff. Themes involving equipment were mainly related to availability, location and proper use. For example, it was demonstrated that some resuscitation equipment was not available on all crash carts. This lead to standardization of crash carts in the health centre and improvement to accessibility of emergency equipment in non-patient care areas.

Conclusion: Through in-situ simulation, we were able to identify system gaps and, more importantly, make recommendations for practical solutions to bridge those gaps. We have identified key aspects for successful integration of knowledge including: establishing a multidisciplinary working groups, having administration support, identifying champions in each clinical area to ensure objectives met and recommendations implemented, operating under the mandate of the cardiac arrest committee, and creating annual schedule for in-situ simulation.
R11 - The impact of pre-calculated doses on decreasing medication-prescribing errors during simulated pediatric resuscitations: a randomized experimental simulation trial

Arielle Lévy (Sainte-Justine Hospital University Centre, Montreal, QC); Guylaine Larose; Benoit Bailey; Barbara Cummins-McManus; Denis LeBel; Jocelyn Gravel (Sainte-Justine Hospital University Centre, Montreal, QC)

Objective: To evaluate if a tool providing pre-calculated medication doses decreases rates of prescribing errors (PE) among residents during simulated pediatric resuscitations.

Methods: A crossover randomized experimental trial in a tertiary care hospital simulation centre. Participants were residents rotating in the pediatric emergency department.

Intervention: Book providing pre-calculated medication doses versus card providing mg/kg-dosing formats. Primary outcome: Medication-prescribing errors defined as a drug prescribed in a dose varying by at least 20% from the recommended dose, or by incorrect route. Residents were involved in two sets of paired scenarios during two sessions [anaphylaxis: ampicillin or nuts and cardiac arrest: V-fibrillation or pulseless V-tachycardia]. Participants were their own control and randomized to the book or card and to one of each scenario pairing as their first session and the alternate during the second session. Two trained independent raters used a standardized datasheet containing a list of recommended medication doses to evaluate videotaped scenarios. Primary analysis: Difference in mean medication error proportions between both groups. We estimated that a sample of 40 residents, representing their own control, would be needed to identify a 5% difference medication error proportions between intervention and control groups (range: 10%-5%).

Results: Forty residents prescribed 1507 medications/defibrillations during 160 scenarios. Median numbers of medications prescribed were 8 and 11 for anaphylaxis and cardiac arrest scenarios, respectively. The number of prescribing errors per 100 bolus medications/defibrillations was similar: 5.11 (39/762) versus 7.51 (56/745) for intervention and control groups respectively, a difference of 2.4 (95% CI -0.1, 5.0). PE most commonly involved were epinephrine (n=31), defibrillation (n=17), and fluid bolus (n=7). Thirty-three tenfold errors occurred in 24/160 scenarios [7/80 (8.8%) vs. 17/80 (21.2%) in the intervention and control groups, respectively). Epinephrine was involved in 31/33 tenfold errors. The intervention was highly associated with a lower risk of tenfold error for bolus medications [OR 0.27 (95% CI 0.10, 0.70)].

Conclusion: A tool providing pre-calculated medication doses was not associated with a decrease in PE rates but highly associated with a lower risk of tenfold error for bolus medications. Patient safety may be improved with such a tool during actual pediatric resuscitations.
R12 - Extreme utilization of simulation for system improvement: Using simulation test new healthcare spaces, processes, and identification of latent threats to patient safety
Alyshah Kaba; Mirette M. Dube (Alberta Health Services, Cochrane, AB)

Simulation-based education has been traditionally used for educating health professionals, yet very little has been published in the patient safety and quality improvement literature on how to design and debrief simulation as part of patient safety and large scale system improvement initiatives. In Alberta, the provincial simulation program (eSIM) exists within the largest single health authority in Canada with over 100,000 employees. Its extreme utilization of simulation for patient safety and quality improvement is leading edge. The objective of this presentation is to share examples of these innovations, considerations, methods and best practices on how to design and debrief a simulation to test a) new processes (e.g. guidelines, order sets) b) efficiencies and patient flow; c) identification of hazards and latent patient safety threats and for d) staff orientation to new spaces/clinical process. Adapting evidence-based process improvement methodology from Alberta, the designing and implementation of the simulations include four key standardized steps: 1. defining the opportunity; 2. build understanding; 3. act to improve, which may include multiple testing of Plan, Do, Study, Act (PDSA) cycles; and 4. Sustain

Results: These innovations in simulation are inclusive of multiple interprofessional teams at the unit level, across multiple departments and sites, and many have a provincial scope, requiring mobilizing of extensive physical, human and environmental resources across the province. They are facilitated across a broad spectrum of contexts inclusive of academic teaching centers, both rural and trauma centres, and a mobile simulation program. Examples of scholarly innovations highlighted include commissioning of new spaces, such as the opening of the first interventional trauma operating room, in which the simulation team collaborated with human factors, trauma services and over 30 stakeholder groups. Others include utilization of simulation to test a new provincial order set for ST elevation MI to decrease door to fibrinolysis time; and organ donation after cardiac death simulations to test a new zone wide policy and mock up the workflow and team communication to support donation. These innovative approaches to designing and debriefing simulation, have demonstrated significant patient safety and quality improvement outcomes across our healthcare system in Alberta.
R13 - **Spatial abilities and drawings of objects from haptic perception: effect of working memory**

*Jean Langlois (CIUSSS de l'Estrie – CHUS, Sherbrooke, QC); Yvan Dagenais; Marcel Martin (Université de Sherbrooke, Sherbrooke, QC), Renald Lemieux (CIUSSS de l'Estrie – CHUS, Sherbrooke, QC); Marc Lecourtois (CIUSSS de l'Estrie - CHUS, Sherbrooke, QC); Elizabeth Yetisir (University of Ottawa, Ottawa, ON); Christian Bellemare (CIUSSS de l'Estrie – CHUS, Sherbrooke, QC); Germain Bergeron (CIUSSS de l'Estrie - CHUS, Sherbrooke, QC); Stanley J. Hamstra; George A. Wells (University of Ottawa, Ottawa, ON)*

Vision-based spatial abilities have previously been correlated with a drawing score based on haptic perception of objects. Vision-based spatial abilities have also been inversely correlated with time to perform correct drawings of objects from haptic perception. The objective of the current study was to determine the effect of working memory on drawings of objects from haptic perception. A cohort of 24 medical graduates was enrolled in a prospective study. The experiment was done in a one-month rotation preparing for residency. Eighteen objects constructed from 10 cubes glued together, similar to Shepard and Metzler’s objects, were drawn by participants from haptic perception. Drawings were scored by one judge. Time performance was defined as the time to perform all drawings/number of correct drawing. The maximum score was 18 for drawing score and 420 seconds for time performance. The first and second exercise were done before and within a one-week drawing course, respectively. In the first exercise, object could be touched by participants for up to seven minutes while drawing the object. In the second exercise, 30 seconds were allowed for haptic perception of the object, 15 seconds to memorize, and up to 375 seconds to draw the object without any further haptic access to the object. Descriptive statistics included median (lower and upper quartiles). Wilcoxon signed-rank test was used to compare results between the first and second exercise. The difference between drawing score in first [17 (17, 18)] and second exercise [12 (8, 14)] was statistically significant (p < 0.0001). Similarly, the difference between time performance in first [186 (157, 221) seconds] and second exercise [283 (191, 529) seconds] was statistically significant (p < 0.0001). Decreasing haptic perception while increasing working memory decreased performance on drawings of objects. This finding could be explained by the cognitive load theory. Haptics is involved in handling of anatomical structure and technical skills performance. Our findings on haptic perception and working memory have promising avenues for anatomy and technical skills education in the simulation laboratory.
Poster Presentations | Présentations par affiches
Level 2 lobby | Hall du 2e étage

Viewing | Visionnement
Friday, October 14, 2016 from 07:30 – 18:30 | vendredi le 14 octobre 2016 de 7 h 30 à 18 h 30

Saturday, October 15, 2016 from 07:30 – 16:30 | samedi le 15 octobre 2016 de 7 h 30 à 16 h 30

Facilitated poster session | Séance d’affichage animée:
Presenters will be at their posters to answer questions at the following times | Les presentateurs se rendront à leurs affiches respectives aux heures suivantes afin de répondre aux questions :

Friday, October 14, 2016 from 13:15 – 14:45 | vendredi le 14 octobre 2016 de 13 h 15 à 14 h 45

At the end of this session participants will be able to:
1. describe current research and innovations in simulation-based education
2. network with health professions colleagues engaged in simulation-based research and innovations.

À la fin de cette séance, les participants pourront :
1. décrire les recherches en cours et les innovations en formation par simulation
2. échanger avec des professionnels de la santé qui participent aux recherches en cours et aux innovations en formation par simulation

*Please note: Abstracts are only available in the language in which they will be presented*
P1 - Assessing competence in emergency radiology via an online simulator

Ivan R. Diamond (University of Toronto, Toronto, ON); Linda Probyn; Errol Colakl (University of Toronto, Toronto, ON); Karen Finlay (McMaster University, Hamilton, ON); Eric S.S. Bartlett (University of Toronto, Toronto, ON)

Objective: Traditional assessments in radiology residency focus on the medical expert CanMEDS role and typically rely upon single or limited static images. We designed an emergency radiology simulator that aimed to assess the breadth of competencies required across medical and non-medical expert (intrinsic) roles. Method: An online simulator with typical emergency cases was administered over a four-hour period in October 2015 to PGY2 - five residents in radiology. Participation was mandatory as a formal program assessment, although university REB sanctioned informed consent was obtained for the use of data for research. The simulator included 15 cases with complete scrollable CT and MRI series and five plain film examinations. Preliminary reports were graded for content and style. Assessors were blinded to the identity and PGY level of the resident. The simulation also included assessment of intrinsic roles via prioritization, protocoling, counseling and handover exercises.

Results: 50 (11 PGY2, 18 PGY3, 13 PGY4 and 8 PGY5) residents participated. Two residents were excluded from the analysis – one because of lost data and one who declined consent. Overall medical expert score was lower for the PGY2s (63%) versus the other years PGY3 (74%), PGY4 (79%) and PGY5 (77%) (p < 0.01). The clinical relevance of the reports provided by the PGY2 residents was also lower than for the other years (PGY2 68%, PGY3 74%, PGY4 75%, PGY5 74%; p = 0.001). The levels of residents did not differ substantially in terms of their performance on the handover, protocol or prioritization exercises.

Conclusion: Simulation provides an opportunity to assess radiology resident performance across multiple domains. PGY2 residents performed worse on the medical expert domains, although performance did not differ amongst other skills and intrinsic roles. This suggests that competence in emergency radiology is achieved early in residency, possibly related to the importance placed on learning to manage on-call independently during PGY2. The simulator should be extended to other areas of radiology, in order to assess the ability to discriminate performance for other required skills and subspecialty areas of radiology. The utility of the simulator as a teaching tool also needs to be explored.
P2 - **Self-guided error reduction in simulated diagnostic cerebral angiography**
Oleksiy Zaika; Roy Eagleson; Sandrine de Ribaupierre (University of Western Ontario, London, ON)

Endovascular surgical procedures require visual-spatial coordination in workspaces with restricted motions and temporally limited imaging. The development of the skills needed for these procedures can be facilitated by 3D simulator-based training. Simulation-based medical education has recently started focusing on personalized training in reducing errors, enhancing trans-situational competence and promoting professional transparency. Cerebral angiography (CA) has lagged behind in this training approach due to the lack of validated, realistic training models, relying strictly on clinical case exposure frequency as a means of assessing proficiency. The ANGIO Mentor visual-haptic simulator has been regarded as an effective training tool, increasing performance in diagnostic CA, however, this simulator has not been tested thoroughly in error reduction in CA. In our study, residents and graduate students were given practice diagnostic angiography and were subsequently tested on a right middle cerebral artery aneurysm case, repeating over eight sessions. Participants were also administered a mental rotations test (MRT) and grouped into MRT groups to identify performance differences. We have identified a significant self-guided reduction in spatial errors by the participants over eight sessions. Further investigation revealed a negative change in error frequency that was not correlated to error longevity. This allowed us to categorize vessels that, although less frequent in erroneous access, were creating the most difficulty for the trainee and most potential harm to patients. Assessing MRTs, we found that high MRT individuals performed much better than low MRT individuals at the start of the study, however, both groups plateaued at a similar performance level by the 8th session. These results are significant in the adoption of personalized medical training in this field and identify vascular areas of difficulty that can be addressed by the curriculum. Although it is well understood that simulation training under expert supervision is most effective, we have shown that self-guided training can build appropriate technical and spatial ability in procedural skill development.
P3 - Spatial abilities, anatomy knowledge and technical skills: a systematic review
Jean Langlois (CIUSSS de l’Estrie – CHUS, Sherbrooke, QC); Christian Bellemare (CIUSSS de l’Estrie-CHUS, Sherbrooke, QC); Josée Toulouse (Université de Sherbrooke, Sherbrooke, QC); George A. Wells (University of Ottawa, Ottawa, ON)

Spatial abilities consist of visualization, orientation and manipulation of structures in space. The relationship between spatial abilities, anatomy knowledge and technical skills was conceptually viewed as a triangle. Spatial abilities have been correlated to anatomy knowledge assessment using practical examination, 3D-synthesis from 2D-views, and cross-sections in a systematic review. Spatial abilities have also been correlated to technical skills performance in beginners and intermediate learners in a systematic review. The objective was to conduct a systematic review of the relationship between anatomy knowledge and technical skills as related to spatial abilities. Search criteria included ‘spatial abilities’, ‘anatomy knowledge’ and ‘technical skills’. Keywords related to these criteria were defined. A literature search was done up to December 31, 2014 in Scopus (including Medline) and in several databases on OvidSP and EBSCOhost platforms. A bank of citations was obtained and was reviewed by two independent investigators. Citations related to abstracts, literature reviews, theses and books were excluded. Articles related to retained citations were obtained and a final list of articles was done. Methodology of articles was assessed for quality using Scottish Intercollegiate Guidelines Network-50 (SIGN-50) assessment instrument. Methods relating spatial abilities test, anatomy knowledge assessment and technical skills performance were identified. A series of 106 articles was obtained. One additional article was identified through other source. A series of 53 articles was identified after duplicates were removed. Forty-nine articles were then excluded. Four articles were retained, fully reviewed, and excluded with reasons, yielding no eligible articles. No eligible articles were found in a systematic review on spatial abilities, anatomy knowledge and technical skills. Future studies will be required to assess the importance of anatomy knowledge before performing a technical skill as related to spatial abilities in the simulation laboratory.
P4 - **Clear speech technique: communication and learning in a simulated patient handoff**
Matthew J. Miné-Goldring; Michael John J. Bautista; Noel O'Regan; Roberta DiDonato
(Memorial University of Newfoundland, St. John's, NL)

Recent mandated shortened work hours for medical residents has increased the frequency of patient handoffs. Compared to clear speech technique in adverse listening conditions, conversational speech has been demonstrated to be less intelligible. Individuals learn and remember less when listening to non-clear speech. What is less well understood is whether the medical learners' learning and memory of critical information during a handoff in adverse listening conditions is sufficient or whether it is impaired in the noisy hospital environment. The objective of this research is to determine if clear speech technique demonstrates improved quality of communication during patient handoffs. The secondary objective is to quantify the improvement in understanding and learning efficiency, knowledge retention, and the ability to perform in a critical event due to clear speech compared to conversational speech in adverse listening conditions. We examined anesthesia residents' learning, memory, and performance during critical incident management in a simulated handoff. Participants listened to two handoffs in two listening conditions, one in clear speech and one in conversational speech, then reported the pertinent information that they were able to recall and indicate a management plan. Outcome measures were the accuracy of recall, time to determine a treatment plan and appropriateness of the plan. Data collection is currently underway. The initial analysis of the data collected to date suggests an experience-dependent learning and memory enhancement when participants experienced the clear speech listening simulation prior to the conversational speech listening simulation. There is a smaller overall difference in the memory performances of the group that had the clear-conversational order than the group that had the conversational-clear order of the experiment. The preliminary findings to date are highly suggestive that if clear speech is used in a handoff situation there is potential for better experience-dependent learning of the speaker, promoting more rapid comprehension and better recall of the message. Further data is currently being collected and analyzed to determine how the participants' individual variability in their cognitive-linguistic functioning may influence comprehension-recall and integration of knowledge during this simulated hand-off. These results and potential implications for simulation learning will be discussed.
P5 - Personalized video feedback improves novice surgical trainees’ laparoscopic knot tying skills
Whitney Thompson (Mayo Clinic, Rochester, MN, USA); Eduardo Abbott; Benjamin Zendejas; T.K. Pandian; David Farley (Mayo Clinic, Rochester, MN, USA); David A. Cook (Mayo Clinic College of Medicine, Rochester, MN, USA)

The objective of this study was to compare the effectiveness of personalized feedback versus generic skill instructions, both delivered using a short video clip, on novice surgical trainees’ laparoscopic knot tying skills. Novice general surgery interns and research fellows completed a timed and video recorded attempt (Performance 1) to tie three laparoscopic intracorporeal knots in an FLS-certified task trainer. Participants were then randomized to receive by email either an expert video (EV) modeling the task or personalized video feedback (PVF) of their own test with voiceover from a blinded senior surgeon. Three additional tests (Performances 2, 3, 4) were administered at one-month intervals, each followed by an EV or PVF video. Following Performance 3, the groups crossed over and received the opposite video format, after which they completed Performance 4. At each test session, participants completed the NASA-TLX to assess perceived workload. To evaluate the overall effectiveness of repeated training, scores from the same knot-tying task, completed as part of their routine surgical training two months prior to Performance 1 (baseline) and one month after Performance 4 (retention) were compared against historical controls. The historical controls were surgical trainees from three previous years who had been assessed on the same task at the same stage of training. 21 trainees completed the study. The change of consecutive test mean performance scores was always positive for PVF, but varied widely for EV. Mean performance scores were significantly higher for the PVF group (Mean diff. = 23.1 [PVF-EV], 95% CI: 0.5 to 45.6, p<0.05) and the mean NASA-TLX score was significantly lower (Mean diff. = -3.0, 95% CI: -5.8 to -0.3, p<0.05), indicating better performance and lower workload for those receiving PVF. Participants involved in this study had a significantly higher mean knot tying score (range 1=lowest, 10=highest) during the retention test compared with historical controls (Mean diff. = 1.5, 95% CI: 0.2 to 2.8, p=0.02). Personalized feedback delivered via video has a positive impact on novice trainees’ laparoscopic intracorporeal knot tying performance and perceived workload compared with a non-personalized instructional video. Brief monthly practice sessions support skill retention.
P6 - The national simulation movement in medical laboratory science programs
Laura Zychla; Christine Nielsen (Canadian Society for Medical Laboratory Science, Hamilton, ON)

Canada is facing a serious shortage of medical laboratory professionals (Medical Laboratory Technologists and Medical Laboratory Assistants/Technicians). Academic programs cannot increase seats without corresponding clinical placements, making this a bottleneck in the system. These spots are scarce due to staffing shortages, crushing workloads and lack of dedicated education personnel. For Phase 1a, the project purpose was to examine the structure and usage of simulation in relation to clinical placements within Canadian medical laboratory science programs. This was achieved through an environmental scan and surveying recent graduates on their student experience during clinical practicum. Overall, simulation is a supported and incorporated component of medical laboratory science programs; however, there is a lack of standardization in its definition and use nationally. The environmental scan highlighted the limited quantity and potential impact of current human health resource and fiscal constraints on quality of clinical placements across Canada. There is growing simulation usage to enhance curricula but there is a need for national consensus on the direction it should take and the replacement amount. Budgetary constraints and the lack of information exchange are hampering simulation incorporation into curricula. Profession specific evidence based research will help support such goals and provide the basis for business cases to evolve education models. The recent graduate survey demonstrated their general satisfaction for clinical placement preparedness training, the placement’s training for technical skills, and the ability to practice skills on quality equipment. Graduates were less satisfied with the safety experience, indicating an area for further review. The data reflects the human health resource shortages, the increased stress and burnout associated with new staffing and workload models, and added complexity of monitoring students during restrained times. The results were discussed at a National Forum (Phase 1b) that brought together key stakeholders and experts in the field to derive a national understanding of these education models, define simulation in relation to the profession, identify the barriers and potential solutions for increasing simulation usage, and to determine program needs for achieving solution goals. The project is proposed to continue discussions with employers (Phase 2) and conduct simulation model research (Phase 3).
Objective: The impact of step stool use and provider height on cardiopulmonary resuscitation (CPR) quality in pediatric cardiac arrest has not been quantified. We aimed to describe the association between step stool use and CPR quality in pediatric providers. We also sought to describe the association between provider functional height (i.e., height + step stool - bed height) and CPR quality, and to determine if Just-in-Time CPR training or real-time CPR feedback attenuate the effect of height on CPR quality.

Methods: We conducted secondary analyses of data collected from three arms of a multi-centre randomized controlled trial of simulated cardiac arrests. CPR-certified pediatric healthcare providers were equally randomized to either: (1) No intervention; (2) Real-time CPR visual feedback (during cardiac arrest); and (3) Just-in-Time CPR training study arms. Decision to use of a step stool during scenario was left up to the participants. Height of each participant was obtained from demographic forms. One video reviewer was trained to identify 30-second epochs for individual participants and step stool use. Epochs were excluded from analysis if two participants provided CPR. We explore the association between 1) Step stool use and quality of CPR in different gender and height groups; 2) functional height and CPR quality in different study arms and 3) interaction between study arm and functional height on CPR quality.

Results: One hundred twenty-four subjects (72% females) participated, with 1,230 30-second epochs of CPR analyzed. Step stool use was associated with improved compression depth in below (female, \(p=0.007\); male, \(p<0.001\)) and above (female, \(p=0.001\); male, \(p<0.001\)) average height providers. There is an association between functional height and compression depth (\(p<0.001\)). After adjusting for gender and step stool use, the use of visual feedback was found to attenuate the effect of height on compression depth (\(p = 0.025\)).

Conclusion: Increased provider functional height is associated with improved compression depth, with visual feedback attenuating this effect. Use of a step stool by CPR providers is associated with a clinically significant improvement in CC depth during simulated pediatric cardiac arrest.
**P8 - Uptake of cognitive aids in simulated paediatric operating room emergencies**

Asad Siddiqui (University of Toronto, Toronto, ON); Elaine Ng (The Hospital for Sick Children, Toronto, ON); Tobias Everett (The Hospital for Sick Children, University of Toronto, Toronto, ON)

The first goal of this study is to describe and enhance the uptake of cognitive aids in simulated paediatric operating room emergencies. The second goal of this study is to assess the impact of cognitive aids on the performance of anaesthesia trainees in simulated paediatric crises. REB approval was attained from the local institution. A randomized, 2 x 2 factorial design was used. The first randomization was whether the Society for Paediatric Anaesthesia Critical Event Checklist (SPA CEC) was available to the participant during the simulations. The second randomization was the mode of orientation (e-module vs. didactic). Participants were randomly assigned scenarios from the Managing Emergencies in Paediatric Anaesthesia (MEPA) simulation database. The utilization of a cognitive aid was recorded. The simulations were videotaped and will be rated by two paediatric anesthesiologists using the MEPA scenario specific checklist and global rating scale. 80 simulation scenarios were conducted. Results demonstrate that in 16.7% of scenarios, residents used a cognitive aid. There was no significant difference in uptake of cognitive aids between the orientation groups (p=0.494) or based on physical availability of the cognitive aids (p=0.97). However, the type of simulation scenario that participants were exposed to impacted the uptake of cognitive aids. Of the seven MEPA scenarios, 38.7% of participants used a cognitive aid in a diagnosis-based event (Malignant Hyperthermia, Local Anaesthetic Toxicity & Anaphylaxis) while only 2% of participants used a cognitive aid in a problem-based event (Hypovolemia, Equipment Failure, Laryngospasm, Loss of Airway) (p<0.01). There was no difference in cognitive aid uptake based on orientation style and was low in both groups. However, results suggest that uptake of cognitive aids is dependent on the type of event. Uptake is significantly greater in the diagnosis-based critical events as opposed to the problem-based critical events. The importance of this is that it demonstrates that cognitive aids are not a substitute for clinical reasoning or judgment, but are best reserved as a list of desirable actions when there is minimal diagnostic uncertainty. This lends insight towards the type of critical events for which cognitive aids should be developed (diagnosis-based critical events).
P9 - An interprofessional simulation-based workshop to improve the end of life conversations with families of potential donors in the intensive care unit (ICU)
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**Objective:** Improve the approach made to the families of potential organ donors in the ICU. Pilot project to design, develop and implement an interprofessional workshop for ICU healthcare professionals to ensure a well planned approach to end of life (EOL) and organ donation conversations.

**Needs assessment:** A literature review identified the main barriers for consent to organ donation. A survey to detect learning needs was then developed and applied to the target population. The areas to improve were: a) understanding of the organ donation process; b) enhance interpersonal skills to approach the potential donors’ family; c) develop a sensitive and compassionate family centered approach to EOL and organ donation discussions, and d) support the patient’s family before, during and after donation discussions. Teaching strategies and curriculum development: Two faculty members and two nurses with expertise in EOL, organ donation and healthcare education developed a 4-hour workshop curriculum comprising: (1) preparatory activities; (2) interactive sessions, (3) a sequence of 3 encounters with simulated family members followed by (4) a structured debriefing after each encounter. Assessment: We developed a simulation evaluation form to guide the debriefing process. We assessed learner satisfaction and perception of self-efficacy after the workshop.

**Results:** Nineteen ICU nurses and 20 residents rotating in the ICU agreed to participate in this workshop, representing 15% of our target population. This project was considered as a quality improvement initiative and therefore no informed consent was required. Eighty percent of the participants were satisfied with the workshop. Eighty percent agreed with the objectives, teaching materials and the chosen teaching strategies. The participants highlighted the interprofessional nature of the workshop and the relevance of the simulation activities to enhance interpersonal skills as strengths of the workshop. They were keen to participate in similar activities in the future (100%) and to recommend the workshop to their peers (100%). They also felt better prepared to participate in EOL and organ donation conversations.

**Conclusion:** The designed workshop addressed the target population learning needs and was highly accepted. Feedback will be used to improve the workshop. It will be offered at a larger scale in our centre.
P10 - **Alleviating pre-operative anxiety through patient education with innovative 3D immersive virtual reality – an RCT (work in progress)**

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The prevalence of pre-operative anxiety is estimated as being as high as 80% in surgical populations. Perioperative clinical trials have revealed that pre-operative anxiety is associated with reduced short-term postoperative recovery, poor functional outcomes, increased pain scores, wound infections, increased length of stay and even mortality. The greatest anxiety has been linked with the fear of the unknown, specifically the process of physically being taken to the operating room. Strategies including implementation of the pre-anesthetic clinic (PAC), the use of videos of what to expect leading up to surgery, calming music, and pharmacological treatments have been costly or with mixed effects. Virtual reality (VR) technology presents a new educational opportunity for patients in an effort to reduce pre-operative anxiety. Through immersive 3D simulation, patients ‘experience’ the journey of being prepped for surgery and transferred to the OR. Patients can learn about their pre-operative experience in an engaging/active manner by having the perception of being physically present in the pre-operative experience days prior to their procedure. Thus, we have constructed and are evaluating an immersive 3D simulation to educate patients about the pre-operative experience, to investigate whether A) immersive 3D VR video can reduce pre-operative anxiety, and B) how this approach compares to current practice of viewing traditional educational videos. One hundred patients are currently being recruited for this study during their visit to the PAC and equally randomized to two groups: 1) watching a traditional video on a television screen OR 2) viewing an immersive 3D VR simulation using Oculus Rift(c) goggles. Anxiety levels are assessed during their PAC appointment and the day of surgery using the validated Visual Analog Anxiety Scale (VAS). For the immersive 3D simulation group, the change in VAS scores pre and post 3D video use will be assessed using a paired t-test. To answer our second question of how this approach compares to current practice of viewing traditional educational videos already in use the mean VAS scores will be compared between the two groups using a two sample two sided t-test. Secondary measures such heart rate and mean arterial blood pressure are also being analyzed alongside VAS.
P11 - Development and validation of instruments to assess forethought and performance in anesthesiologists in a simulated intra-operative massive transfusion scenario: a psychometric study
Maya Contreras (St. Michael's Hospital, Toronto, ON); Claire Burrows; Katerina P glamorous (St. Michael's Hospital, Toronto, ON); Maria Rasmussen (University of Copenhagen, Copenhagen, Denmark); Martin Tolsgaard (University Hospital Rigshospitalet, Copenhagen, Denmark); Rohan Pandey (Allan Waters Family Simulation Centre, Toronto, ON); Charlotte Ringsted (Aarhus University, Aarhus, Denmark)

Background: Efficient management of medical emergencies requires expert performance from clinicians. High quality self-regulation (SR) is central to expertise. Substantial evidence attest that individuals who express more specific goals, plans, and possess higher level of self-efficacy during the forethought phase of SR perform better in various academic and non-academic domains. However, it is unknown how physicians self-regulate in the clinical environment. Our aim was to develop and validate measurement tools to assess forethought and performance in a simulated massive transfusion scenario.

Methods: REB approval was obtained. Six anesthesiologists participated in the exploratory (staff=3, PGY5=1, PGY2=2) n order to develop the measurement tools. Subsequently, 18 anesthesiologists participated in the validation study (staff=6, PGY5=6, PGY2=6). Each participant filled out a demographic questionnaire and subsequently was randomized to either receiving an open ended question (Group A) or probing questions (Group B). Participants were then prompted about a trauma scenario with potential risk for massive hemorrhage and were instructed to report their forethought. Subsequently, participants were asked to manage a simulated scenario and were debriefed at the end of the session. We used Messick’s validity framework to collect evidence for interpretation of scores for forethought. Content evidence was supported by expert review and qualitative data from the exploratory study. Internal structure evidence was supported by inter-rater reliability (Intra-class correlation (ICC)) and internal consistency (Cronbach’s alpha, inter-item correlation). Relation to other variables included level of expertise and performance. Two independent and blinded raters evaluated the interviews.

Results: Average clinical experience for staff was 11 years, 6.6 years for PGY5, and 10.5 months for PGY2 residents. All participants had simulation experience before the study. Overall internal consistency of forethought scores was 0.904, overall absolute agreement was 0.877. Internal consistency determined by Cronbach’s α was very strong (0.904), correlation between individual items and GRS were acceptable (range: 0.31-0.91).

Conclusion: Initial evidence supports the validity of scores on forethought in anesthesiologists. Relation to other variables and performance as well as validation process for task-specific performance tool are under evaluation.
P12 - **Bridging the gap – defining objectives for a high stakes general pediatric simulation curriculum**

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**Introduction:** Graduating paediatricians must obtain critical skills to manage acutely ill children. Training programs are building simulation into their curriculum to ensure safe and adequate exposure to these skills. Determining which objectives are best taught using simulation and will impact clinical learning the most, is crucial to optimize this educational strategy and improve residents’ skills in challenging cases they will encounter in practice. We engaged educators in a two phase study to identify objectives to include in a general pediatric residency simulation curriculum.

**Methods:** Phase 1 used the Delphi Method to survey 25 simulation experts. They rated all paediatric training objectives for their suitability in a simulation curriculum. Retained objectives were used in Phase 2 to survey paediatric content experts who rated clinical frequency, management impact and confidence for each of the objectives retained after Delphi consensus, in order to understand their relative clinical importance.

**Results:** Eighty percent of participants reached consensus after three rounds of the Phase 1 Delphi, with 134 / 240 objectives being kept. Phase 2 had a 49% response rate, including representation of every Canadian centre. Inter Class correlations, cluster and sub group analyses combined results from the two phases, identifying 24 medical expert, 11 skills and 5 Crisis Resource Management objectives to be included in the final curriculum.

**Conclusion:** This multi-modal research design applies to other programs who wish to combine simulation, content and stakeholder expertise to address critical, clinically relevant knowledge gaps with simulation curriculum.
P13 - How much is enough? The ability of medical students to perceive technical proficiency in suturing skill acquisition
Heather McCarthy (Memorial University, Faculty of Medicine, St. John’s, NL); Duane Button (Department of Human Kinetics and Recreation, Memorial University, St. John's, NL); Peter Rogers (Department of Emergency Medicine, Memorial University, St. John's, NL); Adam Dubrowski (Divisions of Emergency Medicine and Pediatrics, Memorial University, St. John's, NL)

Introduction: Most simulation programs follow a time based practice schedule. One alternative is proficiency based training (PBT). We are proposing to test a version of PBT that relies on the trainees’ ability to identify when they reach proficiency (self-PBT). The aim of this study was to test whether self-PBT is a feasible approach for the acquisition of basic surgical skills such as suturing by novice learners.

Methods: 4 students watched a video of suturing technique. They were randomly assigned to one of two groups (N=12). Participants in self-PBT group, practiced until they perceived that they reached proficiency at the skill, and those in the control group completed ten attempts regardless of the perceived proficiency. Their first and last trials were considered pre- and post-tests, respectively and all returned after 1-week to perform a retention test.

Results: Participants in the self-PBT and control groups reached the same skill proficiency, as assessed by experts (p=.490). However, for both groups the pre-test scores were significantly (p < .001) lower than the post-test and retention-tests, and the post-test and retention test did not differ (p=.734). Even though the participants in the control group practiced significantly longer (p = .045) than the self-PBT (10 versus 6 trails, respectively), they were less proficient at the end of practice (p=.02). The perceptions of proficiency did not differ between groups on the pre- and retention tests (p=.086, p=.80). The analysis of acquisition curves slopes in the initial six trials showed that control group had a significantly “flatter” curve (p<.01).

Conclusion: Students in self-PBT group reached perceived proficiency sooner than those in the control group, while showing the same improvement and retention. Self-PBT training required less attempts to reach proficiency. Thus self-PBT training may result in savings in time, cost, and equipment. One possible mechanism for this observation is that in the time based practice the learners pace their learning over the anticipated learning duration, rather than optimally improving on every practice trial.
P14 - The iterative design and revision of an emergency medicine simulation book to meet the needs of a broader simulation-based medical education audience

Michael H. Parsons; Megan Pollard (Memorial University, St. John's, NL)

Objective: To use feedback from a range of local simulation users to inform the iterative revision of our emergency medicine simulation book and make the document more applicable to a wider audience. Methods: The initial version of the Emergency Medicine simulation book was tailored to meet the needs of our local EM program and drew on the knowledge and experience of individuals involved directly with the program. Input was collected from faculty, students and staff at our center. Faculty simulation training background helped in the review and selection of materials on simulation theory and debriefing. Core EM resources were used to address procedural training topics. A focused listing of relevant literature and simulation resources was organized and included for further reading and exploration of the topics. To inform the next round of edits for the book, an anonymous online survey was designed for distribution to a broader group of local simulation users. Potential participants include simulation lab staff, medical students, residents, faculty and staff. To try and collect a more diverse view of the value of the document, individuals from academic and clinical areas other than Emergency Medicine will be included. The survey-based feedback will include participant views on the content, design and general features of the document. The general format of the survey design was to focus ideas in the “start, stop, continue, change” context to allow clear interpretation of what direction participants thought should be taken with revisions.

Results: Feedback from the online survey will be compiled, reviewed and used to direct the revision and further development of the simulation document. Certain core features will be maintained to ensure that the initial focus for our EM trainees is not lost. Based on feedback focused revisions will aim to meet the needs of a broader audience, make the document more widely relevant and more focused and comprehensive for all who choose to use it.

Conclusion: We describe execution of an iterative design process, using input from a variety of simulation users, to further develop a concise simulation resource that can be of value in our local simulation environment.
P15 - **Role of a novel Internet feedback instrument in a new age of simulation training: a randomized control study**

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Simulation for the acquisition of surgical skills is expensive, requires considerable faculty time commitment, and is subject to scheduling conflicts. To circumvent these constraints we investigated the effectiveness of Computer-Based Video Training (CBVT) supported by a novel Internet Mediated Feedback Assessment (IMFA) model.

**Methods:** This was a 3-arm, randomized transfer design study. Medical students (N=42) learned knot tying and suturing via a CBVT module. After the 30-minute CBVT based practice all participants performed a pre-test trial consisting of unsupervised knot tying and suturing. The pre-test trial was videotaped and uploaded to a secure server via Observational Practice and Educational Networking (OPEN) Internet site. Participants were randomly assigned to one of the three experimental groups: Control, IMFA-Peer Feedback, or IMFA-Peer and Expert Feedback. All performed a two-week retention test.

Results: Validated global rating scales showed no significant differences at the initial pre-test between on either the knot tying (p=0.9) or suturing (p=0.8) tasks. Participants in the IMFA-Peer and Expert Feedback group retained more skills than participants in the Control, IMFA-Peer Feedback groups (suturing, p=0.001; knot tying, p=0.001).

**Discussion:** This study shows that personalizing practice schedules in accordance with key principles of self-directed learning needs to be supplemented with an expert feedback in order for surgical skills to be optimally retained in the community of learners.
P16- Teaching to learn: does teaching the FAST exam to high school students enhance learning among medical students?

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The objective of this study was to determine if medical students’ knowledge and technical performance of a FAST (Focused Assessment with Sonography for Trauma) exam could be enhanced by teaching high school students how to perform this exam.

Twenty-three 1st through 4th year medical students (MS) completed a pre-test comprised of two parts: (1) five question quiz (5 total points) and (2) FAST exam (25 total points) on a standardized patient. Following the pre-test, general surgical residents taught MS for 90 minutes using both lecture and hands-on simulation. The MS immediately completed a post-test (PT 1), which was identical to the pre-test. Four weeks later, eight of the MS taught 120 high school students (HS) how to perform a FAST exam. The MS taught independently, with no oversight given. MS who did not teach HS received a video link which outlined the FAST exam diagnostic steps. Eight weeks after the pre-test, MS participants completed a second post-test (PT 2) which was identical to the pre-test. Scores between MS who taught HS and those who did not were compared.

Fifteen MS completed the pre-test and both post-tests; of these, six taught HS and nine received the instructional videos. Overall, there was significant improvement from the pre-test to PT 1 both with the quiz (mean score improved from 2.3 to 4.9, p<.001) and FAST exam (mean score improved from 6.5 to 21.3, p<.001). However, both scores decreased from PT 1 to PT 2 (mean quiz score 4.9 to 4 and mean FAST score 21.3 to 12; p≤.001). MS who taught HS scored higher on the FAST exam technique portion of PT 2 compared to MS who received instructional videos (17.5 and 8.3, respectively; p=.01).

Allowing medical students to give hands-on teaching of medical information or the actual skill of a FAST exam to high school students improves MS long term retention compared with receipt of video-based instruction. Skill and knowledge decay did occur with both groups over 8 weeks of time. Hands-on learning with sequential exposure remains a powerful educational format for long term retention.
We evaluated a novel debriefing technique that combines face-to-face debriefing immediately after a simulation scenario with a delayed period of self-reflection using an online video of the learner's performance compared to face-to-face debriefing alone. The aim is to determine if allowing learners to review the recording and self-reflect on their own time and environment provides added benefits than face-to-face debriefing alone. This approach may also represent a debriefing method that requires less time debriefing in the simulation centre and therefore may be more time and cost-effective. Pediatric residents were randomly stratified into two groups. Each participant led a seven-minute simulation followed by a standardized ten-minute face-to-face debriefing. The control group received no further debriefing and the intervention group was given access to a recording of their performance. Each group returned six months later for a post-test. Videos of each performance were scored by an expert evaluator who was blinded to the level of training of the resident and to the pre/post test status of the video. One evaluator was used in order to reduce inter-rater variability. The improvement in performance of technical and non-technical skills between control and intervention groups was compared. After the post-test, each learner completed a self-evaluation using the same global assessment tool, which was then compared to expert evaluations as a secondary outcome. In addition, surveys were administered before the pre-test and after the post-test. The surveys contained questions aimed to gauge resident opinions on the utility of simulation in pediatrics, as well as on the use of self-reflection, video and web based collaborative debriefing in simulation. Opinions expressed in the surveys were compared between and within groups in order to assess the perceived effectiveness of the combined debriefing technique. We hypothesized that the intervention group would show greater improvement in technical and non-technical skills, that self-evaluations would be similar to that of the expert evaluator and that learners in the intervention group would be more likely to perceive the combined method as a beneficial means of debriefing.
P18 - A High Fidelity Interprofessional Education Mock Code Module for Senior Nursing and Medicine Students

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Integrating high fidelity interprofessional education (HF-IPE) into nursing and medicine education could bring students and faculty together in a teaching and learning environment that would nurture the development of effective health care teams. This is especially important when students are caring for patients experiencing a crisis event. The purpose of this project was to pilot test a new and innovative teaching and learning experience for senior nursing students and medical residents. This paper discusses the design and implementation of an innovative HF-IPE Mock Code Module for senior nursing and medical students, and a pilot project that assessed the impact of participation on students’ knowledge of the role of the team members, teamwork behaviors and satisfaction with the teaching and learning approach. A pre-test, post-test research design was used in this project. One team of nursing (n=6) and medicinal residents (n=2) students participated in the module. Knowledge was assessed pre and post participation; team behaviors were assessed during the simulation, and student satisfaction was assessed after participation. This group of senior nursing and medical students already had a high level of knowledge about teamwork, which did not change after participation in the module. During the simulation the team exhibited a variety of team behaviors including coordination, situational awareness, cooperation and communication. After participation all of the students agreed or strongly agreed that they were satisfied with the experience and their understanding of their role as well as the role and expertise of other members of the team was enhanced. HF-IPE could help to build a culture of patient safety and quality care by providing opportunities for students to learn how to be an effective member of the health care team, but further research is warranted to assess the short and long term impact of HF-IPE on teamwork, collaboration and communication and how to integrate HF-IPE into the curriculum.
P19 - **Objective Structured Assessment of normal vaginal Delivery Skill (OSADS)**  
Katrina E. Zefkic; Krisztina Bajzak; Donna Hutchens; Atamjit Gil (Memorial University, St. John’s, NL, Canada)

**Introduction:** In light of competency based education, objective assessment of technical skills is becoming increasingly important in the evaluation of medical trainees. It is also desirable for trainees to practice their skills on simulators prior to refining and learning judgment through experience in the clinical setting. For simulation to be effective, the learner needs timely and objective feedback. Objective assessment tools for evaluation of trainee performance of other surgical procedures have already been developed. However, no such tool exists for performance of normal vaginal delivery (NVD).

**Objectives:** To develop a structured objective assessment tool for evaluation of performance of a normal vaginal delivery. Also, to obtain data from this pilot study to determine the sample size necessary to demonstrate construct validity.

**Methods:** After obtaining local ethics board approval, a checklist of the 7 steps required for performance of an NVD was developed. Feedback was obtained from experienced obstetricians and the tool revised accordingly. 10 junior trainees (medical students, PGY-1 obstetrical and family medicine residents and PGY-2 obstetrical residents) and 10 senior trainees (PGY3 to 5 obstetrical residents) completed one normal vaginal delivery each at the Labour and Delivery unit in the Health Sciences Centre, St. John’s, NL. Participants’ performance was scored by one of two experts, a senior resident and an attending Obstetrician, using the OSADS.

**Results:** The proportion of “competent” scores was 0.7. Using the “kappa statistic” published by Wright in 2005, a null $\kappa=0.6$, $\kappa$ to detect $=0.9$ and a power of 80%, the sample size of 66 observations per group (novice and expert) was calculated.

**Conclusions:** Face and Content validity of the OSADS was demonstrated. The data required to calculate a sample size to demonstrate construct validity of the OSADS was obtained. Application and construct validity testing of the OSADS is feasible.
P20 - **SPIRALS: A new cognitive approach to teaching and learning clinical reasoning in Emergency Medicine**  
Tia Renouf; Lisa Fleet; Megan Pollard; Megan Morrison; Desmond Whalen; Adam Dubrowski (Memorial University of Newfoundland, St. John's, NL, Canada)

Our objective is to develop a simulation curriculum, through a series of phases, to teach medical students a new cognitive approach to assessing and treating patients in the emergency department (ED).

Clerks are expected to follow their patients over time in the ED, however, they are not taught to do this appropriately for this fast-paced department. We developed a new cognitive approach: SPIRALS (Sick, Pain, Investigate, Resuscitate, Assess Again, LeaveS ED, where the end spirals back to the first “S”). SPIRALS is a non-linear cognitive reasoning tool for teaching ED undergraduates, that may improve teaching efficiency (thereby reducing wait times), and patient outcomes.

**This project involves 3 phases:**

**Phase 1:** Naturalistic observation of ED physicians to ascertain if they exhibit SPIRALS behaviours.

**Phase 2:** Two groups of ED physicians/clerks will be asked to design SPIRALS teaching materials for both simulation and didactic teaching, resulting in two equivalent teaching methods that employ SPIRALS principles.

**Phase 3:** A three-group RCT in which 2nd year medical students will be taught SPIRALS in one of 3-ways (didactic, simulated or both) and then complete a retention test involving a single, novel simulated encounter in a simulated ED.

Pre/post-knowledge, confidence, and skills assessments will be given to participants. Performance will be evaluated to determine the best method of instruction for a SPIRALS curriculum.

We anticipate that simulated teaching of SPIRALS will result in better learning and higher ratings in terms of student knowledge, skills and attitudes. If feasible and practical, we will develop a simulation curriculum that can be used by educators in a wide variety of settings to teach the SPIRALS approach.

SPIRALS will produce more confident clerks who are well prepared to enter the ED. SPIRALS will also enhance the teaching and learning experience for learners and educators by providing engaging learning experiences that enhance students’ knowledge and confidence. SPIRALS will facilitate critical thinking, as it will teach clerks a new clinical reasoning approach to unpredictable ED patients. Finally, SPIRALS can support students’ interdisciplinary collaborations, it’s a type of clinical reasoning that could apply to allied health professions like paramedicine, nursing, and respiratory therapy.
**P21 – The Development and Refinement of a High-Fidelity Surgical Phantom for Examining Torso Exsanguination in Weightlessness and Difficult Oceanic Conditions**

Anthony J. Laporta; A.W. Kirkpatrick; Renaldo Rapada; T. Hoang; E. Pierce; J. McKee; A. Skinner; R. Franciose; C. Ball; Vivian McAlister; A. Beck; P. McBeth, D. King

**Introduction:** Exsanguination is the leading preventable cause in traumatic death, a risk for civilians, soldiers, sailors and astronauts alike. Immediate intervention is mandatory. Learners and practicing clinicians rarely can rehearse such techniques. Space adventure, difficult sea states, and austere environments all have similar identifiable problems including the need for hemorrhage control by non-surgeons in and outside of the body cavity.

**Methods:** The visceral compartment of the human worn partial task surgical simulator (Cut-suit) was contained within a custom-made, sealable surgical “bathtub” on board both a small National Research Council of Canada jet and a multiple sea state trainer from the United States Navy. Six Laparoscopic and ten open abdominal procedures were performed on parabolas of 25 seconds each in weightlessness. Thirteen parabolas were allowed to complete each laparotomy in microgravity.

A new class of naval vessel designed for “shallow water” littoral combat was simulated at the US Navy NSWC PCD Bio dynamics Laboratory. 36 procedures were performed at calm sea, sea state 3, and sea state 4.

**Results:** Blood loss was easily measured by the delivery system thus easily telling the effectiveness of the trainer and simulation platforms. At simulated sea, there was no statistical difference identified between the twelve procedures at calm seas versus either sea state 3 or 4. Sea state roughness did not alter the ability to perform hepatic hemorrhage control. In parabolic microgravity, all open damage control laparotomies were performed in the allotted time. All laparoscopic injection procedures were similarly completed in weightlessness in the allotted time.

**Conclusion:** Previous conclusions that surgery is not possible at any sea state other than sea state 1 are not supported. The results of this study have generated a 21-day at sea study to continue this research. A previously reported study with this trainer has shown effectiveness in remote training. All damage control surgery was completed in microgravity with data available by meeting date. It is now time to combine the remote training capabilities with non-surgeons to determine if non-surgeons can truly become proficient at damage control. This surgical phantom created a training/research tool to further studies of torso exsanguination.
**P22 - Effect of High Deck Accelerations on Surgical Tasks at Sea**

Anthony J. Laporta; T. Hoang; Renaldo Rapada; Bryce Harmon; E. Pierce; T. Polk; M. Pena; M. Johnston; T. Platz; A. Skinner;

**Introduction:** Our objective was to quantify the ability of medical personnel to perform critical surgical procedures onboard non-traditional U.S. Navy warships during high sea states. Six different surgical teams conducted 144 procedures. During the procedures, participants were alternatively exposed to motion conditions similar to those found aboard USS Freedom (LCS 1) while traveling at twenty knots in Sea State 3 and aboard USNS Spearhead (EPF 1) while traveling at fifteen knots in Sea State 4.

**Methods:** Four procedures based on 10 years of war were chosen. These included hepatic hemorrhage, external fixation of unstable pelvis, ankle amputation, and external fixation of a femur fracture. A modified cut-suit was used to simulate these injuries. A modular OR placed upon a Moog Series, 6DOF500E motion base produced the motion with six actuators configured in a hexapod. Four video cameras and a Noldus Observer software allowed for coding and analyzing types, frequencies and durations of observed events. Multiple objective measures were developed for each of the procedures. These were aggregated into a five point Likert type scale, unique to each of the four procedure types. All participants were asked to complete a Surgical Task Load Index (STLX) a variation of the NASA TLX, tailored to collect subjective workload data. A 10-channel EEG cap including nine EEG electrode channels was used to collect EEG signals for cognitive workload.

**Results:** With the exception of perceived workload on Linkert scale (STLX), motion did not significantly impact the ability of qualified surgical teams to successfully perform surgical tasks under the motion conditions tested. Ship motion did not cause any significant change in overall performance. However procedure type and surgical team are strongest predictors of overall performance. Reported STLX workload (subjective) was sensitive to sea state, with different effects across members of surgical team. Surgeons may have perceived workload to be higher overall in the motion conditions because they were doing the critical decision-making. Utilizing measured EEG data neither surgeons nor techs exhibited large differences between motion conditions. However Surgeons had consistently higher workload than Techs on EEG.
P23 - Simulation Leadership Instructors Course: Knowledge Acquisition and Retention Survey
Stephen Miller; Katie Gardener; Jennifer Greene

Introduction: At Dalhousie University there has been rapid adoption and an exponential increase in simulation based medical education opportunities/needs in the past few years. As a result of a small number of trained faculty to debrief and lead simulation exercises, and high cost of travel to attend instructor courses throughout North America, a two day simulation leader instructor course (SLIC) was developed to build local capacity. SLIC allows for medical educators to develop skills in development and delivery of simulation sessions, with a strong emphasis on various approaches to debriefing.

Purpose: This study aims to understand how SLIC has impacted the participants in terms of knowledge acquired and retained

Methods: We took a convince sample consisting of the participants in the October 2015 course. We delivered a comprehensive survey prior to the course in order to determine pre-course knowledge about simulation. We delivered the same survey immediately post course. A third survey has been delivered via Opinion to assess knowledge retention and ability for the participants to deliver this new knowledge in their own practice. We will be presenting descriptive statistics from the first two surveys.

Results: There were 24 participants total from a variety of backgrounds: 75% were physician. Some other disciplines included nurses, admin and one paramedic. Fifty eight percent of the respondents had previous educational training and 79.1% had previous Sim training. There was a significant increase in all facets of knowledge identified in the survey except one. The participants felt strongly that human factors played an important role in medical errors before and after the course. Fifty percent of participants felt uncomfortable using scenario design principles prior to participating in SLIC. Post course 100% of responses indicated they were comfortable. Fifty eight percent of responses indicated they were uncomfortable debriefing a scenario however, after the course, this number was reduced to only 12%.

Conclusion: The SLIC Program is an effective method to educate, engage and train simulation leaders in the education community with the principles of scenario design and managing debrief challenges.