International Pediatric Simulation

Symposia and Workshops

ORCHESTRATION OF PEDIATRIC SIMULATION: ELEGANCE AND HARMONY

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Abstract Book 2014
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Developing a Simulation Based Patient Safety Programme for Senior Paediatric Trainees in Wessex

Kate Pryde 1,*, Kim Sykes 2
1Child Health, 2Paediatric Intensive Care, University Hospital Southampton, Southampton, United Kingdom

Context:
Latrogenic harm is caused to a significant number of patients within the health service each year. Human factors have been found to be implemented in up to 100% of such adverse incidents (Flin, 2013). At present within the UK there is no formal training programme for paediatric trainees designed to educate about patient safety and human error.

Education Goal:
To use simulation as a tool to deliver patient safety teaching and enhance non-technical skills in our trainees in order to improve outcomes for patients.

Progress to Date:
We have developed a simulation based training programme as part of the paediatric regional educational programme for senior paediatric trainees within Wessex. The aim is to build on classroom based introduction to human factors and factors affecting performance earlier in their training. Over 3 years (sessions are run for half a day twice a year) the programme covers essential elements of non-technical skills including teamwork, communication skills, situational awareness and decision-making. Each session includes one or more simulations that vary in complexity, depending on the topic and learning objectives. Scenarios are designed around local safety incidents – medication errors, extravasation injuries and more generic such as NHLSA never events, loss of situational awareness, challenging behaviours. To maximize fidelity a variety of simulation modes are utilized including part task trainers, simulated patients, multiple patient simulations as well as inclusion of the wider multi-disciplinary team e.g. pharmacists. After the debrief more traditional educational methods provide additional information on anything not brought out in the simulation and review the key learning points.

Evaluation so Far:
The programme is just completing its first full cycle. Feedback from participants has been incredibly positive. They have greater appreciation of the importance of non-technical skills in reducing harm and value the opportunity to practice error reduction strategies in a safe, non-threatening environment. As yet we have not been able to formally evaluate effects on patient safety outcomes.

Discussion and questions:
Simulation has proved to be an excellent medium through which to educate our trainees in human factors and patient safety. Utilizing local events, supported by wider evidence keeps it relevant. Whilst there is good evidence that simulation training improves non-technical skills as well as actual procedural skills, specific evidence to show improved patient outcomes with regard to safety is extremely limited (Aggarwal, 2010 & Nishisaki 2007). Arguably there is evidence of a positive effect on safety culture, for example from the number of people who now attend simulation training. We would be grateful for thoughts on how we can measure the impact of this programme on outcomes for patients, including effect on patient safety given the diverse locations of the trainees that attend.

References:

Disclosure of Interest: None Declared

Keywords: curriculum development, patient safety, training

Simulation Instruction Design and Curriculum Development
IPSSW2014-1165

Effectiveness of a Simulation Curriculum on Clinical Execution: a Pilot Study

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Background:
Growing evidence shows that procedural skills acquired through simulation training may successfully transfer to clinical practice. However there is limited evidence on the transfer of more global clinical performance skills. Pediatric residents are expected to learn and utilize a clinical prediction rule derived and validated by PECARN (Pediatric Emergency Care Applied Research Network) to determine whether children with head trauma need neuroimaging to identify a traumatic brain...
injury. Although straightforward to learn, the quick decisions made to image children with head trauma in a busy pediatric emergency department (PED) may proceed based on only an incomplete application of this rule – potentially subjecting children to unnecessary radiation from CT scans.

Research Question:
Interns participating in simulation training are predicted to demonstrate an earlier acquisition of how to apply this clinical prediction rule correctly by demonstrating clinical performance competencies similar to more senior residents with more clinical experience.

Methods:
Single center, blinded prospective randomized-controlled pilot trial implemented for the 2013-14 academic year. All interns completed a written pretest and were randomized to participate in a PECARN head trauma simulation or an unrelated simulation control of acute intracranial hypertension. For the next 12 months, any application of this rule by interns or senior residents in the PED was compared using a standardization observation tool.

Results:
Senior residents were able to correctly identify 44% of the PECARN criteria when evaluating children with head trauma while interns in the intervention group were able to correctly identify 46% of the PECARN criteria, compared with 31% in the control group.

Conclusion:
Although not statistically significant, our preliminary proof of concept data suggests that interns participating in simulation training may demonstrate clinical performance competencies involving the use of the PECARN clinical prediction rule that are measurably similar to more experienced senior level residents. This study suggests that we may improve the efficiency of information delivery through simulation, and has promising implications for future larger studies.

References:
1.1.


Disclosure of Interest: None Declared

Keywords: pediatric, Simulation based research, traumatic brain injury

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**Debriefing and Teaching Methodologies**

**IPSSW2014-1092**

**Comparing Rapid Cycle Deliberate Practice and Traditional Debriefing for Resident Training**

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**Background:**

Simulation-based medical education (SBME) improves medical knowledge compared with no intervention. 1 More research is needed on debriefing techniques and in particular timing of these techniques. 2 Traditionally, much more time is spent debriefing learners after the scenario than participating in the scenario. Using RCDP, learners spend much more time practicing with interspersed feedback throughout a series of increasingly challenging scenarios.

**Objectives:**

To measure the effect of two types of SBME on team performance and leadership skills of residents in simulated scenarios after participating in one of two versions of SBME.

**Methods:**

Teams of pediatric and emergency medicine residents will participate in 6-hour educational training sessions. We will start and finish each day with a testing scenario that will be videotaped and allow scoring using an assessment tool. We will use the Simulation Team Assessment Tool (STAT), to measure teamwork and leadership performance during these simulations.1 Teams will be randomized to participate in traditional debriefing or RCDP with equal time spent with both sets of teams. Comparison of performance changes will be made between teams participating in each type of education. Information regarding level of training, PALS training, satisfaction and self-assessment scores will be collected.

**Current Status:**

Curricula for both arms of the study have been developed and piloted. Data collection has begun for this phase of the project. Residents undergoing either form of training have provided initial positive feedback.

**Questions for Discussion:**

If we have a clear answer from this study, where do we go next? Repeat on larger scale? Analyze differences between arms of study?

What topics are best suited to RCDP?

What level of learner can RCDP be applied to?

**References:**


Disclosure of Interest: None Declared

Keywords: None

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**Debriefing and teaching methodologies**

**IPSSW2014-1121**

**Practice and Coaching vs Simulation and Debriefing: Are we Making this too Complicated?**

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**Background:**

Competitive athletes in both individual and team sports practice long hours in order to achieve peak performance and excel beyond their competition, training endlessly in an effort to identify and overcome their weaknesses before those weaknesses become manifest during competition and are exploited by their opponents. Similarly, top coaches employ a variety of techniques and strategies to prepare their athletes physically and mentally for the rigors of competition. Many individual and team sports are characterized by intense time pressure; athletes often cannot “think” in crucial
game situations but rather must be able to quickly react in order to be successful. Thus practicing doing the right thing under realistic conditions until it becomes an automated response is a key to success. While physical attributes such as strength and coordination are obviously important in many sports, mental abilities and behavioral skills also play significant roles. Maintaining situational awareness, instantly recognizing key cues, avoiding distractions and reacting immediately to changing circumstances are just as important as being able to perform physical tasks in a technically proficient manner. In these ways, athletes and healthcare professionals face similar training and performance challenges.

**Research Question/Educational Goal:**
While healthcare professionals simulate and are debriefed and athletes practice and are coached, what are the similarities and difference in these approaches? What can docs learn from jocks?

**Proposed Approach to Addressing the Question or Goal:**
The similarities and differences between athletics and healthcare in terms of initial and ongoing training, focusing on strategies that are likely to be of benefit to both novice and expert alike, will be discussed. A short list of take-home points that can be incorporated into simulation-based training programs in healthcare will be developed.

**Questions for Discussion:**
What are the differences and similarities between simulation and practice? What are the differences and similarities between debriefing and coaching? Is healthcare too focused on names and acronyms and thereby missing important opportunities to simplify and disseminate a valuable methodology more broadly?

**References:** N/A

**Disclosure of Interest:** L. Halamek Consulting of: Laerdal Medical

**Keywords:** None

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**Debriefing and Teaching Methodologies**

**IPSSW2014-1120**

**Feel is a Four - Letter Word that Begins with “F” and that’s why We Shouldn’t Use It...**

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**Background:**
Debriefing in healthcare has evolved in relative isolation from debriefing in other high-risk industries. Whereas other industries make a clear distinction between debriefings held to provide an emotional release and/or psychological support after a critical event and those conducted to review the technical details of human and system performance during such an event, this distinction is rarely clarified in healthcare. Indeed, it is quite common for the first words of a debriefing to be “How did you feel about that?” even when trainee performance/patient outcome is intended to be the primary focus of the debriefing.

**Research Question/Educational Goal:**
Should debriefings in healthcare be focused on trainee performance and patient outcome or on emotional release/psychological support for the trainees?

**Proposed Approach to Addressing the Question or Goal:**
A close examination of a) the pros and cons of including feelings as a component of debriefings, and b) the methods of debriefing used in high-risk industries other than healthcare will assist in providing an answer.

**Conundrum or Difficulty Encountered:**
A focus on trainee emotions is commonplace/standard in healthcare debriefings. Consideration of other methods of debriefing is likely to encounter significant resistance.

**Questions for Discussion:**
What are the pros and cons of including a discussion of emotions/feelings during a debriefing? Should a distinction be made between a technical and an emotional/psychological debriefing? Is it necessary to discuss feelings in a technical/performance debriefing? How are debriefings conducted in other industries where the risk to human life is high? Are these models of debriefing applicable to healthcare?

**References:** N/A

**Disclosure of Interest:** L. Halamek Consulting of: Laerdal Medical

**Keywords:** None

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**Debriefing and Teaching Methodologies**

**IPSSW2014-1177**

**Reflecting Teams in Neonatology Death Notification Simulation**

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**Abstract Body:**
Teaching residents and fellows the art of delivering bad news to families can be challenging. Historically at our institution, we have used mixed methods of didactic and modeling in the clinical setting to meet these objectives. However, following our experience utilizing the Reflecting Teams methodology from the Medical Family Therapy literature, we decided to utilize this with the Neonatology fellows. We believe the combination of high fidelity simulation to maximize learner emotional engagement in the process adds a layer that simple role playing with standardized family members would completely lack. Reflecting teams consist of a second observational group beyond the normal cohort of facilitators/debriefers and non-participant learners, who are trained in the methodology and observe the
The obstruction of a child's airway from illness or injury is a life threatening emergency and can lead to significant patient morbidity and mortality. The damage to the child, family and all team members involved in this emergency can be catastrophic. In these circumstances a multi-professional team is required to complete a number of life saving procedures in a time critical manner. A recent survey of our region revealed that 50% of ENT and 55% of anaesthetic consultants had not dealt with a paediatric airway emergency for 12 months. Care for paediatric critical airways in our region varies according to time and location and is provided by clinicians with limited exposure and training, using varied equipment.

Educational Goal:
To improve oxygenation in the child with a critical airway in the Wessex region using simulation and quality improvement strategies.

Proposed Approach:
We have used high-fidelity, point of care simulation of paediatric upper airway obstruction to analyse the existing systems through which these patients are managed. These simulations have been carried out in both University Hospital Southampton and in a nearby district general hospital. In both centres there were significant delays before definitive management of the airway. There were problems contacting and delivering ENT and anaesthesiology specialists to the child. There were also significant equipment issues. Staff were unfamiliar with the equipment that might be required, how to use it and where it could be located. There was poor communication between anaesthesia and ENT teams and no stated plan as to how to proceed. These issues are being addressed by:

- A standard algorithm to be used for children with upper airway obstruction.
- Standardised ENT and anaesthetic airway equipment trolleys in specific locations.
- Regular multidisciplinary (doctors, nurses and theatre staff) training courses using animal cadaver models for surgical components and hybrid simulation scenarios to develop clinical skills, rehearse algorithms and focus on human factors.
- Ongoing point of care simulations to provide practice in these rare events and continually improve the pathway.

Difficulty Encountered:
The challenge of this project is delivering and maintaining the training and skills to all the relevant personnel in our seven networked hospitals. To help us achieve this we plan to identify key stakeholders within each hospital.

Potential problems:
- Embedding the training into professional development cycles across different hospitals.
- Continuing to review the pathway by regular point of care simulations within departments due to resource and time allocation.
- Proving an improvement in the competence of those attending the courses.
- Proving a change to patient care.

Questions for Discussion:
1. How do we prove the improved competence of those staff attending courses?
2. How can we prove an improvement in patient care for a rare event?

References:
Disclosure of Interest: None Declared

Keywords: airway, Paediatric, Simulation based research

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Patient Safety and Quality Improvement

**IPSSW2014-1153**

**Development of a Safety Checklist for Pediatric Care Units During “In Situ” Simulation**

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Discussant:
The PAEDSIM working group is an international and multi-professional pediatric simulation collaborative in German-speaking countries dedicated to enhancing patient safety through team and system process improvement. Through 19 multi-day in-house courses at non-affiliated children’s hospitals, we identified latent patient safety threats by observing equipment, logistics, medication and both technical and non-technical skills.

Background:
The PAEDSIM working group was founded in 2008 including team members from 12 academic pediatric centers in Germany, Austria, Switzerland, and the United States. PAEDSIM offers both center-based pediatric team training courses as well as multi-day in-house simulation based training courses. The focus of inhouse trainings is point of care simulations delivered in patient care environments such as pediatric and neonatal intensive care units and emergency clinics. The purpose of this session is to report on our experience leading multi-day inhouse simulation sessions during 19 “in situ”-simulations in German pediatric hospitals. We identified latent patient safety threats that may contribute to medical errors and have a significant impact on patient safety.

Research Question:
Point of care or in situ have been described as potentially important strategies for providing relevant and contextualized simulation-based training that also identifies gaps in both team and system processes. The feedback evaluations of 19 “in situ” courses (each 2.5 days) at non-affiliated children’s hospitals in Germany were analyzed relating to the incidence of latent safety threats by observing equipment (e.g. special equipment for airway- or circulation management, emergency backpack or case, storage...), logistics (e.g. emergency call, emergency room), medication and both technical and non-technical skills. 431 latent patient safety threats were detected, particularly in the categories equipment and logistics. Most contemplated items were related to logistics like equipment storage in different places or oversupply of emergency equipment. In the medication category, mistakes in the attenuation of epinephrine and storage of similar sounding medications side by side were most prevalent. Regarding the technical skills, impart knowledge of the current guidelines (CPR, sepsis) and lacks in the use of technical equipment (i.o.-access, defibrillator) were observed.

Questions for Discussion:
The identified latent safety threats in pediatric emergency care show a high rate of previously unidentified items. According to these results a patient safety checklist for children’s hospitals must be established to avoid these common deficits in the patient care. We developed a safety checklist regarding our results combined with already published data (e.g. emergency equipment, CPR-guidelines). This checklist will be tested for practicability by using in “in situ”-trainings and by evaluation with a Delphi procedure.

Disclosure of Interest: None Declared

Keywords: in situ simulation, latent safety threats, safety checklist

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Patient Safety and Quality Improvement

**IPSSW2014-1151**

**Investigating Drug Error Reduction in a Simulated Resuscitation Scenario with a Mobile App**

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Abstract Body:
Drug errors are an important problem in the delivery of safe Paediatric healthcare. The risk of these errors occurring increases in resuscitation scenarios where stress may affect the ability to correctly calculate drug doses in a timely fashion. Computerised Physician Order Entry systems have been shown to reduce inpatient drug errors. However, there have been no studies looking at drug error reduction using a tablet-based app in acute clinical situations. Simulation provides an ideal tool to evaluate the effectiveness of such software without any risk to patients. There have been no reports of drug prescription apps being assessed in simulated scenarios.

Our randomised controlled trial commencing in January 2014 will compare drug error rates between drugs prescribed by traditional means and those using a new tablet-based iOS prescription app. We will use a simulated Supraventricular Tachycardia (SVT) scenario requiring adenosine administration. A pair consisting of a final year medical and nursing student will undertake the scenario. Our primary outcome measures will be drug dosage, reconstitution and time to administration. The app, which has an inbuilt formulary, calculates the correct dose of a selected drug after entry of weight and age. It then prints a prescription sticker with reconstitution instructions. We hypothesize that the use of the app will reduce dose calculation errors, drug reconstitution errors and time to administration. Students will...
receive prescription refresher training and a tutorial on SVTs prior to the study scenario. We will also use a familiarisation scenario to orientate the subjects to the simulated environment. Ethics approval has been sought. Preliminary results will be available for presentation by April 2014.

Anticipated contributory factors envisaged and taken into account in study design:
- Use of simulation as a research tool in a group of participants with limited simulation experience may introduce confounding factors affecting the results.
- Maintaining consistency of the stress level throughout the multiple scenarios.

Other considerations:
- Ethical risk using simulation-naive participants in research where an emotional response may be significant.
- Power calculations for our study have shown we will require 49 pairs in each arm, requiring delivery of 98 scenarios. Balance between increased efficiency of the study and risk of compromising pre-education and debriefing will be important.

In addition to our primary outcome measures, we hope that this study will strengthen simulation’s role as a tool to investigate new patient safety initiatives and interventions.


Disclosure of Interest: None Declared

Keywords: Drug error, Electronic prescribing, Simulation based research

Crisis Resource Management/Human Factors and Teamwork

IPSSW2014-1040

Self-Designed Video with Standardized Child Patient to Demonstrate CRM in Script-Based Simulation

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Background:
Deficient crisis resource management (CRM) can jeopardize patient safety in high-stakes environments such as acute pediatrics. There is increasing evidence to support the integration of CRM in pediatric acute care training to improve team performance and its tremendous impact on error reduction and patient outcome. Current approaches to dissemination of CRM elements into pediatric practice include simulation-based training, team building exercises and multimedia teaching resources. Most video clips are extrapolated from adult medical television series, cine films, portrayed real stories and teaching resources using standardized adult patients. There is surprising paucity of use of standardized pediatric patients, possibly due to increased sensitivity of exposing health care providers to the stress of a reenacted pediatric resuscitation. To convey an influential learning experience, and in keeping with the power of hybrid high fidelity simulation programs, it is imperative to expose trainees to quality realistic audiovisual film montage of a stressful event.

Research Question:
Does a targeted scripted video featuring a standardized pediatric patient enhance learning outcomes in pediatric CRM training?

Proposed Approach to Addressing the Research Question or Goal:
Having identified a significant skills gap in CRM, and based on the expertise of the local simulation center for scripting and film editing we wrote a script story board “Part 1: Not-so-effective CRM” and “Part 2: Effective CRM” using a standardized pediatric patient, illustrating key CRM elements. Real doctors and nurses, frequently involved in simulation training and familiar with the simulation environment, were approached at local level and asked for expression of interest to perform in this proposed video. Aiming to provide appropriate realism, we identified a standardized pediatric patient willing to perform in this proposed video. Innovative technology, including the use of a “Go-Pro” camera and different fix camera angles by professional multimedia coordinators will allow for capturing of different points of view of team members and the patient. Filmed rehearsals of the scenario were performed for fine tuning and testing of the script. We aim to film this medium in different languages and to disseminate it into different educational settings across sites and nations. We aim to validate the effectiveness of the use of a standardized pediatric patient in this teaching medium on the participants’ ability to learn CRM by means of a qualitative, observational study.

Conundrum or Difficulty Encountered:
Child ‘actors’ – untrained children may over act or be reluctant to perform in this proposed video. Aiming to provide appropriate realism, we identified a standardized pediatric patient willing to perform in this proposed video. In addition to our primary outcome measures, we hope that this study will strengthen simulation’s role as a tool to investigate new patient safety initiatives and interventions.

Questions for Discussion & Unanswered Questions:
How do you prepare a child for this experience? Should we take a hybrid approach and provide more realism with standardized patient actor than with manikin use? What is the most appropriate assessment tool to evaluate learning outcome?

Disclosure of Interest: None Declared

Keywords: None Declared
Life threatening paediatric emergencies in the Emergency Department are a rare but very stressful scenario for staff. The CRUMPET course was developed in 2007 in our Trust as a means of providing inter professional training in technical and non-technical skills (NTS) for doctors in Anaesthesia, Paediatrics and Emergency Medicine, nursing staff from the Emergency Department (ED) and Paediatric wards and Operating Department Practitioners (ODPs). The aims of the course are to develop and enhance non-technical skills and to improve team working across the specialties whilst consolidating the medical management of common paediatric emergencies.

Methods:

The course is a 3 hour session in our simulation suite. The delegates are an ST3-6 or Specialty Doctor and an ST 1/2 in each of the three specialties, two nurses form the ED and Children’s wards and an ODP. We use a medium fidelity manikin Sim Baby™ (Laerdal) and the suite is set up as a paediatric resuscitation bay. Two scenarios are run with adequate time for debriefing. Example scenarios include: status epilepticus, shaken baby syndrome and meningococcal sepsis. We use actors to play the part of the parent and their feedback is used in the debriefing sessions. The faculty consists of Consultants in the three specialties and a senior ED nurse. Over the last 12 months we have recruited new members of faculty and have developed our own Faculty development course for new starters to simulation training. We analyzed 28 feedback forms from 2011:

Results Mean Likert Score /5:

Aim and Content of the Course explained 4.25 Fidelity of the Workshop 4.6 Adequate time for debriefing / discussion 4.5 Care of the Parent Discussed in debrief 4.67 Equipment & Drugs Present 3.75 Did the session meet your educational needs? 4.1 Did you enjoy the course? 4.6 Will the CRUMPET course change your practice? 4.28 Will you recommend the Course to colleagues? 4.64

Discussion/Conclusions:

The course has evaluated extremely well so far and has improved in its fidelity and realism over the past few years. We wish to further improve the fidelity of the simulations and ensure that we have adequate supplies of the drugs and equipment needed for the scenarios. The ongoing challenges are maintaining and developing a wider pool of faculty which are crucial to running the course. Ensuring time for staff to attend requires support of the local departments and college tutors. We would like to assess the impact and retention of the course on the trainees progress during their training scheme. The course has been delivered at two other hospitals so far. We have written a faculty manual and improved the course materials to facilitate delivery at other centres. The Yorkshire and Humber Paediatric Simulation Network has adopted the course with the aim of delivering it at as many sites within the region as possible. We are submitting the course for accreditation with the three specialty colleges.

Disclosure of Interest: None Declared

Keywords: None
followed by skills workshops and simulated clinical scenarios. Topics covered were based on a previous needs analysis of newly graduated interns and included: assessment of the deteriorating child, the child in pain, and the child with asthma. Each session addressed discipline specific objectives in addition to the shared competencies.

Conundrum:
Participant evaluation demonstrated an overall positive experience with requests for more simulation sessions. This paper will discuss objective data collected to date. Faculty feedback highlighted the challenge to assemble and coordinate the learners and faculty from varying disciplines in a busy simulation centre.

This Interprofessional program demonstrates that it is possible to successfully organise and deliver interdisciplinary simulation sessions with senior students from multiple institutions in a hospital based simulation centre. Future challenges include harmonisation of scheduling, accreditation of simulation based education as appropriate clinical training by all disciplines and institutions and the need for interdisciplinary faculty to meet the challenge of addressing the differences in curricula and level of learner.

Questions for discussion:
Challenges encountered have included the following elements:
- Synchronisation of learning objectives across disciplines
- Collaboration between stakeholders/educators across professions
- The need to identify an awareness of all healthcare discipline roles.

One of the major lessons learned was identification of the need to communicate with the parent and child.
This programme has required a high staff to student ratio and a question of sustainability has to be addressed for future programmes.

Disclosure of Interest: None Declared
Keywords: None

Interprofessional Education (IPE)
IPSSW2014-1067

Developing an Interprofessional Simulation Programme-Recent Experience
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Background:
The concept of a ‘Silo Mentality’ has been discussed recently by Paige et al who suggests that such thinking is formed early in one’s professional experience and is fostered by undergraduate medical and nursing curricula lacking inter-professional education. It is a barrier to effective teamwork and good interprofessional practice. This Silo Mentality is mirrored within the ‘simulation world’ resulting in duplication of valuable personnel, time and resource. At a time of financial constraints opportunities within the West of Scotland have been explored over the past 12 months in order to develop both Interprofessional Simulation Practice utilising already existing personnel and resource and maximise Interprofessional Educational Opportunities. It is hypothesised that such exercises may lead to improved performance and safer practice both within and between professional groups.

Initial meetings were structured to identify need and then to bring together different professional groups within the West of Scotland. Early in 2013 the professional groups identified were The Scottish Ambulance Service; The Emergency Medical Retrieval Service and The Fire and Rescue Service.

A faculty was then developed with an equitable representation from each professional group and meetings then held to develop scenarios to facilitate interprofessional education between these three acute service providers.

The first simulation exercise was held on the evening of the 24th June 2013 and consisted of a paediatric and adult casualty involved in a Road Traffic Collision. The second simulation exercise occupied a full day on the 27th September 2013 and involved multiple casualties involved in a train derailment and multiple casualties involved in a heavy goods vehicle collision.

In both scenario days up to 40 personnel were involved.

Research Question/Educational Goals:
Do IP Simulation exercises translate to improvement in safety and performance both within and between professional groups.

Proposed Approach to Addressing the Question/Goal:
The construct, delivery and evaluation of constructed scenarios.

Conundrum or Difficulty Encountered:
The challenge of faculty development; the interprofessional debrief; evaluation of such events.

Question for Discussion:
To share and explore at conference some of the challenges encountered within this project to date.

References:

Disclosure of Interest: None Declared
Keywords: Debriefing, faculty development, Interprofessional education
Tools to Support Development of Simulation Programs in Limited-Resource Settings

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Background:
Health provider training programs in limited-resource settings are increasing in developing countries, often with influence from universities or organizations in developed countries. Simulation has been shown to be an excellent tool in medical education, when finances are not an issue. In areas where resources are limited, educators may feel simulation is an impossible luxury; or they may be the beneficiary of equipment from universities or organizations in developed countries. Our mission is to find creative ways to incorporate lower-fidelity simulation techniques that meet learners’ needs, enhance performance, and impact positively on patient care.

Research Questions:
The primary goal is to understand how we can support educators to develop sustainable curricula utilizing simulation techniques that meet learners’ needs in limited-resource settings.

Proposed Approach:
- Learn from the experience of groups who are doing this successfully
- Gather stakeholders to contribute to a core working-group for limited-resource simulation
- Study a few target areas that are proposed sites for simulation programs

Combining this with what is known about health education, simulation, sustainability, and curriculum development, we will develop a guide for building simulation programs focusing on key aspects: (i) contextualization to culture, (ii) resource availability, (iii) disease patterns, and (iv) workforce development.

While this project addresses specific issues faced in limited resource settings, we expect this to be useful in all settings, and may provide insight on how to improve effectiveness of simulation programs in higher-resource areas.

Challenges and Questions:
1) Identifying groups using simulation in limited-resource areas is challenging, and there is little published on the specific topic in peer-reviewed literature. Possibly the most innovative ideas are developed out of necessity in programs that may be the least likely to dedicate resources to publish about them.
   - How do we best identify training programs already using simulation?
   - How do we identify individuals with expertise and an interest in collaborating on this project?
2) Creating an online forum that will be easy to access and simple to navigate is a technical challenge but there are open-source options to enable this. Publicizing it may be even more challenging since limited-resource programs may be remote and have limited or no internet access.
   - How do we create the most far-reaching platform possible?
3) This type of forum would be ideal to collect data about simulation in places that are classically difficult to reach.
   - What research could be associated with this project?

Disclosure of Interest: None Declared

Keywords: limited resource, low-fidelity, simulation development

Building Pediatric Simulation Capacity in Developing Countries: The IPSS-WFPICCS-Malawi Project

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Context:
Educational interventions such as Emergency Triage and Assessment Training (ETAT) is partly responsible for in reductions in child and infant mortality in...
Malawi. As a result interest in scaling up of interventions like ETAT, and others that employ low-cost simulation-based education has grown.

Project:
Recently, a collaboration has formed between International Pediatric Simulation Society (IPSS), the World Federation of Pediatric Intensive and Critical Care Societies (WF PiCCS) and the Malawi Ministry of Health, to explore possibilities in a) building capacity for improved education of health professionals, and b) developing of a national strategy for simulation-based education and training of the pediatric health workforce in Malawi.

An environmental scan (May 2013) identified the need for faculty development to establish a highly trained cadre of simulation educators in the country. To achieve this, we are developing the following: 1) a train the trainers (TTT) program focused on simulation pedagogy, curriculum development, and program administration and 2) forming the Malawi Simulation Network for Excellence in Heath Professions Education, which will become the Sub-Saharan regional leader in training of pediatric health professionals. In the roll-out of the program, existing programs and pathways (e.g. ETAT) will be leveraged, to facilitate immediate uptake, and to demonstrate “early successes” to fuel support for simulation educational training capacity in Malawi.

Issues for Discussion:
A flawed approach to global health initiatives is when systems and programs are introduced without attention to local context, needs and culture. For example, there are many faculty development programs currently offered by IPSS member institutions, however these programs target learners, utilize different simulation resources, and teach skills that may not be relevant to the context in developing countries. In the proposed approach, the program will be determined through active and ongoing involvement of local stakeholders, and the establishment of local capacity for governance, administration, and delivery. As such, the Malawi partners must be involved in the conceptualization, development, re-development, and implementation of the program.

Discussion Questions:
1. What role should IPSS members play in the development of simulation-based education of health professionals in low resource settings?
2. How do we engage Malawi partners to co-develop a train-the-trainer program that is responsive to local (Malawi) stakeholders and partners needs, is contextually relevant, and which is sustainable?
3. What elements with respect to simulation pedagogy, administration, and governance should be included in the “generic” program?
4. How should the success of such capacity development projects be evaluated?

Disclosure of Interest: None Declared

Keywords: Malawi, simulation capacity development, train-the-trainer program
Perspective:
Teaching started in May 2013 with an opening workshop ‘Update in Neonatology’, which was held in Vientiane, Laos from May 13-17. Simulation-based medical education was newly introduced within this project to medical professionals in Laos. Loss of face and other features of Southeast Asian mentality need to be taken into account during debriefing. Training sessions will extend well into 2016 and are currently performed by a group of dedicated German neonatologists. Impact on hospital mortality rates will be evaluated.

Disclosure of Interest: None Declared
Keywords: educational development, low resource country, simulation
ORAL PRESENTATIONS

**Educational Outreach (including remote, rural and international simulation education)**

**PSSW2014-0000**

Modelling in Perinatology: What can we do to Reduce Global Infant Mortality?

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**Introduction:**

Two-thirds of all infant deaths occur in the neonatal period (birth to 28 days). Infants that die in the neonatal period are affected primarily by congenital malformations and disorders associated with preterm birth, including disorders related to short gestation and low birth weight not elsewhere classified, maternal complications of pregnancy, respiratory distress of newborn, bacterial sepsis of newborn, and neonatal hemorrhage. The Simulation Training Center based at "Research Center for Obstetrics, Gynecology and Perinatology" of Ministry of Healthcare of the Russian Federation, launched the educational seminars «Ways to reduce infant mortalities» under G8 initiative.

**Objectives:**

To develop a simulation-based training for obstetricians that will help to reduce infant mortality in developing countries.

**Material:**

Simulation center includes education hall, the working conditions are similar to those of delivery and neonatal departments, and is equipped with modern manikins as well as computers and multimedia devises. Computerized simulators reproduce normal and abnormal delivery, acute neonatal adaptation and disadaptation, which help to modulate real clinical conditions in obstetrics. In debriefing we use video materials facilitating education process. More than 60 doctors from the Center are employed as trainees after their successful attestation at the «Training of trainees» course. The educational program developed with regard to the needs of certain countries.

**Results:**

In 2012 and 2013, 9 research and practice education courses were performed for obstetricians, 72 hours each. Trainings were performed for 90 obstetricians from 13 countries: Angola, Afghanistan, Armenia, Botswana, Kyrgyzstan, Moldova, Mongolia, Vietnam, Namibia, Nicaragua, Tajikistan, Uzbekistan, and Ethiopia. Anonymous questionnaire surveys on a regular base in the beginning and end of education revealed the dynamics of motivation level of healthcare specialists and trainees, and level of educational and organizing process.

**Conclusion:**

Although some studies show the merits of simulation in the procedural and resuscitation training of pediatricians, more research is needed to assess the effectiveness of simulation as an educational tool. Our future goals include evaluation of this program to reduce global infant mortality.

**References:** N/A

**Disclosure of Interest:** None Declared

**Keywords:** N/A

**Programme Development/Administration and Programme Management**

**IPSSW2014-1150**

The Role of Simulation Training for ECMO Specialists at ELSO Centers in the United States

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**Background:**

Since the Extracorporeal Life Support Organization (ELSO) began, nearly 50,000 pediatric and neonatal patients have been treated with extracorporeal membrane oxygenation (ECMO).1 ELSO offers training guidelines for ECMO specialists, but specific training requirements are left to individual institutions.2 Simulation-based training has been shown to enhance operational performance, improve systems outcomes, and reduce medical errors in select clinical settings; and there are several reports of successful ECMO simulation programs.3, 4 It is not known how many ELSO centers use simulation training for ECMO specialists.

**Research Question:**

This study was conducted to determine the role of simulation methods for training ECMO specialists in the United States. We hypothesized that simulation training would be limited to a small number of academic institutions.

**Methodology:**

A 47-question web-based survey was sent to ECMO coordinators at all 151 US ELSO sites, and responses were collected over a 1-month period. Descriptive results were reported as the percentage of total responses for each question. Logistic regres-
Results:
Of the 94 institutions that responded (62% response rate), 45% report having an ECMO simulation program while 26% report a program is in development. The majority (61%) have been in operation for 2-5 years; 29% for ≤1 year; and 10% for >5 years. Fifty-four percent use a high-fidelity mannequin; 85% debriefing sessions; and 34% video-based feedback. Wet lab (95%) and real-time ECMO monitoring (61%) are used at the majority of centers, while 7% use animal labs. Sixty-three percent of centers use simulation for competency assessment, and 76% use multidisciplinary simulation training. Academic affiliation and number of ECMO staff do not predict simulation use. However, an annual ECMO caseload of >20 and providing ECMO in a pediatric cardiothoracic intensive care unit (CTICU) are associated with increased likelihood of having an ECMO simulation program (OR 2.5, 95% CI 1.5-5.8 and OR 2.8, 95% CI 1.2-6.7, respectively). Access to a simulation center is also associated with simulation use (OR 4.7, 95% CI 1.7-12.5). The most common simulation scenarios in use include pump failure (93%), oxygenator failure (90%), and circuit rupture (76%). Among those using ECMO simulation, all report that simulation has led to an improvement in ECMO training.

Discussion/Conclusions:
Though nearly half of ELSO sites have active ECMO simulation programs, the incorporation of simulation in ECMO training remains in its infancy. Institutions with access to a simulation center, higher caseloads and pediatric CTICUs are more than twice as likely to have ECMO simulation programs. ECMO simulation is universally felt to be beneficial among ECMO coordinators, and further work is needed to delineate best training practices and competencies for ECMO providers.

References:

Disclosure of Interest: None Declared

Keywords: Extracorporeal Life Support Organization, Extracorporeal membrane oxygenation, Survey
anatomy (normal or abnormal), patient cooperativeness, body habitus (thin vs. obese), presence of a knowledgeable assistant, and time-constraints (present or absent) were the conditions rated highest with respect to their impact on the complexity of learning LP for a novice.

**Discussion/Conclusions:**
Combining the SCM with the Delphi method, we have established expert consensus on 27 conditions that impact the complexity of learning LP, as evidenced by good to excellent agreement among panelists based on the ICC scores observed. The simplifying conditions and rank-ordered list of complicating conditions may be used to construct simulation scenarios that vary in complexity. In turn, these scenarios may be used to design a simulation-training program for LP and to evaluate the benefit of a simple-to-complex sequence of training for novice learners.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** Delphi, elaboration theory, simple to complex sequencing

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**Simulation Instruction Design and Curriculum Development**

**IPSSW2014-1080**

**Training Better Pediatricians: Multi-Modal Research Study to Develop a National Simulation Curriculum**

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**Background:**
Pediatric Residency training objectives in Canada are determined by the Royal College of Physicians and Surgeons of Canada (RCPSC). How these objectives should be covered is not determined by the RCPSC, thus teaching methods are not standardized across programs. What’s more, residency training programs offer their learners inconsistent exposure to critical situations in the clinical environment. Educators have turned to simulation to bridge the gap in residents’ learning.

**Objective:**
Using a multi-modal research strategy, we sought to identify the core curriculum objectives to include in a general pediatric simulation curriculum.

**Methods:**
Our study was designed in two phases: (1) Delphi consensus phase and (2) a National 360 content expert survey and program director (PD) needs assessment to characterize each center’s simulation readiness. Phase 1 surveyed 25 simulation experts using the Delphi Method who rated 240 RCPSC objectives of training on a four point likert scale (ranging from 1, should be taught using methods other than simulation to 4: best taught using simulation). Consensus was reached when there was stability of the standard deviations of the ratings. Phase 2 surveyed content experts to better understand the relative importance the objectives identified in Phase 1 had in clinical practice. Community pediatricians, medical education experts, pediatric residents and program directors (PDs) rated clinical frequency, management impact and confidence (IFC), for each of the objectives obtained by Delphi consensus.

**Results:**
20 (80%) experts in medical simulation completed three rounds of the Delphi (Phase 1). 106 objectives were removed, leaving 134, mainly pertaining to acute care pediatrics and crisis management across programs. What’s more, residency training programs offer their learners inconsistent exposure to critical situations in the clinical environment. Educators have turned to simulation to bridge the gap in residents’ learning.

**Conclusion:**
To our knowledge, this is the first study to use an innovative multi-modal research design to combine simulation, content and stakeholder expertise in curriculum design. Our study has highlighted key high impact objectives.
include in a gap-bridging simulation curriculum with the goal of national implementation.

**References:**


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**Disclosure of Interest:** None Declared

**Keywords:** curriculum, pediatrics, simulation

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**Simulation Instruction Design and Curriculum Development**

**IPSSW2014-1050**

**Do They Remember? A Qualitative Study Exploring Recall of Training from a Neonatal Simulation Course**

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**Background:**

Interprofessional neonatal simulation education has been adopted by many deaneries across UK to train medical and nursing teams in aspects of ‘knowledge, skills and attitudes’ necessary for successful resuscitation. Pre and post course questionnaires demonstrate good evidence of improvement in knowledge, skills and confidence at team-work. Evidence suggests that knowledge and skills deteriorate as early as 3 months following a course. However, no study has explored the impact of training in ‘attitudes’ after a similar period of time.

**Aim:** To determine whether there is evidence of sustained impact of ‘attitudes’ gained in an inter-professional neonatal simulation course by exploring candidates’ recall of the training 3-6 months after the course.

**Methods:**

Purposive sample of 6 doctors and 6 nurses from a total of 8 each were recruited from an inter-professional Advanced Neonatal Resuscitation Simulation Course. Semi-structured interviews were conducted 3-6 months following the course with key questions exploring candidate’s recall of what they learnt from the course with follow-up questions based on their responses. All interviews were audio recorded to facilitate verbatim transcription and coded concurrently which aided further data collection. Interviews were analysed using thematic analysis by manual coding. Two independent researchers coded transcripts and agreed on final analysis.

**Results:**

All participants had immediate recall of training in ‘attitudes’ and ranked it as the most useful part of training compared to ‘knowledge or skills’. The three themes that emerged from the candidates’ recall were ‘Speaking up’, ‘Stepping back’ and ‘Teamwork’. Reason cited for retention of ‘attitudes’ was ‘reflection’ among the nurses and ‘expectations of the job’ by the medics. In comparison, recall of knowledge and skills decayed as early as 3 months after the course. Medics considered their ‘lack of seniority’ to be a contributory factor to this and the nurses stated that ‘access to experience’ was a major issue. Both groups suggested informal debriefs and in-house simulations as a means of sustaining the learning experience.

**Conclusion:**

This study focuses on the recall of the training in an inter-professional neonatal simulation course after a period of time. Results indicate immediate recall and greater impact of training in ‘attitudes’ as compared to ‘knowledge and skills’. The time frame of interviews shows retention of the ‘attitudes’ gained at least in the short term. The decay in recall of knowledge and skills 3 months after the course is in keeping with available evidence. In conclusion, this study provides a qualitative insight into the question “Do they remember?” in terms of inter-professional neonatal simulation training. We propose that 3 monthly in-house simulations in the neonatal units can not only help sustain the knowledge and skills but also reinforce good practice in ‘attitudes’.

**Keywords:** simulation, attitudes, recall

**Disclosure of Interest:** None Declared

**Keywords:** None
Assessment (including use and validation of measurement and assessment tools)

IPSSW2014-1199

Team Average Performance Assessment Scale (Tapas): How to Evaluate Team Clinical Performance

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Introduction:
The safety of a patient presenting a life-threatening condition is depending upon success of technical procedures, respect of algorithms and CRM. Several scales have developed to evaluate CRM. Global rating scales and checklists have been introduced in some situations to assess clinical performance (1,2). To our knowledge, there is no evaluation scale covering all the life-threatening conditions allowing objective assessment of clinical performance.

Objectives:
1/- to design and validate an assessment scale for evaluation of clinical performance during immersive simulation of life-threatening conditions.

Methods:
Study approved by the Clinical Investigation Center – INSERM 0802 Scientific Committee and the Faculty of Medicine Research Board. We followed the criteria of Downing for validation of an evaluation scale (3).

Content: selection by 4 experts of items (given by AHA and ERC) (assessments and procedures) from APLS, EPLS, PHTLS, and ATLS courses.

Response process: done on 228 EPs, for control of different sources of error.

Internal structure: tested on 48 participants of 12 MDTs with internal consistency and reliability (ICC) calculated with 2 independent observers.

Relationship to other variables: construct validity with 48 EPs at 1st session and 5th session of a pediatric university course.

Consequences: without consequence for participants. Scenarios were acute life-threatening conditions (medical and trauma) in infants (SimNewB, Laerdal*). Each session was followed by a good-judgment debriefing. Analysis included: linear logistic regression, coefficient correlation between 2 observers, discordance (%), intra-class coefficient (ICC), and comparison between 1st and 5th session (t-test).

Results:
Content: scale with 6 sections and 121 items (preselected according to the scenario), belonging to the ABCDE algorithm, ranked 0 to 2, total=100.

Response process: some items have deleted or grouped to avoid redundancy aiming for more than 90% concordance between 2 independent observers.

Internal structure: the total of potentially selected items being variable from one scenario to another, alpha Cronbach was impossible to calculate.

Mean scores of observers were 44.10±18.82 vs. 44.86±16.76 (p=0.96), with a correlation coefficient of 0.86, p=0.0011, and y=0.9609x with R²=0.68 in linear regression. ICC was 0.921. Delta TAPAS was 7.96±5.47 between the 2 observers with a global discordance <8%.

Relationship to other variables: scores obtained on the 1st session were significantly higher than the ones on the 5th, respectively: 58.66±10.78 vs. 83.04±9.62 (p < 10⁻⁸).

Discussion/Conclusion:
We designed and validated (coherence, reliability, and consistency) a clinical performance assessment scale (TAPAS), used in immersive simulation of MDTs dealing with simulated pediatric emergencies. This scale can be used in children and adults as well.

References:

Disclosure of Interest: None Declared

Keywords: EVALUATION, team performance, technical skills

Simulation Instruction Design and Curriculum Development

IPSSW2014-1057

Effects of Stress on Performance in Observers During High Fidelity Simulation Training

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Background:
High fidelity simulation-based training (SBT) is now a common teaching modality in medicine worldwide. We previously demonstrated that high-fidelity simulation training is associated with a measurable stress response in trainees, as evidenced by an increase in heart rate and salivary cortisol(10); and that repeated exposure to SBT did not decrease this stress response, despite an improvement in the trainees’ performance(3). From our observations, trainees in the ‘hotseat’ actively managing the clinical crisis experience the highest levels of stress but benefit the most from the learning experience. However, the stress experienced by observers (who are in the same room but not actively managing the crisis) and their learning outcomes have never been studied.

Results:
Content: scale with 6 sections and 121 items (preselected according to the scenario), belonging to the ABCDE algorithm, ranked 0 to 2, total=100.

Response process: some items have deleted or grouped to avoid redundancy aiming for more than 90% concordance between 2 independent observers.

Internal structure: the total of potentially selected items being variable from one scenario to another, alpha Cronbach was impossible to calculate.

Mean scores of observers were 44.10±18.82 vs. 44.86±16.76 (p=0.96), with a correlation coefficient of 0.86, p=0.0011, and y=0.9609x with R²=0.68 in linear regression. ICC was 0.921. Delta TAPAS was 7.96±5.47 between the 2 observers with a global discordance <8%.

Relationship to other variables: scores obtained on the 1st session were significantly higher than the ones on the 5th, respectively: 58.66±10.78 vs. 83.04±9.62 (p < 10⁻⁸).

Disclosure of Interest: None Declared

Keywords: EVALUATION, team performance, technical skills
Research Question: We aim to determine if: 1) Trainees who are observers of SBT experience less stress when compared to trainees in the ‘hot-seat’ and; 2) Trainees who are observers in the first two SBT scenarios can perform as well as trainees who were in the ‘hot-seat’ during the third simulation scenario.

Methodology: Thirty-six trainee anaesthetists are randomized into 2 groups to undergo 3 SBT scenarios. 18 trainees randomized to the Observer group first undergo two SBT scenarios as observers (wallflowers) followed by a third session in the ‘hot-seat’. 18 trainees in the Control group will undergo all 3 sessions in the ‘hot-seat’. For each session, stress response is measured by heart rate, salivary cortisol and amylase while performance is measured using the Anaesthetists Non Technical Skills (ANTS) score.

Results: The study is still in progress and will be completed by January 2014. Preliminary results from our interim analysis show that trainees who are observers of the first 2 SBT scenarios experience less stress than the ‘hot-seat’ trainees but yet achieve similar level of performance during the third SBT session.

Discussion/Conclusion: If final results confirm that simulation is less stressful for trainees who are observers compared to trainees in the hotseat, and yet learning can still take place, we can potentially make SBT less stressful and reduce the total number of simulation required. This will reduce unnecessary stress and improve the efficiency of simulation training by reducing the number of sessions required, saving faculty time and resources.

References:

Disclosure of Interest: None Declared

Key Words: Stress and performance

Debriefing and Teaching Methodologies
IPSSW2014-1101

Instructor-Led Simulation Training vs Self-Directed Training during Simulated Neonatal Resuscitation

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Background: Neonatal resuscitation is a high-acuity, low-occurrence event that lends itself well to simulation-based training (SBT).1 Hence, SBT has been recommended by current neonatal resuscitation guidelines as educational methodology. However, SBT is resource-intensive, as it requires not only simulation equipment but also instructors with technical and didactic expertise.

Research Question: The aim of this randomized controlled trial was to assess if instructor-led SBT compared to self-directed simulator training improves performance scores of fifth-year medical students during simulated neonatal resuscitation as part of the objective structured clinical examination (OSCE).

Methodology: Fifth-year medical students were randomized to either receive: i) instructor-led SBT involving low- and high-fidelity simulators (SIM) or ii) self-directed training (SDT) with a low-fidelity newborn mannequin and the Neonatal Resuscitation Program interactive DVD. Both groups had equal duration of training.

As part of the OSCE, students had to perform neonatal resuscitation during a scenario of a term newborn. Outcome measures were students’ OSCE performance evaluated by examiners blinded to participants’ group allocation and using a predefined checklist. In addition, students’ perception of and satisfaction with the respective training modality were assessed using a questionnaire with 5-point Likert type items. Data are shown as mean ± standard deviation or median and interquartile range (IQR). Mann-Whitney-U-test was used to compare continuous variables. The trial was registered with ClinicalTrials.gov. NCT01875900.

Results: Thirty-one students (age 25.5 ± 2.9 years; f:m=21:10) were randomized (SIM: n=13; SDT: n=18). OSCE performance scores were similar between groups (SIM: median 19, IQR 19-20 points vs. SDT: median 20, IQR 19-21 points; p=0.312). Students in the SIM group perceived instructor-led SBT to be more suited for neonatal resuscitation training (median 1, IQR 1-1 vs. median 3, IQR 2-4; p<0.001) and felt better prepared for the OSCE (median 1, IQR 1-2 vs. median 2, IQR 1-2; p=0.051) and for clinical practice (median 1, IQR 1-2 vs. median 2, IQR 1-3; p=0.016) than students in the SDT group.

Discussion/Conclusions: Self-regulated learning has been shown to be an effective educational methodology.2 In our study, instructor-led SBT was as effective as self-directed
Simulator training in teaching neonatal resuscitation skills to medical students.

References:

Key words: neonatal resuscitation, education, simulation

Disclosure of Interest: None Declared

Keywords: None

Assessment (including use and validation of measurement and assessment tools)

IPSSW2014-1107

Learners’ Salivary Cortisol and Holter Changes during Simulated Laparoscopy: Preliminary Results

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Introduction:
Laparoscopy simulation offers a realistic complexity of tasks and required skills (1). Pediatric laparoscopy is very stressful for young surgeons. Subjective stress has already been evaluated during laparoscopy simulation (2), but not objective parameters of stress.

Objectives:
1/ To evaluate performance of medical students (MS) and young surgeons (YS) in laparoscopy;
2/ To evaluate stress level by objective parameters before and during laparoscopy in both groups.

Methods:
Study approved by Faculty IRB. 7 MS received a didactic lesson on laparoscopy and a 2-hour hands-on, and 6 YS who usually operate by laparoscopy were included. Performance was assessed by a MISTEL-derived scale (1). Times were recorded. Biological stress was assessed by salivary cortisol (SC) (ELISA) (3): 2 hours prior (T0) to simulation and immediately after session (T1). Electrophysiological stress was assessed by Holter: basal heart rate (HR) and pNN50 (differences between adjacent RR intervals that were >50ms). Stress induces a decrease in pNN50. Analysis of average SC, HR and pNN50 (M, SD) and their variation over time.

Results:
Performance score was higher in YS: 47±13 vs 10.7±33(MS), p=0.03. SC was identical at T0 in both groups: 4.96±2.96(MS) vs 6.10±2.51(YS), p=0.47.
At T1, it was higher in MS but not significant. But it increased from T0 to T1, only in MS, p=0.048. Basal HR was higher in YS: 96±9 vs 77±10(MS), p=0.0004. During the simulation session HR was identical in both groups: 89±12(MS) vs 94±9(YS), p=0.36. But it seemed to increase from T0 to T1, only in MS, p=0.06. Basal pNN50 was lower in YS: 5.2±5.4 vs 18.5±13.4(MS), p=0.04. During the session, pNN50 was identical in both groups, p=0.96. But it seemed to decrease from baseline to session, only in MS, p=0.06.

Discussion/Conclusion:
Performance scores were higher in YS because of their experience of laparoscopy. We recorded two profiles of response to stress: the novice’s one exhibits increase in stress level during the procedure, while the beginner’s one evidences increase in stress level prior to the procedure, in anticipation of the procedure. Our results suggest that the impact of a simulation session on stress parameters might be different according to the experience of the learners.

References:

Disclosure of Interest: None Declared

Keywords: None

Assessment (including use and validation of measurement and assessment tools)

IPSSW2014-1192


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Introduction:
The safety of a patient presenting a life-threatening condition is depending upon success of technical procedures, respect of algorithms and CRM. Most of team training immersive simulations focused on CRM. Several scales have developed to evaluate CRM. Nevertheless the accuracy and effectiveness of resuscitation efforts cannot be assessed only by communication and leadership. Global rating scales and checklists have been introduced in some situations to assess clinical performance (1,2). In obstetric crisis, some authors found a correlation between a clinical efficiency score and CRM (3). To our knowledge no comparison exists to date for acute pediatric life-threatening conditions.

Objectives:
1/ to objectively evaluate CRM and clinical performance with an evaluation scale during immersive simulations of an infant in shock. 2/ to compare both scores.
Methods:
Study approved by the Clinical Investigation Center – INSERM 0802 Scientific Committee and the Faculty of Medicine Research Board. 48 participants signed informed consent and were randomized in 12 MDTs (emergency physician, nurse, and paramedic, all with < 6 years of experience, and resident) for a high fidelity simulation session (infant in hypovolemic shock – SimNewB, Laerdal*). CRM was assessed by the Clinical Teamwork Scale (CTS) (4). Clinical performance was assessed by the Team Average Performance Assessment Scale (TAPAS) we developed and validated (under review), allowing assessment of any life-threatening condition. CTS and TAPAS were assessed by two blind observers. Each session was followed by a good-judgment debriefing. Analysis included: for each score (CTS and TAPAS): mean±SD, minimum, maximum, coefficient correlation between 2 observers, discordance (%) and intra-class coefficient (ICC); correlation between CTS and TAPAS was calculated.

Results:
30 simulation sessions were recorded (each with 4 participants). CTS score was 45.98±15.96, from 25 to 80 (over 100) and TAPAS was 44.98±17.46 from 19.5 to 83.5 (over 100). Coefficient correlation, discordance, and ICC for CTS were: 0.72, 11.03%, and 0.717. Coefficient correlation, discordance, and ICC for TAPAS were: 0.86, 7.96%, and 0.921. Correlation between CTS and TAPAS was significant: 0.76, y=0.98x, R²=0.46, p=0.0074.

Discussion/Conclusion:
Evaluation of CRM (CTS) and clinical performance (TAPAS) was possible for each immersive simulation session. Mean scores were in the average but showed a wide range of possibilities. We observed a significant correlation between technical skills (TAPAS) and non-technical skills (CTS). We speculate there is a causative relationship between both of them. Therefore, debriefing technique should consider that participants with less than 6 years of clinical experience have not only a deficit of communication when a gap in performance is noticed. Future studies should investigate this relation between technical and non-technical skills in much experimented professionals.

References:

Disclosure of Interest: None Declared
Keywords: crisis resource management, Teamwork, technical skills

Crisis Resource Management/Human factors and Teamwork
IPSSW2014-1087
Technical Skills and Behavioral Skills in Neonatal Resuscitation: What’s the Correlation?

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Background:
Successful neonatal resuscitation requires both technical and behavioral skill. Key behavioral skills important in neonatal resuscitation have been identified and include knowledge of environment, anticipation and planning, leadership, communication, distribution of workload, attention allocation, information utilization, resource utilization, calling for help early and professional behavior.

Research Question:
We sought to determine the correlation between technical and behavioral skill during neonatal resuscitation.

Methodology:
We performed a secondary analysis of data obtained in a prior study on the effect of deliberate practice on neonatal resuscitation performance. The study followed a repeated measures design, in which participants completed a series of 3 high-fidelity simulation sessions and received a facilitated debriefing after each.

Objective measurements of technical skill were obtained during each of the simulations by way of blinded video review using a validated technical skill assessment tool. For the current analysis, we performed a second blinded review of the same videos, using a previously validated behavioral assessment tool which measured skill in each of the 10 key behaviors in neonatal resuscitation.

Statistical analysis was performed to determine correlations between technical and behavioral skill.

Results:
30 residents, divided into 15 teams of two, participated in the study. Overall technical and behavioral skill increased from simulation 1 to simulation 3 (technical: F (2,449) = 11.8; p < 0.001, behavioral: F (2,149) = 27.2, p < 0.001). Overall, technical skill and behavioral skill were strongly correlated (p= 0.48; p =0.001). The strongest correlations were seen in distribution of workload (ρ = 0.60; p =0.012), utilization of information (p= 0.55; p =0.026), and utilization of resources (p= 0.61; p =0.011). There was a positive correlation between resident year group and overall technical (p = 0.321; P = 0.032) and
behavioral skill ($\rho = 0.422; P = 0.004$). There was also a positive correlation between simulation session number and technical ($\rho = 0.327; p = 0.028$) and behavioral skill ($\rho = 0.293; p = 0.05$).

**Discussion/Conclusions:**
We found a high degree of correlation between technical and behavioral skill during neonatal resuscitation. The degree of correlation between specific behavioral skills and technical skill is likely dependent on the team constituents and the environment of the resuscitation.

**Disclosure of Interest:** None Declared

**Keywords:** None

**Simulation for Procedural and Psychomotor Skills**

**IPSSW2014-1058**

**Randomized Trial of Efficiency & Effectiveness of Videolaryngoscopy for Intubation Mastery Training**

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**Background:**
Success rates for neonatal intubation (NI) are sub-optimal1-3 with visualization implicated in majority of failed attempts4.

**Research Question:**
Does videolaryngoscopy (VL) with deliberate practice (DP)5-6 improve efficiency & effectiveness of training compared to traditional laryngoscopy (TL)?

**Methodology:**
Subjects (student, pedi intern, NICU fellow) were randomized to VL or TL. Baseline NI skills were assessed using skills checklist & global skills assessment (GSA). Educator provided a scripted session with clear expectations of a minimum passing score (MPS). DP was performed on a bench top manikin. VL group used real-time video from Storz CMAC videolaryngoscope to guide instruction. TL group used the same equipment with monitor off; feedback was based only upon external technique. When subjects confident with NI, or after 20 minutes, summative assessment was conducted using a skills checklist & GSA. Recorded airway views were scored by a blinded observer. “Mastery” 5 was defined as tube placed in < 30 sec, completion of skills checklist, “mastery” GSA rating, and grade I airway view. “Effectiveness” was if MPS was achieved. “Efficiency” was duration of training for providers achieving mastery.

**Results:**
58 subjects randomized with similar demographics, baseline knowledge & attitudes between groups. All subjects had significant improvement in knowledge, technical skills, comfort & confidence after training. No difference noted between groups in efficiency or effectiveness. (Table 1) Kaplan-Meier curve demonstrated decreased training time for intervention group, but was not statistically significant.

**Conclusions:**
VL did not improve efficiency or effectiveness of NI training with DP in this study, which was limited by heterogeneity of providers and time limits. Multi-center study lanned through INSPIRE network.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Pre Post p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>NI Skill (%)</td>
<td>VL 48.1 (39.1, 56.9)</td>
<td>92.3 (88.4, 96.1)</td>
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<tr>
<td></td>
<td>TL 47.5 (37.0, 57.9)</td>
<td>85.8 (79.2, 92.3)</td>
</tr>
<tr>
<td>Knowledge (%)</td>
<td>VL 80.1 (73.8, 86.5)</td>
<td>95.62 (92.5, 98.7)</td>
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<tr>
<td></td>
<td>TL 80.4 (71.7, 89.2)</td>
<td>96.89 (94.1, 99.7)</td>
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<tr>
<td>Effectiveness</td>
<td>VL 0/25, 0%</td>
<td>13/32, 40.63%</td>
</tr>
<tr>
<td></td>
<td>TL 0/16, 0%</td>
<td>60/25, 24.0%</td>
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<tr>
<td>Efficiency (sec)</td>
<td>VL 985.5 (901.7, 1069.2)</td>
<td></td>
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<tr>
<td></td>
<td>TL 1056.99 (975.61, 1138.37)</td>
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**Disclosure of Interest:** None Declared

**Keywords:** Videolaryngoscopy, Neonatal Intubation, Mastery Training

**Patient Safety and Quality Improvement**

**IPSSW2014-1083**

**Exploring Code Blue Team Experiences at a Tertiary Care Pediatric Hospital**

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1Hospital for Sick Children, Toronto, Canada

**Background:**
Code blue teams in hospitals are mobilized and assembled on an ad-hoc basis to resuscitate critically ill patients. Varied simulation-based training opportunities are in place to enable code team members to manage these complex situations. However, it has become increasingly apparent that the provision of optimal resuscitation training is impeded by a lack of understanding of the significance of various elements of code blue team performance. As a starting point towards more effectively designing and implementing resuscitation training opportunities, the current study explored code blue team experiences at our tertiary care pediatric hospital.

**Research Question:**
To understand the experiences of code blue team members with a focus on teamwork, leadership and education.

**Methodology:**
We used a grounded theory approach with the aim of developing a model of code blue team performance at our hospital. Approval was obtained from the hospital’s Quality Risk and Management Board. We conducted 23 semi-structured interviews with participants who were selected using purposeful criterion and maximum variation sampling strategies. Specifically, in addition to having experience with resuscitation, we identified those who were...
recently involved in a code blue event and interviewed individuals across professions. The data was iteratively collected, transcribed and analyzed using a constant comparative approach. Data analysis was facilitated using NVivo qualitative research software.

**Results:**
The three main themes that emerged were: 1) the impact of leadership - necessity of a loud and clear leader who keeps calm and delegates roles and tasks; 2) the importance of context - physical space, familiarity with equipment and people, and variable definitions of codes; and 3) the role of experience - code blue skills overlapping with skills of daily practice, and the ability to interpret the situation and adjust to flexible roles and procedures.

**Discussion/Conclusion:**
Our results highlighted the importance of effective leadership and the challenges of working as an ad-hoc team in different locations and variable situations. Of particular interest to our aim of designing effective simulation-based training was our participants’ articulation of their confidence with the skills required in a code blue situation that overlap with the skills they use in their daily practice and their resulting unwillingness to perform skills that fall outside the scope of their own practice. Code blue events are rare and it is difficult to provide the exposure and maintain the knowledge and skills that may be outside of an individual’s everyday practice. Simulation based courses, including “in situ” simulation, are well suited to address these issues, however future educational interventions can be better tailored to meet specific needs and gaps for different team members. These findings may be transferable to other institutions with similar code team structures and patient populations.

**Disclosure of Interest:** None Declared

**Keywords:** Resuscitation, Simulation, Teamwork

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**Patient Safety and Quality Improvement**

**IPSSW2014-1200**

**Crash Test Simulation: Rapid Improvement of Safety Throughout a New Building Prior to Opening**

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**Background:**
Inherent hazards exist when utilizing a new clinical space for patient care. Prior efforts to mitigate risks have focused on isolated systems testing (e.g. code blue alarms) and staff training, but have not tested all elements of the environment. Simulation has been previously used to identify hazards related to introduction of new high-risk procedures 1 and to test single clinical environments prior to opening. This study aimed to use in situ simulation to perform pre-opening environmental safety testing across a new 10-floor clinical building.

**Hypothesis:**
In situ simulation across multiple areas in a new clinical building would allow us to rapidly identify and address unit-specific and global safety, orientation and personnel gaps prior to building occupation.

**Methods:**
6 Step Process: (1) focus group analysis (FGA) with key stakeholders (hospital, nursing and code team leadership) was used to identify 6 locations of perceived highest risk in a new 10 floor inpatient building connected to a large Children’s Hospital. (2) Follow-up FGA and building walk-throughs with stakeholders from each area were used to identify specific testing objectives within four categories: personnel resources, emergency response/ communications, equipment concerns, and environment-specific safety concerns (e.g. MRI safety). (3) Simulation scenarios were created to target each objective, employing multiple simultaneous scenarios to authentically recreate “a day in the life” for native teams. Simulation participants included inpatient staff as well as ICU and CICU code teams. (4) Expert observers used structured worksheets to identify areas of concern related to the testing objectives. (5) Structured debriefing of participants and observers was used to identify areas of concern and brainstorm solutions. (6) Results of testing were distributed to hospital and unit leadership for remediation.

**Results:**
Safety testing was conducted in 6 unique areas over 3 days: non-clinical mechanical space, remote inpatient MRI suite, and 4 inpatient wards (cardiology, neuroscience, oncology, and surgery). Debriefing identified 43 unique safety concerns related to Code team response (5), communications systems (2), equipment concerns (missing, poorly positioned, or malfunctioning) (18), inadequate personnel resources (3), knowledge gaps (5), or latent safety threats (10). Primary and secondary solutions were identified for each point, with primary solutions categorized as establishment of uniform practice/ education (19), minor building/engineering modifications (6), obtain/modify equipment (17), and staffing changes (1).

**Discussion:**
High-fidelity in situ simulation was used within a structured process to identify and address specific testing objectives related to patient safety in a large new clinical environment. Testing successfully identified a large number of threats to patient and personnel safety and solutions were identified to insure safe occupancy.

**References:**

Disclosure of Interest: None Declared
Keywords: in situ simulation, latent safety threats, patient safety

Crisis Resource Management/Human Factors and Teamwork
IPSSW2014-1037
Establishing Sustained Culture Change Through Team Training
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Background:
Many patient safety concerns raised in the 1999 Institute of Medicine report1 have not been resolved despite considerable attention.2 Medical errors are commonly attributed to communication breakdowns.3,4 Conversely, effective teamwork and communication has been associated with objective measures of high quality care.5 Simulation is an integral core of many teamwork training programs. To date, there are no published serial assessments of the impact of teamwork and communication training on the culture of safety over time in the pediatric literature.

Research Question:
Using a validated instrument, we serially assessed the safety culture in a Neonatal Intensive Care Unit (NICU) before and after a customized teamwork training initiative and novel sustainment program. We hypothesized that perceptions of safety culture would improve longitudinally.

Methodology:
A modified Agency for Healthcare Research and Quality Survey on Patient Safety Culture was administered to NICU staff prior to participation in a compulsory, multi-disciplinary, simulation-based teamwork training and communication skills program. A deliberate sustainment program to prevent drift of lessons learned included integrating the principles into work rounds, signage, an intranet-based situational awareness board, team huddles, and novel teamwork training rounds by NICU nursing and medical leadership. The same survey was administered to staff 3 and 12 months following participation. Percent positive response was calculated for each statement and proportions were compared using chi-square testing. Results are compared to national data.

Results:
96% of 350 NICU staff members were trained over 2 months. Two of 10 survey items improved and one declined 3 months after training. Four survey items improved and one remained lower at 12 months. The proportion of participants who agreed with the statement: “Staff feel free to question the decisions or actions of those with more authority” increased from 55% to 76% and 83% at 3- and 12-months respectively (p<0.0001). The proportion of participants who disagreed with the statement: “Things ‘fall between the cracks’ when transferring patients from one unit to another increased from 36% to 48% and 52% (p<0.01). “Staff will freely speak up if they see something that may negatively effect patient care” improved from 81% to 85% and 90% (p<0.02). “In this unit, people treat each other with respect” changed from 69% to 68% and 80% (p<0.011).

Conclusions:
Compulsory training in teamwork and communication skills improves short-term NICU staff perceptions of empowerment and the quality of patient hand-offs. A novel sustainment program following teamwork and communication training measurably improved staff perceptions of culture of safety over 1 year.

References:
1 Khon L, Corrigan J, Donaldson M, eds. To Err is Human: Building A Safer Health System; Washington, DC. National Academy Press; 2000(1)

Disclosure of Interest: None Declared
Keywords: None

Interprofessional Education (IPE)
IPSSW2014-1052
Did they Use it? A Qualitative Study Exploring Transfer of ‘Attitudes’ from Simulation to Workplace
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Background: Simulation Education is increasingly being used in order to develop appropriate ‘knowledge, skills and attitudes’ needed in the resuscitation of newborn infants. ‘Human factors’ are a leading cause of unsuccessful resuscitation attempts and yet it is unclear as to whether training received in ‘attitudes’ in simulation training is being reproduced at the workplace and retained over a period of time.

Aim: To explore candidates’ perceptions as to whether the training they have received in ‘attitudes’ in a neonatal simulation course is transferred to the workplace.

Methods: Purposive sample of 6 doctors and 6 nurses from a total of 8 each were recruited from an inter-professional Advanced Neonatal Resuscitation Simulation Course. Semi-structured interviews were conducted 3-6 months following the course which consisted of key questions exploring transfer of ‘attitudes’ with follow-up questions based on the responses of the participants. All interviews were audio recorded with the consent of the participant to facilitate verbatim transcription and coded concurrently which aided further data collection. Two independent researchers coded transcripts and agreed on final analysis. Participant responses were analysed using thematic analysis by manual coding.

Results: All participants reported transfer of learning to the workplace. Three main themes emerged. The first theme was ‘Self-Awareness’, in which nurses reported better recognition of the image they project as team leaders. The second emerging theme, ‘Shared Understanding’ highlighted how nurses were now using two-way communications not only at resuscitation but also during interactions with colleagues and parents. Doctors reported increased awareness of the image nurses were now using to facilitate working as a team. The third theme to emerge was ‘Collaboration without Confrontation’, where both nurses and doctors reported opting for strategies to avoid conflict when there was a difference of opinion, leading to better working environments.

Conclusion: This study focuses on the translation of learning of human factors “back on the job” from the perspective of the candidates. Results indicate that learning, facilitated by human factors’ training on inter-professional neonatal simulation courses, is being reproduced at the clinical workplace. The time frame of the interviews emphasises retention of attitudes at least in the short term. In conclusion, this study provides a qualitative insight into the question “Did they use it?” in terms of human factors training with initial evidence of translation of behaviours from simulation to the workplace.

Disclosure of Interest: None Declared

Keywords: simulation, attitudes, transfer of learning,

Interprofessional Education (IPE)

IPSSW2014-1103

Did It Make a Difference? Exploring Modification of Behaviour After a Neonatal Simulation Course

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Background: Health Education North West, UK, has been running an inter-professional neonatal simulation course for two years which has aimed to train junior doctors and nurses in the necessary ‘knowledge, skills and attitudes’ needed for the successful resuscitation of a newborn. Pre and post course questionnaires demonstrate good evidence of improvement in the above aspects 1. However, a systematic review of structured resuscitation programs including simulation showed that no study so far has reported on a change in behaviour at the workplace after a period of time 2.

Aim: To determine whether there is evidence of modification of behaviour at the workplace after an inter-professional neonatal simulation course from the candidates’ perspective 3-6 months after the course.

Methods: Purposive sample of 6 doctors and 6 nurses from a total of 8 each were recruited from the inter-professional Advanced Neonatal Resuscitation Simulation Course run by Health Education North West, UK. Semi-structured interviews were conducted 3-6 months following the course with key questions exploring candidate’s perceptions on change in their behaviour following the course with follow-up questions based on their responses. All interviews were audio recorded to facilitate verbatim transcription and coded concurrently which aided further data collection. Interviews were analysed using thematic analysis by manual coding. Two independent researchers coded transcripts and agreed on final analysis.

Results: All participants reported a perceived modification in behaviour. Three themes emerged. Nurses said that they have attempted to ‘break hierarchical barriers’ as they have started to confront the old-fashioned culture of medical superiority. Junior doctors reported an ‘accelerated development’ of their behaviour in a resuscitation scenario which normally would have taken years of experience. Both professions reported an enhanced awareness of ‘synergy’ when working in teams.

Conclusion: This study focuses on modification of behaviour following an inter-professional neonatal simulation course after a period of time. Results indicate
that the neonatal simulation course is leading to a modification of behaviour at the clinical workplace as perceived by the candidates. The time frame of interviews shows that this change in behaviour is sustained at-least in the short term. This is the first attempt to report an evaluation of a training program which corresponds to Kirkpatrick level 3.

References:

Disclosure of Interest: None Declared

Keywords: simulation, behaviour modification,

Kirkpatrick level 3

Educational Outreach (including remote, rural and international simulation education)

IPSSW2014-1073

Compliance with Guidelines Recommending Simulation for Pediatric Resuscitation Training in Austria

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1Division of Neonatology, Department of Pediatrics and Adolescence Medicine, 2Clinical Skills Center, Medical University of Graz, Graz, 3Division of Neonatology, Department of Pediatrics and Adolescent Medicine, Medical University of Vienna, Vienna, 4Department of Pediatrics, Academic Teaching Hospital Landeskrankenhaus Feldkirch, Feldkirch, Austria, 5Department of Pediatrics, University of Alberta, 6Neonatal Research Unit, Royal Alexandra Hospital, Edmonton, Canada

Background:
Current international resuscitation guidelines recommend simulation for the training of neonatal and infant resuscitation.1,3

Research Question:
We aimed at assessing compliance rates with these recommendations in Austria.

Methodology:
We performed a national survey among 31 neonatal institutions in Austria. A questionnaire consisting of 20 questions was sent by e-mail to consultant neonatologists at level II and III neonatal centers. If not returned after eight weeks, a telephone call was made and the questionnaire administered a second time. The study period lasted from December 2012 to April 2013.

Results:
Twenty-five questionnaires (80.6%) were analyzed. The majority of institutions (n=22, 88%) used simulation as instructional modality. Supervised clinical practice, theoretical education (e.g. seminars), and Newborn Life Support (NLS) and/or European Paediatric Life Support courses were named as further educational methodologies.

Six institutions (24%) used medical simulation centers for neonatal and infant resuscitation training. Simulation equipment was available at 17/25 institutions (68%), with a median of 1 part-task trainer (0-2), 2 low-fidelity resuscitation mannequins (0-10), and 0 high-fidelity patient simulators (0-7). Fifteen institutions (60%) carried out team training including physicians and pediatric nursing staff, and 11/25 institutions (44%) utilized interdisciplinary resuscitation training with other medical specialties. Resuscitation training was mainly carried out at clinical locations (e.g. hospital ward, intensive care unit, delivery room; n=12, 48%) and/or in lecture halls and seminar rooms (n=10, 40%). Training frequency varied widely, ranging from one training per month to one training per year. Institutions without simulation equipment at their disposal (n=8, 32%) were asked to specify reasons. Availability of a simulation center and financial restrictions were named five times each.

Discussion/Conclusions:
The majority of neonatal institutions in Austria utilized simulation for neonatal and infant resuscitation training according to current guidelines. However, educational practice varied widely, especially in regard to training frequency and team training. Therefore, we urgently suggest developing a national consensus agreement on best practices in simulation-based neonatal and infant resuscitation training.

References:

Key words: resuscitation, education, simulation

Disclosure of Interest: None Declared

Keywords: None

Programme Development/ Administration and Programme Management

IPSSW2014-1078

Safe Return to Paediatric Clinical Practice - A Simulation Programme for Paediatric Trainees

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Abstract Body:
Returning to work after a break from clinical practice is a daunting prospect for trainees. Many trainees have up to a year away from clinical work on maternity leave or out of programme, with
time periods up to 3 years for trainees undertaking research. These doctors are expected to return to full duties immediately including on-calls. They frequently find this distressing and have concerns about skills, knowledge and confidence. We are not aware of any stand alone simulation programmes in the UK specifically aimed at helping paediatric trainees return to safe clinical practice.

A Paediatric Return to Work Simulation Programme was developed using scenarios mapped to the RCPCH curriculum, covering the key areas of emergency management, safeguarding, leadership, communication skills, and human factors. The course used fully immersive simulation in a purpose built high fidelity centre at the Royal Wolverhampton NHS Trust. The pilot study consisted of 7 paediatric trainees from the West Midlands who were due to return to clinical work following a break in practice. The effectiveness of the programme was assessed qualitatively and quantitatively using pre and post programme questionnaires (likert scales). Two questionnaires were undertaken immediately before and after simulation training and a final questionnaire was undertaken 3 months later following the return to clinical practice.

Results:

Pre-programme: concerns about returning to clinical practice 85.70%. Confident managing acute paediatric problems 28.50%, neonatal problems 28.50%, safeguarding issues 42.80%. Free text concerns included “feeling out of touch, rusty technical skills, and remembering guidelines”.

Post-programme: confident managing acute paediatrics 100%, neonates 85.70%, safeguarding 85.70%.

One wrote “having been out of practice for 1 year, I was worried about forgetting all the protocols and not being useful on the ward. But after attending this session, I feel more confident in returning to work as it covered all aspects of acute practice in a short time”.

Follow up Questionnaire: To date 100% of responders feel confident managing paediatric, neonatal and safeguarding issues. 100% stated that the simulation training helped them transition back into clinical work. 100% agreed the experience learned has been useful in their clinical work.

The Paediatric Return to Work Simulation Programme improves confidence and the perceived ability to manage paediatric, neonatal and safeguarding problems. This positive effect appears to be sustained. Future development would be aimed at identifying whether these positive effects result in an improvement in clinical practice and patient safety. Since the pilot this programme has secured funding from Health Education West Midlands. It has been adopted regionally, with the potential to be adopted nationally.

Disclosure of Interest: None Declared

Keywords: Paediatric, Return to Work, Simulation

Programme development/ Administration and Programme Management

IPSSW2014-1047

A Hybrid Simulation for Genetic Counselors Utilizing a Standardized Patient and Infant Manikin

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Context:

Within the field of genetic counseling, delivering bad news is a necessary skill. Yet opportunities to practice this skill in clinical practicums are rare. Simulation has been shown to be very effective in training health professionals in many fields, including pharmacy, pediatrics, and obstetrics and gynecology. Simulation has also been used to study prenatal counseling, and can serve to train physicians in communication with patients regarding sensitive medical decisions. Recently, simulation has been used in the field of genetic counseling to provide an opportunity for students to practice the disclosure of prenatal test results. The aim of this project was to increase the fidelity of simulations for genetic counseling students by using a hybrid simulation, including a standardized patient and an infant manikin, for disclosure of genetic test results involving a mother and infant child that cried periodically during the session.

Description:

Simulation sessions took place in the Pediatric Simulation Center located at Children’s of Alabama / University of Alabama at Birmingham. Graduate students enrolled in the Advanced Clinical Skills in Genetic Counseling Course were required to attend the hour long simulation activity as part of their fall practicum course. Students were given 30 minutes to disclose results indicating a variant of unknown significance to a mother with a 10 month old child. A wireless manikin was used for the 10 month old child who cried periodically. The genetic counseling program director and an expert in simulation education viewed the simulation in the debriefing room via live video and audio feed. Debriefing took place immediately following the simulation session. The standardized patient participated in the debriefing along with the genetic counseling program director and an expert in simulation education.

Observation/Evaluation:

Students were asked for verbal feedback regarding the value of the simulation experience. Students were also required to write a one page reflection on their performance and the experience of disclosing test results to a mother when the child is being held and is somewhat disruptive. All students reported that the experience was valuable, and...
that they enjoyed the opportunity to practice their counseling skills with a person they do not know.

**Discussion:**
A hybrid simulation utilizing a standardized patient and an infant manikin provides a unique learning opportunity for genetic counselors to practice their disclosure skills in a safe yet realistic environment. Including the standardized patient in debriefing allows for feedback to be given to the student from someone other than the program director and the simulation educator. This type of hybrid simulation can be used for many different scenarios in genetic counseling and can add a layer of depth to the educational components of the program which may not be offered otherwise.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** delivering bad news, genetic counseling, hybrid simulation

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**Programme Development/ Administration and Programme Management**

**IPSSW2014-1166**

**Introducing the First “In Situ” Simulation Program on Cardiac Emergencies at Texas Children’s**

Patricia Bastero 1, William Kyle 2, Kerry Sembera 3, Gay Matthews 4, Jeniffer Arnold 5, Antonio Mott 6, Kevin Roy 1

1CCM, Texas Children’s. Baylor College of Medicine, 2Cardiology, Texas Children’s. Baylor, 3Heart Center. 4CVICU, Texas Children’s Hospital, 5NICU, 6Cardiology, Texas Children’s. Baylor College of Medicine, Houston, United States

**Background:**
Almost every hospital follows patient safety and quality improvement issues, and has to face the training of brand new staff in high acuity care areas. Simulation based educational programs are a very effective and efficient way to train health care providers on emergency situations, and improving their confidence and comfort when treating high risk patients.

**Methods:**
We installed our simulation equipment, including a camera and a mock crash cart, in one the procedure rooms on our cardiology floor. Five simulation instructors with experience on cardiology emergencies and/or CRM skills participate in the program. We run twice weekly “just in time” simulation scenarios. We use the small conference/family room on the cardiology floor for our debriefings. The scenarios are run for 10 minutes, debriefings for 20 minutes. Evaluations are filled post-simulation activities every time, by every participant.

**Results:**
We created over 300 learning opportunities, training 97% of the residents, 100% of the cardiology fellows, 67% of the NPs and 90% of the RNs, on our cardiology floor. The evaluations are overall > 4/5 when assessing for self reported ability to perform as part of a team during high-stakes events, increasing the vigilance to patient safety during crisis and self confidence in handling critical situations. They all found the scenarios helpful and enlightening, and the debriefing sessions useful and educational, but not stressful.

**Comments:**
It feasible to create an interesting and engaging “in situ” educational program with minimal equipment and limited manpower, that improves team and personal performance, as well as helps controlling turn over rates. We need further research to evaluate whether this educational method helps improving patient safety, by, for example, increasing RRT call while decreasing real codes, and improving code outcomes.

**Disclosure of Interest:** None Declared

**Keywords:** cardiac emergencies, in situ, team performance

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**Programme Development/ Administration and Programme Management**

**IPSSW2014-1060**

**Yorkshire Immersive Paediatric Simulation (Yips): A Novel Regional Paediatric Simulation Course**

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**Context:**
Junior doctor training has undergone significant changes in the UK in recent years. Consequently, there has been a drive to embrace new ways of delivering training. In 2011, the Department of Health (DOH) advocated technology enhanced learning (TEL) to potentially improve quality of health care, patient outcomes, safety and experience1. The Royal College of Paediatrics and Child...
Health (RCPCH) is developing a national strategy to integrate simulation-based learning into paediatric training. In 2012, following a survey assessing training needs, a paediatric simulation programme was developed and piloted in Yorkshire for ST3 trainees. This course is now mandatory.

**Description:**
The YIPS programme is a fully immersive simulation-based one-day programme aimed at easing the transition to middle grade status for paediatric ST3’s. Based on the RCPCH curriculum, acute management and communication scenarios were developed encompassing three domains: attitudes, skills and knowledge. YIPS includes resuscitation and stabilisation of children and neonates, provides opportunity to develop handover and leadership skills and promotes safeguarding awareness, safe prescribing and discharge planning. Each candidate immerses in two scenarios followed by debriefing led by an experienced faculty of paediatric consultants, simulation fellows and nurses. Programme implementation for a maximum of 6 candidates per course, is achieved through a simulated paediatric ward and theatre using actors and high-fidelity simulators. Toys, pictures, contemporaneous notes, drug and observation charts and consent forms, enhance authenticity. Candidates observe live video feeds and video playback facilitates debriefing.

**Observation/Evaluation:**
36 trainees attended the mandatory YIPS courses. Pre and post-course candidate questionnaires were used to subjectively evaluate the programme using a five point Likert scale from “strongly disagree” to “strongly agree”. Post-course, trainees felt more confident in their ability to: lead a ward round (P=0.001), lead a team in acute paediatric (P< 0.001) and neonatal emergencies (P=0.0001), provide effective handover (P=0.021), deliver bad news (P=0.005), manage patient discharge (P=0.031) and communicate safeguarding concerns (P=0.062).

**Discussion:**
The DOH and RCPCH advocate the role of TEL for clinical education and patient benefit. We have designed and delivered an immersive simulation-based ST3 course to bridge an important gap between junior and more senior roles. Following the pilot in 2012, this course has become mandatory for paediatric trainees and has received overwhelmingly positive feedback. Our novel course has significantly improved confidence of trainees leading ward rounds, managing acute situations and communicating difficult information; invaluable skills for middle grades. Future aims include objective course assessment and inter-professional participation.

**References:**
2. RCPCH - http://www.rcpch.ac.uk/training-examinations-professional-development/postgraduate-training/simulation-training/simulation

**Keywords:** Paediatric, Simulation, Yorkshire
manage patient discharge (P = .001) and initiate safeguarding procedures (P = .050).

Discussion:
Prolonged absence from the workplace poses a challenge for skills, knowledge and patient safety.\(^1\) Having identified a void in educational support for Yorkshire paediatric trainees, we designed an immersive simulation-based tailored “return to work course” incorporating challenging clinical, communication and team-based scenarios. Our novel course significantly improved the confidence of our trainees in dealing with an array of paediatric situations. Following the success of this pilot our future aims include further course development, objective candidate knowledge and behaviour assessments, integration into other medical specialties and multi-professional use.

References:

Keywords: Return, Work, Simulation
Disclosure of Interest: None Declared

Simulation Instruction Design and Curriculum Development
IPSSW2014-1156
Design and Implementation of a Simulation Based Study for Community Paediatric Nurses
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\(^1\)Bristol Simulation Centre, Bristol, United Kingdom

Abstract Body:
Until recently simulation had not been integrated into the Bristol Community nursing curriculum. We developed a simulation educational event to address recognition and initial management of the deteriorating child and manual handling. The learners were from the Jessie May trust, a charity that care for children with life threatening or life limiting conditions in their own homes. Community nurses are also often lone workers, which increases the difficulties in dealing with emergency situations.

Description:
This was a joint venture between the Bristol Simulation Centre and the Jessie May Trust. Our learning objectives were for the nurses to consolidate their ABCDE assessment, understand when and how to call for help and the use of SBAR communication tool when doing so. There was also the opportunity to explore manual handling issues in an emergency situation with a focus on dealing with these situations in the child’s home. To our knowledge such a community paediatric nursing simulation event has not previously been described in Europe.

The study day consisted of a manual handling update with the trust lead and then 4 scenarios based on real clinical events. The scenarios were as follows:
- Fitting child who is unresponsive to VNS magnet and bucal midazolam
- Child with a dis/misplaced tracheostomy
- Child stuck in a hoist
- Child in hospital who vomits and aspirates

Observation and Evaluation:
The participant’s evaluated the day as 100% successful in helping improve knowledge, skills and understanding and relevant to development. The day also raised awareness of the potential risks while caring for children in the community. Participants commented that the “scenarios were very good and realistic and that the “topics covered are possible real events that might happen”.

Discussion:
The scenarios and subsequent debriefs allowed the participants to reflect and explore issues surrounding being a lone worker. Much discussion was provoked about the importance of familiarity with emergency and manual handling equipment. A recurring theme was the importance of comprehensive handover from parents with regard to general wellbeing of the child and location of medical equipment within the household. Following the day and evaluation it was clear that this is a study day that would be a valuable educational tool if delivered to community paediatric nurses on a regular basis.

Disclosure of Interest: None Declared

Keywords: Community, educational development, Paediatric

Simulation Instruction Design and Curriculum Development
IPSSW2014-1129
All Together Now. The Evolution of Multidisciplinary Training for the South Thames Retrieval Service
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Context:
The South Thames Retrieval Service (STRS) has been established as a combined retrieval service since 18th May 1998. It transfers about 850 critically ill children every year from their local hospital to a paediatric intensive care unit. 76% of these children are mechanically ventilated and 20% require inotropic support.

Description:
Retrieval teams need to be well prepared to deal with all potential situations that could arise. The first contact from the referring hospital will be a telephone call. This call must be handled efficiently and with sensitivity for the caller’s situation. Equally when the team arrive at the referring hospital it is important that relevant information is acquired
speedily and considerately. All this requires excellent clinical knowledge, communication skills and awareness of effective team dynamics to facilitate appropriate actions to ensure the safe transportation of the sick child to a PICU.

Observation:
Traditionally retrieval team member groups; ambulance technicians, nurses and medical staff, have been trained independently of each other. The developments in the field of High Fidelity simulation in health care has allowed education teams to re-create real life scenarios within the safe environment of a simulation suite. This has enabled the multidisciplinary retrieval team to be actively included in combined training. Here both clinical skills and human factors can be explored and developed.

Discussion:
We will detail how the introduction of MDT simulation training days within the STRS has evolved, highlighting areas of challenge and conflict and how these have been overcome to achieve the successful programme of training and support.

Disclosure of Interest: None Declared

Keywords: human factors, multidisciplinary, transportation

Simulation Instruction Design and Curriculum Development
IPSSW2014-1137

Developing a Limited Resource, High Impact Simulation Curriculum in Rural Uganda

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Introduction:
Emergency medicine (EM) is an evolving, and relatively new, field in limited resource settings (LRS). The Global Emergency Care Collaborative (GECC) has developed an EM training program at Karoli Lwanga “Nyakibale” Hospital, in rural Uganda. The program delivers a two year, intensive, high level course, focusing on shifting emergency care services that are traditionally physician level services to local nurses. At its completion, the nurses graduate as “Emergency Care Practitioners” (ECP) and independently manage a wide range of medical, surgical and traumatic emergencies. As in many areas of Africa, the introduction of formal emergency care services has been novel at Nyakibale. Crisis resource management (CRM), mass casualty management, the concept of triage and clinical urgency are not part of traditional health care curricula. Additionally, in a hierarchical education system, it’s not culturally acceptable be seen as “practicing” in front of patients, making teaching and integration of some of these concepts more challenging. Simulation is recognized as an effective educational tool in critical care and surgery, but to our knowledge, no focused curricula exists in LRS EM programs.

Objective:
We sought to develop a simulation curriculum that would allow us to integrate teaching CRM & triage principles as well as improve the clinical proficiency of the ECPS in their limited resource, but very high acuity, emergency room setting.

Methods:
The project took place in two phases. First, a needs assessment was performed both with ECPs at the Nyakibale site and with visiting GECC EM physicians. While on site, a presentation and video on ‘an approach to team work’ served as an introduction to simulation and cases were piloted. Input was sought from target learners & educators who provided a list of the cases they felt needed to be most practiced or whose clinical outcome had the highest impact when managed expertly. In the second phase, clinical scenarios identified locally were combined to those generated by the founding physicians of GECC to create a final list to be used in a consensus survey.

Results:
A preliminary list of 47 clinical objectives was obtained through the initial consultations. Five GECC members underwent a consensus survey whereby all objectives with over 80% agreement were kept. This underwent two rounds, after which 24 pediatric, adult and trauma objectives were identified for the core curriculum and a further 12 for an advanced curriculum. Special note was made to include decision making ability, social dilemmas (eg domestic violence) and skill development in the scenarios.

Conclusion:
To our knowledge, this is the first formal simulation curriculum to be developed for the delivery of adult & pediatric EM skills and practice in LRS. A description of the curriculum, including resources used, topics covered and evaluation methods, is forthcoming. We hope to encourage collaboration as this project goes into its implementation stage.

References:
3. Levine AC, Presser DZ, Rosborough S, Ghebreyesus TA, Davis MA. Understanding barriers to emergency care in low-income countries:

**Disclosure of Interest:** None Declared

**Keywords:** human factors, multidisciplinary, transportation

**Simulation Instruction Design and Curriculum Development**

**IPSSW2014-1137**

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3. Levine AC, Presser DZ, Rosborough S, Ghebreyesus TA, Davis MA. Understanding barriers to emergency care in low-income countries:
view from the front line. Prehosp Disaster Med 2007;22(5):467–70.631
5. Periyanyagum U., Dreifuss B., Hammerstedt H., Chamberlain S., Nelson S.W., Kamugisha J. B., Koshaba P., Bisanzo M.

Disclosure of Interest: None Declared

Keywords: curriculum, limited resource, simulation

Faculty Development

IPSSW2014-1136

Reflection and Learning from One Year Position as a Paediatric and Neonatal Simulation Fellow

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Context:
Clinical teaching fellowships in the UK have existed sporadically depending on different medical specialties preferences and local trusts commitment to educational development. However, more posts have been invested in following Lord Darzi’s recommendation to develop and increase clinical leadership.

The Yorkshire and Humber Deanery School of Paediatrics used part of this funding to form management and leadership fellowships in simulation. Over the last 3 years these posts have been expanded and now encompass 6 full time fellows working across the region.

The principle behind investing in these posts was the recognition that simulation provides excellent educational resource to develop clinical and non clinical skills including team working, communication, leadership abilities.

Description:
For the past year we have been working as simulation fellows throughout the region. Responsibilities included delivery of simulation-centre based single professional courses, development of an “in situ” multi-disciplinary simulation programme, increasing access to multi-disciplinary based sessions, improving consistency and collaboration as part of a regional simulation network.

Observation/Evaluation:
The year as a simulation fellow has helped develop our simulation, teaching and leadership abilities. As well as sustaining programmes already in place, we developed a new region-wide “in situ” simulation project and immersive neonatal intensive care simulation for medical trainees and nursing staff.

We have been involved with designing scenario and setting up a scenario bank, running mannequins, technical support and facilitating and debriefing sessions. Further work includes research and work to reduce patient risk by identifying systems errors through “in situ” simulation.

Challenges we faced included resistance and prejudice to simulation, lack of nursing experience of simulation as an educational tool, and the importance of creating projects that would be sustainable on a long-term basis.

Since the posts have come into existence, simulation has become a mainstay of medical education for paediatric trainees, access to multidisciplinary education has increased with simulation sessions implemented in hospitals throughout a large regional area.

Discussion:
We found that simulation fellows have allowed development of a regional programme of simulation, which would not have been achievable without these posts.

Simulation fellows can be an invaluable resource to help develop and implement simulation courses. However, currently there is no network of simulation fellows, or record of how many posts exist. There are no recommendations as to what training should be given to new fellows or what the role should involve.

It would be useful to develop a curriculum for medical simulation fellows to follow including recommended induction and training. A network of fellows to share experiences and knowledge would help to maximise collaborative work throughout the UK.

References:
3 SaferMedicalPractice: Machines, Manikins And Polo Mints, CMO Report, Department for Health 2008
4 A clinical fellowship in simulation in health care. Mercier S, Jones ND, Guha A. BMJ Careers, Feb 2010

Disclosure of Interest: None Declared

Keywords: educational development, fellow, simulation
**Standards of Best Practice: Simulation**

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**Context:**
The first Standards of Best Practice: Simulation were published in 2011 by the International Nursing Association of Clinical Simulation and Learning (INACSL), followed by the first revision in 2013. This presentation will discuss how these standards apply to pediatric simulation.

**Description:**
There are seven Standards of Best Practice identified in the 2011 publication:
1. Terminology
2. Professional Integrity of the Participant
3. Participant Objectives
4. Facilitation
5. Facilitator
6. The Debriefing Process
7. Participant Assessment and Evaluation

In 2013, these were updated and include initial guidelines for implementation. The document will continue to be updated every two years to ensure the practice is kept up to date.

**Observation/Evaluation:**
The Standards of Best Practice should be utilized as a foundation to make decisions in the design, implementation, and evaluation of pediatric simulations. They are as appropriate for pediatric scenarios as they are for adult. This presentation will provide numerous examples of how these Standards can drive decision-making for those facilitating learning with pediatric patient simulation.

**Discussion:**
It is vital for educators and facilitators of learning in the simulation environment to achieve the highest standard possible in this setting. Simulation has traditionally been held to a higher standard than other teaching strategies due to the very large cost of providing this methodology; however, learning outcomes now drive our need for excellence. These Standards can provide the foundation for facilitators while allowing for individualization of teaching.

**References:** INACSL Board of Directors. Standards of Best Practice: Simulation. Clinical Simulation in Nursing. 2011;7, S1-S20.

**Disclosure of Interest:** None Declared

**Keywords:** Simulation Design, Standards, Terminology

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**The Simulation Quality Assurance and Development Process**

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1STFS, HEKSS, Brighton, 2Ed Dept, HEKSS, London, 3Sim Centre, University of Surrey, Guildford, 4Sim Centre, St George’s Hospital, 3Sim Centre, Barts and the London Hospitals, London, United Kingdom

**Context:**
Postgraduate (PG) Medical Education using simulation has been gradually introduced throughout the last few years and it is accepted that the equipment, the degree to which embedding of simulation into postgraduate medical education (PGME) has occurred, and the development of Simulation Local Faculty Groups (LFGs) is diverse and variable across Kent, Surrey and Sussex (KSS) Local Education Providers (LEPs). Within KSS, a simulation experience is mandatory for all Foundation Year 1 doctors and strongly recommended for all Foundation Year 2 doctors. It was always the intention to visit LEPs to observe simulation in practice. The SQUAD visit was aimed to provide both visitors and members of the Simulation faculty the opportunity to exchange ideas and concerns relating to the use of Simulation in the education of postgraduate doctors in the KSS area. The key to the learning from this is the professional conversation after the observation has been completed.

**Description:**
To gain the widest possible perspective, the KSS Simulation team was augmented by two colleagues from the London Deanery, a colleague from the University of Surrey as well as an Associate Director from the South Thames Foundation School. The team was therefore a mix of clinical and academic colleagues which would inform the process from two paradigms.

**Observation/Evaluation:**
The planning stages were more time-consuming than estimated, but it was felt that as a new programme (which had only been piloted on a very small scale the year before), needed time for ideas to be discussed, expanded and agreed. The benefit of working with colleagues with different experiences and perspectives cannot be underestimated. At each stage of the process, including the preparation of documentation, progress was discussed and agreed by the team as a whole.

Sharing team aims and values: It was agreed that the visits should be:
- Developmental for both the visitors and the visited
- Should focus on the learning engendered by the simulation
- Observe and feedback on key processes:
  - Pre-session activities
  - Introduction
  - Familiarisation with the manikin (if used)
- Scenario
- Debrief
- After session activities

It was also agreed that documentation should be sent to all LEPs prior to their visit. This documentation should guide the LEP through the key processes and focus.

**What was observed during the visits?**

The simulation events observed were diverse but 90% of those visits were to Foundation Simulation, the remaining 10% involved higher specialty trainees. We will present findings from our visits giving an overview of simulation practice within the Kent, Surrey and Sussex region.

**Disclosure of Interest:** None Declared

**Keywords:** None

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**Faculty Development**

**IPSSW2014-1104**

**Curriculum Led Simulation-A New Training Resource on the E-Training for Trainers Website**

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1STFS, HEKSS, 2STFS, South Thames Foundation School, Brighton, 3STFS, 4Ed Dept, HEKSS, London, United Kingdom

**Context:**

We present an e-learning module on Curriculum-Led Simulation (CLS) developed for faculty trainers and trainees to give an overview of a standard simulation experience within the Foundation years.

**Description:**

e-Training for Trainers (e-TTT) is a generic, open-access, interactive e-learning platform which uses video clips and self-assessment to deliver training to trainers. The modules cover a range of topics including workplace-based assessments, annual review of competency progression and other educational / clinical topics. It is linked to a database which records details of those who have completed the training modules; the database can be accessed by employers. This freely available educational initiative has been developed and resourced by the South Thames Foundation School / Kent, Surrey and Sussex Deanery (KSS). KSS Simulation Network (KSS SimNet) were commissioned to produce the module on CLS and a professional production company was employed to provide technical expertise during the filming and editing process.

**Summary of Results:**

We will present feedback on the new CLS module together with data showing the current usage of the e-TTT site across all modules.

**Discussion:**

e-TTT is an innovative way of providing open access educational materials to both trainers and trainees. The production of modules is dependent on adequate resourcing, significant input from committed trainers and professional production support.

**Take-Home Message:**

e-TTT is an effective platform for the delivery of web-based training modules covering a range of specialty topics.

1) Faculty Development
2) Programme development
3) Multimedia, e-learning and computer-based instruction

**Disclosure of Interest:** None Declared

**Keywords:** None

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**IPSSW2014-1148**

**Integrating Simulation to an International Project for New Pediatric ECMO Teams in Latin America**

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**Context:**

New pediatric ECMO teams are developing in Central and South America. Unfortunately not every individual in those teams has access to training in centers with large volume and experience on ECMO. Our team has been approached once again to teach introductory courses on ECMO in Colombia, Chile and Costa Rica. There is evidence in the literature on the benefits of simulation-based ECMO training1-3. We previously taught this course, including simulation scenarios, with standard post-scenario debriefings (2013). We have created a new educational program for our 2014 courses, directed to novice ECMO teams with little or no previous experience with simulation.

**Description:**

Didactic lectures will be run every morning, as in previous courses given to members of the same hospital, followed by simulation-based training sessions every afternoon. They are all 3 to 5 days long intensive courses. The groups trained during 2013 will represent era 1: with traditional group debriefings after each scenario. The new groups will represent era 2. For era 2 groups the simulation scenarios will follow a different pattern of debriefing. Utilizing rapid cycle debriefing for the first 1-2 days, while practicing ECMO basics, which will give the groups an opportunity to familiarize with simulation. On days 3-5, more complex scenarios will be presented with the main objectives of CRM skills and team training. Those days, traditional scripted group debriefings will be conducted.

**Observation/Evaluation:**

We will compare the pre and post-evaluations of era 1 (2013) and era 2 (2014), expecting better results on the latest.

**Discussion:**

Adapting the type of debriefing to the expertise on simulation of the learners, and changing it along their exposure to simulation and the topic taught,
may represent a more efficient way of training novice ECMO teams.

References:

Disclosure of Interest: None Declared

Keywords: evolving debriefings, novice ECMO teams

Multimedia, E-Learning and Computer-Based Instruction

IPSSW2014-1175

Sven: a Simple, Web-Based Ventilator Simulator and Blood Gas Instruction Platform

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Abstract Body: Education and Technology Innovation:

Context:
In the UK within paediatric intensive care, many medical and nursing clinicians commence their attachment with only a rudimentary knowledge of ventilator management and ventilatory strategies. Specifically in our institution, a programme to develop nurse-led weaning of ventilation has been set up, but the educational materials relied largely on didactic lectures before a block of supervised practice.

To address this gap in educational provision, we have developed SVEN, a web-based simulated ventilator that allows practitioners to adjust ventilator settings and which will then produce a realistic blood gas based on their changes. To assist the education process, educators are able to construct multi-stage scenarios, with stepwise tasks created for the learner.

Description:
Using the FileMaker Pro Database system (1), a platform was devised that replicated the common controls on most ICU ventilators. Educators can script a brief scenario in multiple stages and are able to set parameters such as airway resistance, chest wall resistance, A-a gradient and serum bicarbonate. By this method, a suitable starting blood gas is derived. Learners can then be asked to set values for inspiratory time, ventilatory rate, inspiratory and expiratory pressures, inspired oxygen and see the effect their adjustments have on the blood gases. The scenarios can be scripted in such a way as to be useful for group teaching, instructor supervision or self-directed learning.

Observation/Evaluation:
SVEN was written specifically for, and trialled during, the latest ventilation weaning course for nurse practitioners. The platform was projected in a classroom setting as part of the course delivery and direct feedback was sought from course participants. As a result of this feedback, adjustments were made to SVEN's interface resulting in an enhanced experience for users new to ventilatory practice.

Discussion:
SVEN provides a simple, educator driven platform through which multiple ventilation-based scenarios can be constructed and then used for education and teaching. Initial responses to the platform from educators and learners have been extremely positive.

References: (1) FileMaker Pro Inc., Santa Clara CA, US

Disclosure of Interest: None Declared

Keywords: Educational Development, Technology, Ventilation

Serious Games and Virtual Environments (e.g. second life)

IPSSW2014-1178

Serious Gaming: A Virtual Mechanical Ventilation Simulator for Pediatric Critical Care Medicine

Traci Wolbrink 1,* Jeffrey Burns 1
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Context:
Post-graduate medical trainees face many challenges when trying to master complex concepts in the pediatric critical care environment including work hour restrictions and increased pressures on physicians to assure safe and efficient care. Thus, opportunities for experiential learning that had served as the foundation of the hospital-based apprenticeship model have decreased (1). The emergence of innovative technologies, such as serious gaming, actively incorporates principles of adult learning theory, offers the potential to accelerate learning for complex topics such as mechanical ventilation, and allows the learner to practice prior to performance. Serious gaming is becoming more utilized in medicine (2-3). Here we describe the development and early use of a virtual mechanical ventilation simulator for pediatric critical care providers.

Description:
The virtual mechanical ventilation simulator was developed based on the alveolar gas equation and expert-derived algorithms, and incorporates all facets of managing a mechanically ventilated child, including clinical assessment of the patient, ventilator, and monitoring, as well as graphical displays of waveforms, capnography, patient generated
variables, and arterial blood gas measurements that result from device manipulations (Figure 1). The ventilator contains a knowledge guide, short problems to solve, and case studies. After field-testing for usability and quality assurance, the device was deployed on OPENPediatrics (OP), a web-based training platform. Robust analytics embedded in the platform track use patterns, and user surveys provide qualitative feedback for ongoing formative evaluation.

Figure 1: Screenshot of a case study in the virtual mechanical ventilation simulator.

Observation/Evaluation:
Since the release of the virtual mechanical ventilation simulator in September 2012, 255 pediatric critical care providers have used it 498 times, spending an average of 78 minutes on the ventilator activities. 43 users completed an online survey after using the ventilator, and 84% (36/43) of users reported that the ventilator was useful or very useful. Through formative evaluation, we have identified several sections that required modifications to improve the learning experience. These were corrected and released in several versions over 14 months.

Discussion:
Although still in the testing phase, the virtual mechanical ventilation simulator has the potential for providing an innovative way to teach mechanical ventilation. Qualitative feedback suggests high user satisfaction. Ongoing work is still necessary to validate the simulator, better understand common challenges faced by learners, and further refine the learning experience.

References:

Disclosure of Interest: None Declared

Keywords: mechanical ventilation, Serious gaming, virtual simulation
has helped to identify several latent errors that have been acted upon to improve patient safety. We aim to develop an outreach program to expand the use of this teaching strategy to other hospitals across the region.

References:

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement
IPSSW2014-1069

Identifying Latent Risks Through “In Situ” Simulation Training to Improve Patient Safety

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Context:
In situ simulation training is acknowledged as a very effective way of identifying latent risks in organisations and thus improving patient safety (1,2,3). Within Yorkshire and the Humber deanery, we have set up an ongoing programme of in situ simulation training in paediatrics and neonatology which is being supported by the YHCaNs (Yorkshire and Humber Children and Neonatal simulation network).

Description:
At every in situ session being delivered around the region a latent risks identified form is completed. This allows documentation of the risk identified and details of what has been done to rectify this problem. This information can then feed into local risk management processes as well as being collated at a regional level.

Observation/Evaluation:
Each in situ simulation session results in the identification of a range of latent risks. These can be divided into 4 categories: Environment, Equipment, Medication and Training. Many of the risks identified would be highly unlikely to be reported through the usual risk management processes. With the data collected it is clear there are themes to these risks. So far the recurring themes have included lack of knowledge regarding obtaining O-ve blood in emergency, lack of knowledge of the T-piece system on the resuscitator. Both of which you would expect to form part of any hospitals basic training.

This information is feedback immediately to the teams involved so they can implement change at a local level. Within the YHCaNs we shall be disseminating this information through a 6 monthly newsletter.

Discussion:
In situ simulation training is an excellent way to recognize latent risk and therefore a powerful patient safety tool. We hope by disseminating information about the risks identified through training around the region that patient safety can be improved through shared learning.

References:
2. Identification of latent safety threats using high fidelity simulation, E Wetzel Journal of quality and patient safety June 2013

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement
IPSSW2014-1032

Learning by Reflecting Critical Indented in Simulation Setting

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Introduction:
Conventional teachings using lectures, skills-drills and role play sessions do not replicate the exact clinical environment. At LWNC, simulation sessions have been a regular feature over the past 18months. One of the recent adaptations has been to use actual critical incidents in simulation sessions.

Methods:
Consultant with simulation interest will identify an incident that has happened recently and had major impact on patient’s outcome. The incident is replicated in the simulation setting and response to the incident is then reflected in the debriefing session. Below are examples of incidents simulated.

Incident-1: Term baby with dusky colour transferred from midwifery-led Birth-Centre in air (16miles) to NICU with arrival saturation 45%

Learning objective: Administer O 2 to any undiagnosed blue baby until further assessment.

Incident-2: 28wk preterm with admission hypothermia went on to have umbilical lines as part of Golden hour management with further deterioration in temperature.

Learning objective: Hypothermia is an independent risk for mortality. Secure peripheral venous access and wait for normothermia before attempting umbilical lines.

Incident-3: 26wk preterm infant with severe PIE deteriorates leading to extubation. Re-intubation performed 3 times even though Pedi-cap was...
Learning objective: Pedi-cap showing positive result but no clinical improvement needs more thought rather than just automatic re-intubations:

- Increased pressures, adjustment of ET tube length, ruling out pneumothorax etc.

Incident-4: 25wk preterm with 50-60% O₂ requirement on admission had late diagnosis of esophageal intubation because of time pressures of umbilical lines insertion within golden hour.

Learning objective: Obtain CXR immediately if admission FiO₂ is > 40%, before proceeding with central lines.

Incident-5: A term infant is born with no signs of life. Resuscitation proceeds beyond 18-20 minutes with no cardiac output and although consultant advices to stop resuscitation, registrar gets difficulty in communicating with family due to language problems and at 30 min of age HR appears >100. Child gets cooled and eventually intensive care is withdrawn on day-4.

Learning objective: Decision to stop resuscitation need to made decisively by the resuscitation team where there is no cardiac output despite 10-15 minutes of full resuscitation.

Results:

In our practice, simulating critical incidents that have occurred in recent past in clinical environment has tremendous impact on learning by reflection.

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement

IPSSW2014-1187

Training Away Pediatric Cast Saw Burns Via Simulation: Development of a Novel Simulation Trainer

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Context:

Cast application and removal are essential to pediatric orthopaedics, often performed by providers of variable experience and training. Recent investigations have documented saw burns in over 1 of every 200 casts removed, and insurers have paid up to $100,000 (USD) per claim. Simulation training and practice of proper cast application and removal with feedback, stands to reduce injury, optimize outcomes, and reduce healthcare costs. The purpose of this initiative was to develop, validate, and implement a novel simulation trainer and curriculum to improve safety during cast removal.

Description:

Thirty thermocouples (Omega, Stamford, CT) were applied to a wrist fracture model (Sawbones, Vashon, WA). After fracture reduction and cast application using standardized techniques, a cast saw (Stryker, Kalamazoo, MI) was used to cut the cast with continuous temperature recording. Both “good” and “poor” technique –as established by consensus best practices– were utilized during removal. Temperatures were compared to known injury thresholds; humans experience pain at temperatures above 47°C and above 60°C may lead to epidermal necrosis. In addition to measuring heat with varying techniques, construct validity was evaluated by assessing novice (student), intermediate (resident), and expert (faculty) performance. Finally, competency/proficiency in casting was assessed in residents using a newly developed simulation curriculum.

Observation/Evaluation:

Using cast saw “good” technique, mean peak temperatures were 43°C ± 4.3°C. The highest recorded was 51.9°C. With “poor” technique, mean peak temperature was 75.2°C ± 17.3°C. The maximum temperature with “poor” technique was 112.4°C. This simulator has been integrated into a longitudinal simulation curriculum for trainees rotating through pediatric orthopaedics at our institution each year. Performance is evaluated with an Objective Structured Assessment of Technical Skills (OSATS) as well as temperature measurements. OSATS are correlated with clinical measures of effective cast application (cast index, rate of lost fracture reduction) and patient safety (incidence of cast saw injury).

Discussion:

A novel task simulator and curriculum have been developed to assess competency and enhance performance in the application and removal of casts. There was a 32.2°C temperature decrease when proper cast saw technique was utilized. Furthermore, “poor” technique consistently achieved temperatures that would cause epidermal necrosis. This model allows instruction and continuous monitoring of proper technique by trainees. Ongoing validation study will further demonstrate that more experienced operators have a better temperature safety profile than less experienced operators. Furthermore, correlations between performance in this simulation and clinical outcomes will be quantified. There is tremendous opportunity for widespread implementation both for training and competency/certification.

References:

Discrimination of Interest: None Declared  
Keywords: orthopaedic surgery, patient safety, quality improvement

Patient Safety and Quality Improvement  
IPSSW2014-1140

Training Clinical Teams to Maximize Safety in New Units: A New Use of “In Situ” Simulation

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Context:
In April 2013, Seattle Children’s Hospital opened a new 330,000 sq ft building, including a new emergency department, pediatric and cardiac ICUs, cancer care and radiology units. Prior to opening the new facility to patients, 15 days of in situ simulation-based training were conducted to introduce interprofessional staff to their new work environment and to improve their clinical emergency preparedness.

Description:
After more traditional training and orientation to the new building took place (tour of the new facility, scavenger hunts, and skills-based training), interprofessional staff from all 5 units underwent simulation-based training in routine and emergency patient care. Unit-specific simulation events and patient care scenarios were created and validated with content experts. A total of 70 hours of simulation-based training were conducted in the new building. Before and after the training, participants were asked to complete a survey which included questions on knowledge of availability of emergency supplies, location of emergency equipment, how to summon additional help, and comfort level in responding to emergencies in the new building. Surveys also included questions on anxiety levels and self-perceived preparedness to function in the new facility.

Observation/Evaluation:
A total of 737 pre and post-training surveys were returned (58.6% response rate on pre-training survey and 61.7% on post-training survey). Completed surveys came from nursing staff, 556 (75.3%) physicians, 99 (13.4%), and allied healthcare providers, 82 (11.1%). Significant improvement was seen in self-perceived emergency preparedness, including knowledge of available emergency supplies (p <0.001), knowledge of emergency equipment location (p <0.001), knowledge of how to summon help (p <0.001), and feeling of preparedness to respond to emergencies (p <0.001). 85.4% of participants agreed or strongly agreed, they felt less anxious working in the new building after the training event. 96.8% of participants agreed or strongly agreed that participation in the training would help them function in the new facility.

Discussion:
The addition of in situ simulation training to a more traditional orientation was found to be an effective method of orienting staff to a new clinical environment and to improve perceived clinical emergency preparedness. In situ interprofessional simulation training should be considered prior to utilizing any new patient care area.

Disclosure of Interest: None Declared

Patient Safety and Quality Improvement  
IPSSW2014-1072

High Fidelity Simulation (HFS) Team Training Improves Team Performance for Neonatal Resuscitation

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Introduction:
HFS is efficient to teach neonatal (NN) resuscitation skills to individuals. However delivery room resuscitation is a team work. In the AURORE Perinatal Network (28 maternity units (MU), 45 000 births/year) we introduced an in situ training program based on HFS.

Objectives:
We aimed to determine whether in situ HFS training of 80% the perinatal staff of a MU is able to improve the overall team performance for NN delivery room resuscitation.

Methods:
We performed a randomized controlled trial in 12 Maternity Units (MU), which were assigned to receive 4-hour HFS training sessions for multidisciplinary groups of 6 professionals or no training. Sessions were delivered in situ by experienced neonatologists and midwife.

www.ipedsim.org
A baseline evaluation of the 12 MU was performed from Jan. to Feb. 2012. A random sample of 10 professionals in each MU was faced with 2 standardized programmed scenarios run on a NN HF-simulator. The medical procedures were video recorded for later assessment. The 12 MU were then randomly designed to receive or not the HFS training from Mar. to Jun 2012. All the MU were again evaluated 3 months later using the same 2 scenarios. The evaluation was based on analysis of the videos by two neonatologists blind to the pre/post and training/non training arms. Compliance with 2010 ILCOR Guidelines and skills were evaluated using a score sheet based on different published scores and the teamwork performance using the TEAM score (Cooper 2010).

To compare the differences in team performance between the training group and control group, the total median and median scores of each of the items is calculated and compared using the Mann–Whitney U test.

Results:
34 HFS training sessions were necessary for training at least 80% of perinatal staff of the 6 MU of the training group. A total of 230 videos were analysed from Jan. and Feb. 2013. The total technical score improved of 40.63% in the training group for the scenario 1 (p=0.01) and 29.7% for the scenario 2 (p=0.004). The team performance for the 2 scenarios improved of 60.8% (p=0.001).

Conclusion: Our study shows that in situ HF simulation formation improves significantly the overall staff performance in Neonatal Resuscitation (Technical skills and team work)

Disclosure of Interest: None Declared

Keywords: None

**Patient Safety and Quality Improvement**

**IPSSW2014-1142**

**Using Simulation to Pre-Brief for a High Risk Scenario – Joined Up Thinking**

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Context:
Embrace (Yorkshire & Humber Infant & Children’s Transport Service) is a combined neonatal and paediatric transport service in the UK and transfers critically ill patients by air and ground. Previous reports have described our transport simulation training philosophy1-2. Providing high fidelity simulation training in an ambulance or in the clinical setting can be challenging due to safety and cost constraints3.

One of the tertiary neonatal units and the Embrace service became aware of a patient in the region who was pregnant with conjoined twins. This condition in pregnancy is a rare occurrence4. So this is highlighted as ‘low frequency = high risk’ event which may benefit from simulation learning5.

Description:
Although the patient’s overall care was handed over to the London unit for ongoing management we were aware of the real risk of preterm and unplanned delivery within the region. Our neonatal unit carried out a simulated exercise, with medical and nursing staff to allow the logistics of the delivery and stabilisation to be thought through in a systematic way. Embrace simulated the ongoing scenario of the infants needing to be transferred by ambulance. For both scenarios two baby manikins were attached to each other to resemble the attachment of the twins in this case. This gave staff an insight into how they would be able to position and care for both babies on a resuscitator, in an incubator and in a transport incubator. This covered such issues as the technique of intubation, identification of infants, obtaining vascular access, equipment set up along with the very real issue of a potentially blocked airway needing manual ventilation.

Evaluation:
The simulated delivery and stabilisation on labour ward and on the NICU highlighted a range of equipment and logistical issues. This process enabled us to construct a detailed plan of how equipment should be set up at delivery, what everyone’s roles and responsibilities were and how we should prepare the cot space on the NICU. The simulation carried out at Embrace was done in the ambulance. This was successfully carried out with three groups of staff. Issues regarding equipment and use of personnel was highlighted. Feedback from learners showed that the experience was useful and allowed them to consider the practicalities of moving this rarely cared for patient group. A teaching record was completed to identify clinical governance links and clinical skills and competencies.

Discussion:
These simulated scenarios enabled a detailed and cohesive plan to be drawn up covering delivery, stabilisation and safe transfer of these high risk infants. The plan was made widely available around the NICU and at Embrace to enable ideas to be shared and understood. It was also shared with other local NICUs in case she presented elsewhere in labour. They also highlight the power of simulation as a pre-briefing tool to enable the multidisciplinary team to proactively manage a high risk situation.

References:
1) Hancock S, Harrison C et al. Embracing the future – utilisation of a simulation programme to support the development of a joint neonatal and paediatric transport team. IPSSW2010, Madrid
3) S W Hancock, A Doddamani et al. Proof of concept; use of handheld tablet technology to provide low cost high fidelity simulation training. IPSSW2013, New York
Using “In Situ” Simulation to Test New Clinical Units

Kimberly Stone 1,*, Jennifer Reid 1, Joan Roberts 2, Douglas Thompson 3, Taylor Sawyer 4, Neil Uspal 1, Tausala Coleman 1, Pamela Christensen 5, Leslie Harder 6, Jamell Hassell 2, Elizabeth Evans 7, Don Stephanian 7, Jeanette Zaichkin 8

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Context:
In April 2013, Seattle Children’s Hospital opened a new 330,000 sq ft building, with a new emergency department, pediatric and cardiac intensive care units, cancer care and radiology units. We sought to use in situ simulation to identify patient safety risks associated with the new clinical space by testing new systems and processes one month prior to initiation of patient care.

Description:
Simulation events were designed for each new unit with full care teams. Content experts identified all changes associated with each unit in 4 areas: environment, roles and responsibilities, processes and technology. Each change was ranked according to its potential impact on patient safety and clinical practice. Changes deemed high risk and/or high impact were included in testing. Clinical scenarios representing routine and emergency care for each unit were created and validated with content experts. Over 10 days, all 5 units were “opened” for testing. Clinical and support teams cared for simulated patients for both routine and emergency situations. Observers monitored each testing day and captured potential patient safety risks using a standard log. Observations were recorded and prioritized according to their risk to patient safety as critical, high, medium or low. Emerging themes were identified. Findings were reported to appropriate facilities and clinical groups for remedy. Following opening, new patient safety risks were monitored via a central command center.

Observation/Evaluation:
A total of 249 interdisciplinary staff participated in simulation testing events over 10 days, totaling 2160 participant hours. Thirteen simulation instructors and 5 simulation technicians ran 48 multi-modal simulation scenarios. Over 1800 patient safety risks were identified, including 226 considered critical or high priority (e.g., inability to hear code alarms, emergency equipment location misidentified). Major themes included risks associated with equipment, signage, and planned workflow processes. 100% of critical and high priority safety risks and 98% of all patient safety risks were resolved before the building opened. After opening, no new critical issues were identified.

Discussion:
In situ simulation is a useful modality to identify and address latent patient safety risks in new clinical environments and should be considered prior to utilizing new patient care areas. Integration of simulation activities with organizational structure is imperative to address identified patient safety risks.

Disclosure of Interest: None Declared

Keywords: in situ simulation, latent patient safety risks, testing clinical environments
Observation/Evaluation:
Various simulation scenarios have been run since the start of the project. Examples include accidental extubations, delay in sepsis recognition/antibiotics prescription, ischaemic limb injury due to indwelling arterial line. Scenarios are re-run back to back if the team doesn’t achieve expected outcomes. The anonymous feedback forms by the participants of the scenarios have shown they value this targeted training. The trend of ‘incident severity’ is on the decline on our PICU but long term monitoring will continue to identify any re-emerging or fresh trends.

Discussion
‘Targeted’ simulation training is an important training tool to enhance the safety culture on PICU. PICU Safety and Simulation Groups should develop a symbiotic relationship for this to succeed.

Disclosure of Interest: None Declared

Keywords: PICU, safety, targeted “in situ” simulation

Patient Safety and Quality Improvement
IPSSW2014-1041

It’s in the “Can”- Development of a Multiprofessional Simulation Network for Yorkshire & Humber

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Context:
The Yorkshire & Humber (Y&H) neonatal and paediatric clinical community has a proud history of developing clinical skills and simulation education with free access to one of the first high fidelity simulation centres in the UK, early reports to IPSS1 and collaboration with the Children’s Hospital Boston Pediatric Simulation Program. Financial support for the purchase of equipment and the building of infrastructure, including 4 additional simulation centres, came from the Y&H Clinical Skills Network (CSN). In 2011 it became clear that equipment and infrastructure were no longer a limiting factor to further growth and we had to maximise the utilisation of our most precious resource, people.

Description:
The Y&H Childrens & Neonatal Simulation (Y&H CaNS) Network was established with a clear aim to support the development of knowledge, skills and performance of multi professional teams with responsibility for assessing, resuscitating, stabilising and transferring the critically ill child or neonate. A ‘Hub and Spoke’ model, with 5 mini geographical networks centred on a main simulation centre, was adopted. Multi-professional “Champions” were identified in each hospital with ‘Hub’ leads and key links to Embrace and NHS clinical networks identified. A strategy by the CSN and PD to develop simulation training posts for doctors in training was harnessed. Y&H CaNS Network outputs have included:
- Mapping a strategy to the Framework for Technology Enhanced Learning2
- Identify and sustain simulation training throughout the curriculum
- Standardised simulation template
- Adoption of 5 established simulation courses
- Online bank of peer reviewed simulation scenarios
- Web based platform for resources
- Data collection from “in situ” simulation to identify latent risks
- Network simulation training directory

Evaluation:
Benefits are emerging of how this large multi-professional collaboration is impacting patient safety and delivering value for money. In 2013/14 over 1,300 multi professional delegates are expected to attend over 35 different simulation courses in well-equipped simulation Hub centres. There has been a trend to modify courses, which were delivering single professional training, to provide a learning environment for multi-professional teams. An early evaluation of “in situ” simulation is reporting an improvement in pre and post course confidence levels.

Discussion:
Y&H CaNS Network firmly believes that multi professional teams who work together should train together and this is at the heart of our simulation based education. Having gathered our human resources together we are looking to maximise our resources and provide value for money education which is focussed on patient outcomes. Challenges include providing equitable access for all professional groups. On-going work is dedicated to evaluating this impact, providing quality assurance and ensuring sustainability.

References:
1) Hancock S, Mayer A, Ralph T et al. Bringing the teams together – simulation training for stabilisation and transfer of the critically ill child. IPSSW 2009 Scientific Programme R09c

Disclosure of Interest: None Declared

Keywords: None
Space Invaders: A New Frontier in Large Scale Simulation

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Context: To utilise large scale simulation to assess the full system functioning of a children’s emergency department prior to actually constructing the building. The simulation aimed to identify the impact of physical structure, patient pathways and staffing levels on patient care and experience, departmental efficiency and safety. The simulation was timed to enable the lessons learnt to inform the departmental design, before the final stages of the build commenced.

Description: A life size temporary model of the proposed children’s emergency department was built, with full size walls, equipment and facilities mirroring the proposed layout. The department was staffed with a full compliment of nurses, doctors and therapists, who over a 5 hour period treated 53 child simulated patients and accompanying supervising adults for a range of simulated illness and injury. The simulated patients reflected a typical Saturday evening case mix and the entire patient journey from reception to admission or discharge was simulated in real time. Verbal and written feedback was captured from patients, carers, clinical staff and subject matter experts. Feedback was presented at follow up multi-professional discussion sessions to enable functional utilisation of the data.

Observation/Evaluation: Data regarding the departmental flow of patients, therapies provided to patients and timeliness of treatment, in addition to multi-modal feedback, demonstrated clear structural, functional and staffing challenges within the proposed design.

Discussion: The multi-modal simulation feedback catalysed a redesign of the internal space, patient flow and clinician utilisation within the proposed children’s emergency department. These changes were implemented prior to building the actual department, preventing exposure of real patients to this learning curve. A first for the NHS, the project has demonstrated that design and quality improvement of complex systems can be achieved using large-scale simulation. Simulated child patients brought the clinical space to life, powerfully drew staff into the simulation and provided the child’s perspective on issues such as confidentiality; generating functional information that cannot be obtained from paper modeling. The project demonstrates how staff, children and families can contribute meaningfully to the design of clinical spaces within the NHS.

Disclosure of Interest: None Declared

Keywords: None

Day in the Life of a Pediatric Hospital: Preparing for a Hospital Move Using Simulation Training

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Context: Children’s Hospital Los Angeles conducted multiple eight hour days of simulated patient care in our new hospital building prior to the actual move. Planning for this simulation began months in advance with staff and all disciplines utilizing a scenario template to simulate typical in-patient care. The purpose was to test new workflow patterns, paths of travel, become familiar and competent with new equipment (booms, phones, pneumatic tubes, badge access entryways, paging system, computerized charting systems, etc.) and all new systems.

Description: Eight hour days of simulated patient care in our new hospital building prior to the actual move. Planning for this simulation began months in advance with staff and all disciplines utilizing a scenario template to simulate typical in-patient care. The purpose was to test new workflow patterns, paths of travel, become familiar and competent with new equipment (booms, phones, pneumatic tubes, badge access entryways, paging system, computerized charting systems, etc.) and all new systems.

Observation/Evaluation: Evaluators were independent observers not associated with the inpatient care areas being observed. Workflow coordinators, command center leads and issues communicators were utilized as observers, documented concerns throughout the event and provided feedback in the daily debriefings. This
allowed for capture of issues, concerns, interruption in workflow patterns, IT services and communications, equipment failure or improperly working equipment and identified any other organizational needs.

Discussion:
The large scale simulation of a Day in the Life allowed staff and the entire hospital to become familiar in a new environment. The entire hospital was involved in a large scale simulation exercise that encouraged teamwork, professionalism, excitement and helped to alleviate anxiety of the unknown associated with a hospital move. Any existing problems not foreseen in the new hospital building were identified and corrected prior to the move. On the actual day of the hospital move, patients from all the floors/units occurred simultaneously. Because of Day in the Life simulation, the actual move was completed ahead of schedule in less time than anticipated without incident.

Disclosure of Interest: None Declared

Keywords: None

Process Improvement and Organizational Change
IPSSW2014-1076

Take a Break, Reduce Stress and Improve Performance
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Context:
There is stress built in our learning environment but very little is taught in practical management of stress in our educational curriculum. Simulation has become an integral part of curriculum at all stages of learners, from medical students to residents/ fellows and even practicing physicians. Current research shows improved learning and retention of skills. However, the realism in simulation creates stress and when measured using salivary cortisol levels¹, it is higher in learners undergoing simulation than when these learners were in their work environment managing similar situations (unpublished data by Dr Oriot).

The innovation recommended is introduction of a relaxation technique during pre-briefing phase of Simulation, so that it gets integrated into regular curriculum. The intervention is a simple audio recording prompts with background music to guide learner through breathing exercises and practice of mindfulness over a pre-determined brief time of 5-7 minutes. This intervention could be made available over a mobile phone App and is available to learner at his/her fingertips at command, and can be used before anticipated stressful encounters like presentations during rounds, morning reports etc. It can also be easily incorporated in their daily routine on an individual basis.

Description:
The implementation would include development of such audio recording created in collaboration with Integrative Medicine or adopting a commercially available phone App. There are several such Apps available but are incomplete in terms of active participation with mindfulness. The development of our own intervention would enable it to be more inclusive and culturally appropriate and timed to fit into the curriculum schedule.

Observation/Evaluation:
The outcome can be objectively tested in a piloted simulation setting where the intervention of 5-7 minute relaxation technique can be included in pre-briefing phase. There are commercially available kits to measure salivary cortisol using micro-ELISA. With IRB approval and informed consent, learners can be tested for levels of salivary cortisol at baseline (pre-intervention) and after simulation (post-intervention) in intervention (case) and non-intervention (control) groups, along with physiological parameters like heart rate to assess the effectiveness of intervention. The learners can also be surveyed on self-report of stress and the usefulness of intervention.

Discussion:
The skills learnt and practiced during sessions and maintained there after on a regular basis will foster emotional well-being and improve learning and performance during any stage of learner’s life i.e. clerkship, residency, fellowship and professional life. This innovation would yield significant returns in both short and long term time frames, with not very intensive investments in terms of resources and funding.

References:

Disclosure of Interest: None Declared

Keywords: None

Crisis Resource Management/Human Factors and Teamwork
IPSSW2014-1131

Lessons Learnt from Point of Care Neonatal Perinatal Simulation
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Introduction:
Perinatal resuscitation often involves a multidisciplinary team managing the mother and the newborn baby. Management of the mother and baby in a perinatal emergency is often complex and involves a multidisciplinary team working efficiently together. Crisis Resource Management (CRM) factors can be crucial in determining the outcome in such a situation.
The neonatal simulation team set up neonatal-perinatal point of care simulation training sessions to improve CRM factors training amongst maternity and neonatal staff at 2 institutions.

**Aim:**
To share the experience of using neonatal perinatal simulation involving multi-disciplinary team training.

**Methods:**
All simulation sessions delivered at 2 neonatal units were reviewed over a 2 year period (June 2011 to May 2013). The participants were neonatal tier 1 and tier 2 trainees, advanced neonatal nurse practitioners, neonatal nurses, neonatal clinical educator, midwives and obstetric trainees.

All sessions were delivered in the delivery suite using low fidelity preterm and term manikins. Simulation scenarios included maternal emergencies and advanced neonatal resuscitation (ie. massive obstetric haemorrhage, shoulder dystocia, cord prolapse, fetal distress). We analysed the learning points and actions implemented following these sessions. Participants were given feedback by 2 experienced faculty members.

**Results:**
Data from 11 perinatal sessions was analysed and categorized into clinical or Crisis Resource Management (CRM) groups. 47 neonatal staff participated in the sessions.

Gaps in clinical knowledge were identified infrequently. CRM issues related to communication, personal support, equipment and role identification were frequently identified as a significant issue amongst team members.

Action points leading to significant change in clinical practice or system was identified in 4 sessions. All of these related to adequate equipment not being available or stocked on resuscitation trolleys in the delivery suite. As a result, all equipment checklists on resuscitation trolleys were reviewed and updated. Feed back was provided to midwifery and neonatal staff on the importance of regularly checking resuscitation equipment.

**Conclusions:**
CRM issues were identified more often than gaps in clinical knowledge in perinatal multidisciplinary simulation sessions. Identification of issues relating to availability of adequate equipment improved risk management in the delivery suite.

**Disclosure of Interest:** None Declared

**Keywords:** multidisciplinary, perinatal, simulation
greatest for low level agreement questions such as technical skills (52% variability, with anaesthetists lowest and PICU registrars highest).

Discussion:
Trainees from a range of disciplines perceive that interprofessional simulation team training is primarily useful for learning non-technical skills. They report that such training can help them improve management of future critical events, should be built into training programmes and form part of mandatory hospital training.

References:

Disclosure of Interest: None Declared

Keywords: none

Crisis Resource Management/Human Factors and Teamwork

IPSSW2014-1024

Lebanon’s First Multidisciplinary Simulation Workshop

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Abstract Body:
High fidelity simulation was proven to be beneficial in certain aspects of medical training. However, it remains a young concept in Lebanon and few centers currently have high fidelity simulation capabilities.
We conducted a multidisciplinary simulation workshop during the Middle East Medical Assembly (MEMA) held at the American University of Beirut Medical Center (AUB-MC), Beirut, Lebanon in May 2013. The workshop consisted of the following scenarios:
1. Trauma scenario: Adult male who sustained a motor vehicle accident and presented in hemorrhagic shock and an amputated leg
2. OB/GYN scenario: Woman delivering a large-for-gestational-age baby who sustains a hemorrhagic shock secondary to placental abruption
3. Neonatal scenario: Resuscitation of the baby just delivered (scenario 2) with low APGAR scores and shoulder dystocia
4. Airway skills station: Basic and advanced airway skills

We aim to report our experience in conducting the first multidisciplinary simulation workshop in Lebanon.

Methods:
1) Didactic lecture
2) Hands on simulation
3) Rotation between the 4 stations for 20 minutes followed by a 10-minute debriefing session at each station
4) Final collective debriefing

Results:
The audience consisted of attending physicians (15%), registered nurses (39%), residents (34%) and medical students (12%). Attending physicians were Pediatricians obstetricians and family practitioners. Registered nurses were from different departments; mainly the ED, ICU, Continuing professional development office, maternity and neonatal wards, and we also had registered nurses who work in simulation labs in other institutions. The residents were mainly from the OB/GYN and pediatric departments.

The exit survey answers in % to the following questions:
1. Course was very useful (100%)  
2. Will you be using simulation-based education in your practice? (97%)  
3. Will you be interested in attending simulation based workshops in the future? (93%)  
4. Do you think that training workshops such as mechanical ventilation workshops should be simulation based? (97%)  
5. Do you think simulation should be used in residency training? (97%)  
6. Is this your first simulation experience? (No in 41%)

Conclusions:
1. The workshop was successful in introducing simulation technology to our institution
2. Participants requested that simulation be formally introduced in their areas of expertise and practice
3. Participants enjoyed the workshop and thought that simulation was very useful in team work and critical thinking

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Disclosure of Interest: None Declared

Keywords: None
Out of the Blue... Crew Resource Management - Similarities in Aviation and HRO

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Abstract Body:
CRM (Crew Resource Management) encompasses a wide range of knowledge, skills and attitudes including communications, situational awareness, problem solving, decision making, and teamwork; together with all the attendant subdisciplines which each of these areas entails. The elements which comprise CRM are not new but have been recognised in one form or another since aviation began, usually under more general headings such as ‘Airmanship’, ‘Captaincy’, ‘Crew Co-operation’, etc. In the past, however, these terms have not been defined, structured or articulated in a formal way, and CRM can be seen as an attempt to remedy this deficiency. CRM can therefore be defined as a management system which makes optimum use of all available resources - equipment, procedures and people - to promote safety and enhance the efficiency of flight operations. CRM is concerned not so much with the technical knowledge and skills required to fly and operate an aircraft but rather with the cognitive and interpersonal skills needed to manage the flight within an organised aviation system. In this context, cognitive skills are defined as the mental processes used for gaining and maintaining situational awareness, for solving problems and for taking decisions. Interpersonal skills are regarded as communications and a range of behavioural activities associated with teamwork. In aviation, as in other walks of life, these skill areas often overlap with each other, and they also overlap with the required technical skills. Furthermore, they are not confined to multi-crew aircraft, but also relate to single pilot operations, which invariably need to interface with other aircraft and with various ground support agencies in order to complete their missions successfully.  

There are similarities between Jetpilots, paediatricians and a paediatrician and the necessity for both to train the Non-Technical-Skills especially in a more and more complex PC depending environment.

References:
(1) CAP 737 / Crew Resource Management (CRM) Training 29 November 2006 Civil Aviation Authority 2006  
(2) http://www.exosphere3d.com/pubwww/pages/project_gallery/cactus_1549_hudson_river.html  

Disclosure of Interest: None Declared

Keywords: Academic training - flight surgeons - paramedic, CRM - Crew Ressource Management, military/ civilian Aviation and high reliability organizations

Simulation For Procedural and Psychomotor Skills

‘Look Inside’ - A New Concept for Training Model Design: Application to Chest Tube Insertion

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Introduction:
Insertion of chest tube is a mandatory procedure in case of traumatic pneumothorax, but risks severe complications if not well-performed. While simulation-based training in chest tube insertion allows a net gain in performance, a simple and realistic model for surgical insertion of chest tube is lacking.

Objective:
The objective was to design an adequate model for surgical chest tube insertion.

Methods:
A task-trainer combining a plastic, electronic, and biological material designed by 4 experts and tested on 56 participants over 30 months (on a 1-10 Likert scale).

Results:
The model involved a half chest-wall (lamb) fixed on cover of a plastic box, connected to a webcam facilitating assessment of the intra-thoracic steps of the procedure, for 60 € of equipment. All anatomical structures were represented during

An Example for a superb performing aircrew is the Hudson River Accident with US Airways Flight 1549 on January 9th 2009.  

Unfortunately the Air France flight 447 on 1st June 2009 proved that even the best meant standards are sometimes not enough to prevent a tragic accident.  

I will point out the similarities between a jetpilot and a paediatrician and the necessity for both to train the Non-Technical-Skills especially in a more and more complex PC depending environment.
surgical dissection and insertion of chest tube. Wrapping the box cover with plastic film on both sides enhanced realism (pleural membranes). The demonstration contributed to teaching 8 participants in a row (200 €) and was reproducible over 30 months of diversely located courses. Anatomical correlation and realism were highly rated by users (7.4±0.82 and 7.5±0.85 respectively), and also served as tools through which the procedure was learned (8.36±0.96). The overall satisfaction of users was: 8.33±0.87.

Conclusion:
The model for surgical chest tube insertion in traumatic pneumothorax was found to be realistic, affordable and transportable. Furthermore, it allowed comprehensive assessment of the extra and intra-thoracic procedural steps. It represented a very useful tool for teaching a complex procedure for which existing models are insufficient.

References:

Disclosure of Interest: None Declared

Keywords: None Declared

Simulation For Procedural and Psychomotor Skills
IPSSW2014-1191
Training Lumbar Puncture through Simulation. A New Experience in a Pediatric Teaching Hospital

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Context:
The advantages of using Clinical Simulation in medical education are widely known. In Argentina has been recently incorporated in the curricular simulation activities for pregraduate and postgraduate students. The Associated Direction of Research and Teaching from “Juan P. Garrahan” Pediatrics Hospital has implemented in the Simulation Center a program for the training of professional skills. The simulation training program promotes the acquisition of these skills in a controlled and safe environment before the first contact with the patient.

Description: The goal of this work is to describe the starting experience of a training practice on lumbar puncture for pediatrics’ residents.

Methods and materials: The training on lumbar puncture using simulation was leaded to pediatrics’ residents freshmen, admitted on June 2013. All the participants had full access to the theoretical material (videos and literature) posted on the course’s webpage. They had to complete the pretest and pre confidence survey in order to face the practice sessions. After the practice, the participants had to complete the postconfidence survey and the perception’s usefulness of the educational tool survey. During simulation practices the tutors evaluated the procedure through a skills checklist. The simulation practice was closed with a “debrief” to reflect on the strengths and weaknesses evidenced during practice. Subsequently, the impact of the program was picked up from participants’ performance first lumbar puncture on real patients, after the simulation practice.

Observation/Evaluation:
54 pediatrics residents freshmen completed the program. The scores assigned by the checklist averaged 7±/ - 1.6. On the score achieved in the simulation practices no differences were shown between those who had some experience in lumbar puncture and those who had none. The procedure’s confidence level raised significantly after the training. All the participants rated the tool as “very useful” for their practice.

Up to date, 41of the 54 residents performed, at least one lumbar puncture on real patients, after training through simulation. 83% were successful, with an average of 1.12 puncture attempts. None of the patients had immediate complications related to the procedure.

Discussion:
The training program on lumbar puncture through simulation has also added to the skill and systematic evaluation of the procedure. The subsequent impact of the use of this tool was largely positive. One of our questions is whether a good performance in the real procedure is a reliable and convenient way to measure the real impact of the program. Furthermore we ask whether participants can maintain positive impact on long-term participants. These and other questions must be answered in future research.

References:


Disclosure of Interest: None Declared

Keywords: lumbar puncture, pediatrics, simulation

Educational Outreach (including remote, rural and international simulation education)

IPSSW2014-1054

The Use of Simulation in a School Nurse Workshop

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Context:
School nurses are expected to care for a diverse group of students with varying ages and medical issues. They must retain competency and stay up to date on treatment protocols ranging from chronic illnesses to emergent situations.1-2 Our goal was to evaluate if school nurses believe interactive simulation is beneficial for reviewing clinical skills and staying informed of current evidence-based practice guidelines. The simulation experience described in this abstract took place as part of a school nurse workshop in July 2013 sponsored by the Alabama Board of Nursing and Children’s of Alabama.

Description:
This simulation experience took place in the Pediatric Simulation Center located at Children’s of Alabama / University of Alabama at Birmingham. One hundred nine school nurses from various school districts within the state of Alabama attended the workshop. Skills reviewed in the simulation center included tracheostomy care, seizure protocol, diabetes management, and asthma exacerbation treatment. Each of these four scenarios was designed to simulate the school setting and was facilitated by a content expert in each skill. Participants spent 30 minutes working through each scenario and participating in a short bedside debriefing. Each participant completed an evaluation after working through all four scenarios and were asked to describe what they believed was most beneficial about the experience and what they felt could be improved.

Discussion:
The program evaluation data was overwhelmingly positive in favor of using simulation as a tool in retaining competency in clinical skills for school nurses, as well as instaying informed on current evidence-based practice guidelines. The participants also believed they would benefit from a yearly workshop involving simulated cases in a school setting along with an increased amount of cases.

References:

Disclosure of Interest: None Declared

Keywords: pediatrics, school nurse, simulation

Educational Outreach (including remote, rural and international simulation education)

IPSSW2014-1160

Drivers and Barriers for Pediatric Healthcare Simulation Capacity Development in Malawi

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**Context:**
Malawi’s pediatric mortality rate is upwards of 120/1000 children.1,2 50-82% of these deaths occur within 48 hours of hospital admission;2,3 Recent introduction the Emergency Triage Assessment and Treatment (ETAT) has reduced mortality by up to 10%.3 As ETAT incorporates elements of simulation, national interest in this educational tool has grown. At the request of the Malawi Ministry of Health (MMoH), members of IPSS evaluated ETAT, to delineate strengths and weaknesses in simulation pedagogy within the program, and identify opportunities and threats to pediatric simulation capacity development in the country.

**Description:**
An 8-person multidisciplinary team travelled to Malawi in May 2013 to conduct the evaluation. A utilization-focused evaluation framework (the CIPP model4) was adopted to guide the process. For each CIPP element, multiple data sources were analyzed, including direct observation, field notes, and interviews with stakeholders completed during site visits to the MMoH, central and district hospitals, rural healthcare centers, both medical and nursing training colleges, and during the ETAT course. Borrowing on the SWOT (strengths, weaknesses, opportunities and threats) matrix,5 data were organized as drivers (strengths and opportunities) or barriers (weaknesses and threats).

**Observation/Evaluation:**
Our evaluation revealed simulation is underutilized within ETAT. Context evaluation identified MMoH support for national scale-up of ETAT and curriculum revision to align with simulation best practices as drivers. Barriers included high patient volumes and staff shortages, limiting time for faculty and participants to attend training. Input evaluation identified access to simulation materials (e.g. mannequins and patients for ‘clinical practice’) as a driver, and a limited number of trainers as a barrier. Process evaluation identified opportunities for interprofessional education and team-training as drivers, and lack of faculty training in simulation pedagogy as barriers. Finally, product evaluation revealed participants perceived ETAT significantly improved their skills. However, severe clinical resource shortages, resulting in a mismatch between what is taught and what healthcare workers can deliver, was identified as a significant barrier to subsequent improvement in pediatric outcomes.

**Discussion:**
Our evaluation reveals faculty development and enhancement of simulation pedagogy within ETAT as the most pressing needs in capacity development of pediatric healthcare simulation in Malawi. This may be facilitated through a ‘train the trainers’ program focused on best practices in simulation.6 Once a highly trained cadre of simulation educators has been established, development of programs beyond ETAT (e.g. “in situ” simulation in healthcare facilities) may be explored. However, in such low-resource settings, educational content must be appropriately matched to the realities of clinical practice.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** Emergency Triage Assessment and Treatment (ETAT), Malawi; pediatric simulation capacity development

**Educational Outreach (including remote, rural and international simulation education)**

**IPSSW2014-1173**

**An Innovative Multimodal Paediatric Simulation Programme Tailored to the Referring Hospital Needs**

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**Context:**
The vast majority of critically unwell children present to their local hospitals where there are no paediatric intensive care facilities. There is a compelling body of evidence that suggests the ability of these local
teams (Emergency, Paediatric and Anaesthetic) to apply best practice ‘Golden’ hours critical illness stabilisation, has a very significant impact on intact survival. The Children’s Acute Transport Service (CATS) as a specialised mobile paediatric intensive care service that provides that serves over 50 district general hospitals that serves a population of 12 million in the South Eastern and Eastern regions of England. CATS has a responsibility not only to ensure timely advice and specialist team arrival, but in addition, to support the education and training of local hospital staff in critical illness response.

Description:
Simulation training addresses all the skill sets required for this stabilisation of the acutely unwell or seriously injured child including, diagnosis, advanced clinical skills, timely application of ICU algorithms, effective team delivery and management of resources. Traditionally immersive simulation training has been delivered to small candidate groups. Additionally in response to local needs assessment and user demand we have adapted a novel approach with a locally delivered multi modal, multi disciplinary simulation training programme which includes:

1. Paediatric critical illness stabilisation training utilising high fidelity portable mannequins and equipment: 8-10 staff per session.
   ‘Stop/Start’ high fidelity scenarios with team member substitutions: 30-40 staff per course.
   High Fidelity Part task workshop
2. ‘Role play’ with faculty as candidates. Audience voting for interventions and team structure with focus on human factors: 20-80 staff per session
3. Where only classroom environments are available, we create a fully immersive environment using our inflatable clinical cubicule in a bag solution

Several of these modalities can be selected on each outreach visit to fit around department educational timetables. This enables frontline and off duty staff to attend in shorter call protected sessions.

Evaluation:
Feedback and suggestions for future sessions were collected from all simulation training offered. There has been an overwhelmingly positive response to all methods of delivery. We plan 12 standardised local delivered sessions over the next 6 months where team performance will be analysed.

Discussion:
In expanding our traditional small candidate group simulation programme we have successfully addressed the need of our referring district general hospitals. By pushing the boundaries within immersive simulation training the retrieval community have the ability to reach a wider audience and respond to the increasing demand for training from their referring hospitals. We believe the many key advantages offered by high fidelity simulation remain.

Disclosure of Interest: None Declared

Keywords: Intensive Care, Outreach, Retrieval

**Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)**

**IPSSW2014-1048**

**Synchronous Mobile Audiovisual Recording Technology Cart (SMART-Cart)**

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**Context:**
Video-enhanced debriefing is commonly used in healthcare simulation. The ability to conduct video-enhanced debriefing during in situ simulation is limited by the capacity to quickly and easily record and playback video in the clinical environment.

**Description:**
To improve our ability to conduct video-enhanced debriefing during in situ simulation we developed a Synchronous Mobile Audio-visual Recording Technology cart (SMART-Cart). The SMART-Cart is composed of a compact metal cart with integrated components; dual wide-angled pan-tilt-zoom cameras and remote lavaliere microphones, a 500 GB audio-video computer with two rear facing LED monitors, and a large front-facing LED monitor positioned for easy video playback and review. Inside the cart there is room to store and transport a pediatric mannequin, components, scenario library and supplies.

**Observation/Evaluation:**
During a pilot-testing phase involving 75 in situ simulations with the capture of over 10 GB of audio-visual data, the SMART-Cart functioned extremely well with no technical issues encountered. In a time trial study, room setup and take down speeds were significantly faster using the SMART-Cart as compared to traditional methods (set up: 3.5 min vs. 56.6 min; p = 0.003, take down: 3.1 min vs. 41.9 min; p = 0.002). There was also an almost 50% reduction in the overall foot-print of the simulation equipment and cameras into the available training space (SMART-Cart 8 sq. ft. vs. conventional 14 sq. ft.).

**Discussion:**
Based on our experience, the SMART-Cart provides a fast and reliable option to facilitate video-enhanced debriefing during in situ simulation. The SMART-Cart appears to be superior to traditional methods of in situ video recording and playback and also to previously published mobile cart designs. The SMART-Cart could function as the stand-alone audio and video system in a fixed simulation center for a fraction of the cost of an installed video system. Future potential uses include the SMART-Cart
as a plug-in to the primary video system in a fixed simulation center, and to conduct video-enhanced debriefing during in situ simulation-based outreach at other facilities.

References:
7. Sawyer T, Sierocka-Casteneda A, Chan D, Berg B, Lustik M.

Disclosure of Interest: None Declared

Keywords: None

Simulation technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)

IPSSW2014-1045

Virtual Patient Tool to Enhance Communication of “Asthma Action Plan” between Parents and Providers

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Introduction:
Asthma is a preventable illness affecting 7 million children with $56 billion in lost productivity. The education given to parents via “Asthma Action Plan (AAP)” has little effect in decreasing rate of admission in Georgia hospital (12% vs. 9% national). Though multifactorial, ineffective communication between healthcare Providers (HCPs) and parents may be one the factor contributing to it. It is well known that Improvements in communication between parents and their child’s HCPs could lead to better understanding of treatment plans, prevention, and management of their health. Effective communication skills for better patient-provider relationship and at appropriate level of complexity, ensuring parents maximally understands the AAP is important. Computer-based virtual patient (VP) programs have been evolving in the past few years, with improved interactions. The purpose of development of this interactive virtual parent (VP) simulation tool is to improve communication between HCPs and parents in relation to AAP.

Description:
The current AAP was reviewed by multidisciplinary team experts from hospital and community settings. AAP was modified using appropriate HL principles making it simpler for parents to understand all the given instructions. We then devised a scenario modeling a conversation between the mothers of a male child with asthma being discharged from hospital once AAP teaching was completed. It contains thirteen questions/statements posed by the patient’s mother. There are 5-6 multiple choice responses from the HCPs varying in complexity or empathy. SMOG readability calculations were made to ensure that communication is around 8th or below grade level. The rationale for all choices is provided to educate for better communication techniques when HCPs use the AAP in their clinical setting.

Conclusion:
A virtual human avatar who is a mother of child receiving AAP has been created. The VP appears and behaves like a real patient imitating a natural human interaction is a lifelike interactive 3D patient avatar and environment. User will select the ideal answer from the perspective of the HCPs like resident, medical student, nurse, respiratory therapist etc. VP will also present enquiries to the HCPs that challenge the provider’s HL communications skills. Feedback from the user at each question will automatically log into a remotely accessible database. This program is designed with the Unity3D Game Engine. Immediate deployment on multiple platforms including Microsoft Windows, Apple Macintosh OS, iPhone, iPad, Google Android, plugins for all major Internet browsers. This VP software tool is expected to improve communication between HCPs and parents and have positive affect in achieving primary goal in improving care of children with asthma. This VP Software on AAP will be eventually accessible to the largest audience possible, and will enable larger studies looking into the effect of bias on health communication.

Disclosure of Interest: None Declared

Keywords: None
Creating a Low Cost Air Ambulance Environment for High-Fidelity Simulation Training

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Context:
Embrace Yorkshire & Humber Infant & Children’s Transport Service is a combined neonatal and paediatric transport service in the UK and transfers critically ill patients by air and ground. Previous reports have described our simulation training philosophy1,2,3. Providing high fidelity simulation training in an air ambulance is challenging due to safety and cost constraints4. We describe the utilisation of innovative low cost solutions to create an immersive environment for high-fidelity simulation training of medical crew on air-ambulances.

Description:
We have created the physical space and dimensions of an Agusta Westland 109 helicopter passenger cabin using recycled wood panels. Cut outs for windows provided additional realism. The internal fixtures are matched utilising seats, seatbelts, medical gas outlets, patient stretcher and standard in-flight equipment. A Softcomm ATC-4Y battery powered aviation intercom allows communication between the simulation participants wearing their Alpha multi-fit flight helmets and the simulation facilitator wearing a basic headset. The intercom has a ‘line in’ which is used to feed background helicopter noise from an mp3 player into the mix. There is also a ‘line out’ which could be used to record conversations for debrief purposes. This simulation set-up was trialled at an Embrace aeromedical training day with local and national participants.

Evaluation:
The simulation was carried out successfully to two multi-professional groups. Verbal feedback from learners was positive. They felt it matched their educational needs and provided an immersive experience, more so than was to be expected from a simple wooden structure on the ground in a garage.

Discussion:
A study done in 2006 concluded that high fidelity simulation in the environment of an air ambulance helicopter was feasible but expensive to implement5. We have previously described our experience of simulation in a static road ambulance using a sim cart and Laerdal SimBaby1 and in a moving road ambulance using mobile tablet technology6. We have created a low-cost simulated air ambulance environment which is easy to store and put together. Physically restricting the participants, by matching the space available in the real aircraft, contributed to the fidelity. By using aviation communications equipment and removing visual distractions, the learner can be immersed in a realistic simulation to help prepare them for the relatively austere conditions of a helicopter when transferring critically ill patients.

References:
1) Hancock S, Harrison C et al. Embracing the future – utilisation of a simulation programme to support the development of a joint neonatal and paediatric transport team. IPSSW2010, Madrid
3) S W Hancock, A Doddamani et al. Proof of concept; use of handheld tablet technology to provide low cost high fidelity simulation training. IPSSW2013, New York

Disclosure of Interest: None Declared

Keywords: None
We wished to design low cost, safe simulated drug vials to improve the realism of these packs in simulated events.

**Description:**
The labels of the drugs contained in each pack were emulated in a freely available image editor (Microsoft Paint). Using the layout and matching colours of the real stickers, each element was drawn onto a 200 by 100 pixel image. Each label was formatted to contain the warning ‘Not for Human Use. For Simulation Use Only’. This was copied into a label-printing template in a word processor (Microsoft word) to print onto standard sized labels. They were then printed and applied to plain simulation vials. The simulated drug packs are now used on all of our in-house and outreach simulation courses and have enabled staff engaged in simulation exercises to calculate and draw up the correct amount of drug in a realistic time frame.

**Discussion:**
These simulated drug packs provide a low cost, realistic and easily reproducible solution to using medications in simulated scenarios. IRB review was not applicable to this project.

**Disclosure of Interest:** None Declared

**Keywords:** None

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**Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)**

**IPSSW2014-1039**

**The Role of The Scribe in a Ward Based Critical Event: An Innovative Program using GOPRO Technology**

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1surgical ward, Children’s Hospital Westmead, 2Childrens’ Hospital Westmead, 3Kim Oates Australian Paediatric Simulation Centre, 4Children’s Hospital Westmead, Sydney, Australia

**Context:**
Rapid response systems in the early detection of recognising the sick child have led to new tools and processes to better support staff in identifying, escalating and managing sick children. With these improved systems processes the incidence of cardiac arrest in a general ward area is scarce. It has been identified at our institution that in a non- critical care ward area, nursing staff are now less exposed to critical events and therefore may present a risk of becoming deskillled in the process of clarity and responsibilities of roles during an emergency situation. Moreover some nursing roles have been identified as more complex than that of the team leader, airway, breathing and circulation nurse. Whilst a yearly accreditation for resuscitation is required by all clinical staff, the focus is teamwork, airway management and chest compressions. The role of the scribe and the elements of what, when and how to document is not one that is formally taught. In our recent experience, it has been reported that this role is allocated to the least experienced nurse on the shift. Senior nurses have expressed concern in undertaking the role because they have not received formal education on what this role entails. Consequently they feel unprepared to provide support and guidance to more junior nurses. In light of addressing this identified gap in education the authors proposed an innovative simulation based curricula involving utilisation of the GOPRO camera technology.

**Description:**
The GOPRO camera is a small lightweight camera, which may be worn in various mounts including head and chest; it is often used in extreme sports. Research in medical simulation using GOPRO has demonstrated its use to enable students to enhance communication skills, and to practice roles and clinical procedures. In this context we aimed to observe the actions taken of the nursing scribe through his or her point of view in a simulated scenario in the Simulation Centre. In this instance the camera is mounted on the head of the nurse scribe. The footage captured then functions as an adjunct to the video replay process during the debrief session following the scenario. The simulation program comprised of a two-hour session including lectures addressing the role of the scribe, documentation and principles of crisis resource management.

**Observation/Evaluation:**
The point of view approach has enabled participants and faculty to observe the complexities of the nursing scribe role and clarify responsibilities during a critical event in a general ward area.

**Discussion:**
The outcome of this course remains a work in progress, as use of GOPRO technology is new to our program. This paper will discuss the participant feedback and future goals of designing a pre recorded screen based simulation to compliment the course. We will also discuss the post pilot course learning outcomes.

**References:**


Disclosure of Interest: None Declared

Keywords: None
“In Situ” Simulation – Learning to Promote Safety and Team Behaviour where it is Required the Most

Chetana Kallappa 1, 2,* , Basheer Tharayil 3, Prabhakar Nayak 4
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Introduction:
“In situ” simulation aims to achieve high fidelity (realism) by performing the training in areas where patient care is delivered and real errors occur. In our experience, we also felt that setting up the training in the SIM lab for an hour was not worthwhile. Amongst the busy working hours it is easier for the team to get to “in situ” training sessions than to simulation centres/labs.

We present our experience of running “in situ” paediatric simulation sessions with successful outcomes, in a team of same trainees over 6 months.

Objective:
To provide experience of all 4 separate components of “in situ” simulation, i.e. briefing, simulation, debriefing and follow-up. Outcomes were analysed on individual and team behaviours on human factors, latent factors and knowledge base.

Methods:
Simmon app was used on a slightly modified low fidelity mannequin. An i-phone was used by the instructor to run the scenario and an ipad was used as a monitor which was previously paired. Appropriate props were used as well. Training was provided to paediatric trainees, nurses and pre-registration house officers. Emphasis was given to both human factors and factual learning. Scenarios were selected from cases seen on the unit or from scenario bank and were on topics such as safe guarding, SVT, status epilepticus, Bronchiolitis etc.

Results:
10 sessions were run over 6 months. 61 doctors, 12 nurses participated.

The numbers of incidents in the first 2 months into running the simulation were high as compared to the next 3 months. For example, 16 incidents of suboptimal care were observed as opposed to 2 in the last 2 months. There was a dramatic improvement in knowledge deficits, clinical skill deficits, leadership problems, communication failures and poor resource utilisation.

Recurring themes for both clinical and behaviour were recognised that still need attention. Clinical themes were drug doses and choices, recognising and anticipating clinical deterioration. Behaviour themes were losing a situational awareness, preparation and planning failures.

Overall, the individual feedback stated over 80% improvement in confidence levels in managing paediatric patients.

Conclusion:
In situ simulation offers many important advantages over centre-based simulation such as learning in the real setting, learners are at ease as they are in their own environment, minimises space requirements and is easily accessible.

Training the same team had positive outcome as “in situ” simulation training as a tool was easy to use to assess and remediate team performance before, during, and after the session. It was a satisfying and rewarding experience for trainees and the trainers.

Though our experience is positive, we are aware of possible disadvantages of shortcut to lab based simulation training. We strongly feel these can be mitigated by the use of standardised scenarios, protocols and adequate preparation and planning.

References:


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In Situ Simulation: A Method of Experiential Learning to Promote Safety and Team Behavior

Kristi K. Miller, MS, RN; William Riley, PhD; Stanley Davis, MD; Helen E. Hansen, PhD, RN

Disclosure of Interest: None Declared

Keywords: “in situ” Simulation, Simmon
High fidelity simulation training (HFST) is becoming increasingly integrated into paediatric training. Local feedback suggested it was the neonatal emergencies that caused trainees most trepidation in the step up from tier 1 to tier 2 doctor. A course was developed to address this need.

**Description:**
Funding was agreed by the Deanery; the day would be free for local trainees and faculty expenses provided. Scenarios were developed which required trainees to use clinical and non-clinical skills. Two simulation suites were used simultaneously; one set up as neonatal intensive care the other as a labour ward or postnatal ward.

The faculty included experienced and inexperienced medical and nursing simulation trainers. Neonatal nurses were able to enhance their training by acting as complicit faculty. All hospitals in the Deanery were represented.

Places were offered to tier 1 trainees advancing to tier 2.

**Observation/Evaluation:**
Two training days were held in 2013 training a total of 12 trainees. Formal and informal feedback was overwhelmingly positive. Anonymous feedback forms were received from all 12 trainees. All 12 stated they would recommend the day to their peers. Most suggested it should be a compulsory training day. Many commented on the benefit of the realism, opportunity to practice independent decision making and the informative feedback.

**Discussion:**
The European Working Time Directive has reduced the clinical exposure and experience of our trainees who often find the transition from ‘tier 1’ to ‘tier 2’ rota stressful. This Step up to Registrar training day helps prepare trainees for the transition. Our limited experience would suggest this type of HFST should be available to all trainees prior to commencing on the tier 2 rota. There should be separate training days dedicated to paediatrics and neonates.

Inexperienced simulation trainers appreciated the opportunity to work alongside experienced faculty and increases the pool of simulation trainers in the Deanery; all continue to support this programme. Professional development for nursing staff is often restricted by cost; this provides a valuable opportunity free of charge.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** None
A Comprehensive Tracheostomy Tool Kit for Healthcare Providers in Hospital and Community Settings

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Abstract Body:
“Tracheostomy Tool Kit” is important to
1. Develop Competency in initial and ongoing Tracheostomy care
2. Develop Competency in changing Tracheostomy tube
3. Understand the Importance of multidisciplinary approach in caring for child with Tracheostomy

Tracheostomy care is complicated and requires multidisciplinary coordination of all caregivers from hospital to home to decreased morbidity and mortality with a reduced average time to decannulation and eventually significant positive impact on quality of life. Variations in care and management of patients with a tracheostomy exist between hospitals, in inpatient and outpatient facilities, and in emergency rooms. Efforts should be made among clinicians to reduce variations in practice when managing patients with a tracheostomy, thus minimizing complications, prolonged hospitalizations, and even death.

We have recently identified several deficiencies and concerns related to the tracheostomy care within the hospital settings and at home by caregivers. Survey of our trainee showed that they lack confidence in changing tracheostomy and overall care of patient with tracheostomy.

A comprehensive tracheostomy toolkit addressing appropriate documents and training of all the providers will be helpful. Thus we have initiated a Multidisciplinary tracheostomy task force which includes intensivist, ENT surgeon, Pulmonologist, resident representative, Respiratory therapist, Nurse managers, Educators, Home discharge planners, Representative/Patient Advisor from Patient and Family centered care and a parent. We reviewed existing materials within our and from several other institutions on tracheostomy care. Subsequently modified existing and created several new documents. We now have a “Tracheostomy Tool Kit”. The elements of tool kit are:

1) Initial management in Intensive Care Unit until first Trach change.
2) Subsequent management and transfer to pediatric floor.
3) Daily Tracheostomy checklist for availability of essential equipments and patient secretion status.
4) A Handout to Caregivers Tracheostomy care.
5) Competency assessment checklist on Trach change for Healthcare Providers and Caregivers.
6) Parents understanding of Tracheostomy care checklist using teach back method.
7) Tracheostomy Change training for HCPs/caregivers by a. Video demonstration, b. Mastery training in Simulation lab, c. Actual demonstration on patient.
8) Routine tracheostomy site care training by a. Video demonstration, b. Mastery training in Simulation lab, c. Actual demonstration on patient.
9) Multidisciplinary Discharge Planning Checklist.
10) Discharge Kit
11) Discharge instructions

All the training tools and handout have been prepared using appropriate health literacy principles.

We recently conducted 4 hours workshop to train several trainees and other HCPs from hospital and home health settings with positive feedback. We will be discussing all the elements of Tracheostomy tool Kit, training in simulation lab in the workshop.

Disclosure of Interest: None Declared

Keywords: None

Simulation Instruction Design and Curriculum Development

Developing a Resident-Authorized Pediatric Simulation Curriculum: Capturing the Residents’ Experience

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Context:
Many institutions have simulation-based curricula for pediatric residents; however, few are designed by the residents themselves. The Accreditation Council for Graduate Medical Education (ACGME) cites effective teaching skills and learner-centeredness as part of the pediatric competencies. The goal of this study is to characterize and evaluate the residents’ learning experience and perceived improvement in ACGME competencies after participating
in the development of a pediatric resident-authored simulation curriculum.

Description:
An anonymous online survey was conducted of 24 PGY3 pediatric residents at a tertiary Children’s Hospital after their participation in designing simulation scenarios under the mentorship of a pediatric faculty member and simulation expert. Prior simulation experience, perceived disease management knowledge, perceived usefulness of the scenario design exercise to learn and teach ACGME competencies, and effect on career development were queried. Questions used 4-point Likert scales and free-text responses. Paired and independent t-tests were used for statistical analysis.

Observation:
The response rate was 75%. No resident had authored a simulation case prior to this experience; 28% had no previous experience with simulation; 54% had participated as learners; and 61% had only associated simulation with mock codes. Residents reported improvement in knowledge of disease pathology, presentation, management, and procedural skills after authoring simulation scenarios (mean 2.7 to 3.6, p<0.001). However, residents’ perceived usefulness of the scenario design exercise for their own improvement of ACGME competencies was not changed by the learning experience (p=0.38), nor did it change their perception of the usefulness of the actual scenario product for other learners (p=0.17). Residents recognized value for their teaching portfolio (p = .02). Novices to simulation did not report more difficulty in this curriculum than seasoned residents (p=0.22), and confidence in ability to author scenarios increased (mean 2.2 to 3.9, p<0.001).

Discussion:
Residents reported improvement of their disease specific knowledge after authoring scenarios, despite not perceiving a difference in usefulness of the learning experience for improvement of ACGME competencies. Having the opportunity to execute scenarios with other learners may improve this perception of usefulness as a teaching tool.

Disclosure of Interest: None Declared

Keywords: None

Simulation Instruction Design and Curriculum Development
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Development of a Pediatric Simulation Program
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Context:
Kaiser Permanente, Los Angeles Medical Center’s Simulation Center was tasked to introduce simulation into the pediatric resident curriculum. The strategy was to provide procedures simulation training to incoming pediatric residents in June, 2012

Description:
A detailed instructional design approach was used that integrated pediatric staff physicians throughout the educational curriculum development. Ten procedures were identified for simulation educational training. The ten procedures targeted were: femoral line, subclavian line, bladder catheterization, endotracheal intubation, intraosseous, lumbar puncture, peripheral IV, umbilical venous catheterization, umbilical arterial catheterization and venipuncture. Based on a detailed literature review the developer created learning objectives for each procedure which were the foundation in course materials development that included: procedures checklists, pre- and post-course assessment quizzes, lesson guides and PowerPoints. Learning objectives were also crucial in the selection of supporting videos and part task trainers. The course materials were loaded onto a Kaiser Permanente simulation website that enabled residents to access all course materials on-line.

Observation/Evaluation:
Procedures simulation was introduced to the incoming pediatric residents. In the introductory phase they were exposed to seven procedures. A resident profile was built so he/she would have access to the on-line course materials. They were emailed instructions on how to access the course materials and instructed to take the pre-course assessment quiz and review the course materials. The residents were divided into two groups: A and B. The staff physician-to-residents ratios were: 3-1 and 4:1 respectively. Class time was 1 hour 30 minutes. The staff physician reviewed each procedure with the residents. When the procedure was completed the staff physician debriefed the resident to provide feedback and remediation as needed. At the completion of training residents were instructed to complete the post-course assessment quiz.

Discussion:
Based on initial observations staff physicians’ input was critical when developing simulation training materials. Their guidance and direction during the procedures training was equally important to the residents learning. The hands on experience the residents received by using the simulators under the guidance of staff physicians was an invaluable learning experience. Some limiting factors we encountered were: classroom availability, staff physician availability and time to train. When incorporating simulation training into a residency curriculum it is critical to integrate staff physicians into the development process early on. Review training room availability and determine lead times to reserve rooms. Identify staff physicians early to prevent schedule conflict. Adjust class time according to staff physician-to-residents ratios.

Key Words: pediatric, simulation, development

Disclosure of Interest: None Declared

Keywords: None
Implementation of Pediatric Simulation-Based Education at the Medical University of Graz

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Introduction:
Simulation has been widely implemented into under- and postgraduate medical education within the past decades [1]. Simulation technology encompasses computer-based virtual reality, part-task-trainers for the training of technical skills, static manikins, and high-fidelity integrated patient simulators [2]. There are numerous advantages associated with simulation-based medical education (SBME), such as structured, controlled, and risk-free training, reproducibility of learning experiences, training of routine as well as rare clinical situations, on-demand training, and the combination of cognitive, technical, and behavioral skill acquisition [3]. Therefore, an elective simulation-based course has been introduced at the Department of Pediatrics at the Medical University of Graz.

Methods:
An interdisciplinary work group, established in January 2013, has designed the course. Teaching contents, course time, and educational objectives have been defined and coordinated with current pediatric courses.

Results:
The presented elective course has started as pilot project in autumn 2013. The number of participants has been limited to guarantee hands-on training for every participating student. Students will learn structured assessment and resuscitation of newborns and common neonatal diseases (e.g. transitory tachypnea of the infant, wet lung, bacterial infection, hypoglycemic seizure, meconium aspiration). After theoretical introduction (lecture) on neonatal assessment, resuscitation and diseases, and familiarization with the infant simulator, students actively train practical skills and participate in simulated clinical scenarios with subsequent video-assisted debriefings.

Conclusion:
Pediatric simulation-based education has been implemented as pilot project in the pediatric curriculum of the Medical University of Graz. The impact of the described course will be determined through objective assessment of cognitive and technical skills. If the SBME results in significant improvement of cognitive and technical skills, this educational pilot project should be established for all medical students.

References:

Disclosure of Interest: None Declared

Keywords: assessment of newborns, resuscitation of newborns, simulation-based course
Results:
22 nurses and three doctors have so far participated in two study days. 80% (n=20) professionals described themselves as working primarily in palliative care. Only 32% (n=8) had previously experienced simulation. Based on confidence questions, attendees felt more confident in managing specific end of life scenarios (p=0.008). Based on true/false questions pre and post study day, 80% of participants improved their knowledge. The median improvement score for the cohort was 4 (p=0.001).

Discussion/Conclusions:
The study demonstrated a significant improvement in confidence and knowledge following the simulation course. This supports further time/financial investment in developing this type of study day. Simulation is a useful teaching adjunct in paediatric palliative care. The course also provides a valuable opportunity for professionals to network and discuss/share experiences.

References:

Key words: Palliative, Hospice, Simulation
Disclosure of Interest: None Declared
Keywords: None

Simulation Instruction Design and Curriculum Development
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Holistic Care of the Simulated Pediatric Patient: Providing Patient and Family Care
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Context:
The survey Clinical Learning Environment Comparison Survey (CLECS) was administered to 422 undergraduate nursing students across the US to determine whether their learning needs were better met in the traditional clinical environment or simulated clinical environment. Outcomes demonstrated that learning needs related to holistic care were not being met.

Description:
Following evaluation of the survey findings, efforts were undertaken to create opportunities in the simulation lab to better prepare students to provide holistic care for pediatric patients. Most experiences tend to focus on the physical aspects of patient management, such as managing a physical crisis. The holistic care encompassed the areas of developmental, spiritual, psychosocial, cultural, and physical, while also including family members at times. For example, a picture frame with a photograph of him with his soccer team was placed by the bedside. The patient is a young boy who has had abdominal surgery for a ruptured appendix. The students find that he is crying when they examine him. If questions are asked and in a caring manner, learners will find out that he is afraid his mommy and daddy will be mad at him. He has heard them talking about how there isn’t much money and his dad can’t find a job. He knows his parents have been on the computer trying to get something called insurance but that hasn’t gone well. He doesn’t have any real friends because they only moved to town a month ago. He doesn’t like school because he doesn’t know anyone. But, he loves soccer and is trying to convince mom that his pain is better and he can go to the game tonight. While he is pain-free and stable physically, there are numerous other areas of concern for the nurse or physician to manage. This presentation will offer numerous examples that can be easily and inexpensively used in the sim lab of any healthcare students or practitioners.

Observation/Evaluation:
Formal evaluation of each scenario was completed with the Simulation Effectiveness Tool (SET) which measures students’ perceptions of how effective the teaching strategy was in the lab. After the initial survey, the CLECS was administered at the end of the traditional clinical courses and before the practicum. This data showed that improvements were made each semester in this area of patient care, in both environments.

Discussion:
Anecdotally, from conversations with facilitators and experts in the field, much of the learning in patient simulation focuses on the physical aspect of the patient care. Additionally, the tendency is to focus on crisis situations. However, our patients are not always in crisis! It is important for our healthcare students and practitioners to know how to approach and manage holistic care needs of the patient and family as those sometimes play a larger role in returning to health than the physical alone.

Disclosure of Interest: None Declared
Keywords: family, holistic patient care, spiritual
alignment method, a programme including didactic teaching, skills training and simulation were developed to meet specified learning objectives2. Our objective was to evaluate the impact of a programme combining clinical workshops and high fidelity simulation scenarios on nurses’ confidence to assist in an intubation in the PHDU environment.

Description:
The curriculum was created as a two step programme using the scaffolding approach, allowing learners to build on previous successful learning experiences2. Clinical simulation can enhance learning by combining new knowledge with the performance components of psychomotor skills and clinical problem solving2. An airway and endotracheal intubation skill station was conducted, identifying four components of learning: role allocation, appropriate size equipment, medication and doses according to local guidelines and confirmation of endotracheal tube position. Skill stations were followed by in situ high fidelity simulated scenarios of a deteriorating infant requiring intubation, enabling hands-on application of each competency and skill practiced. In addition to psychomotor skill application, clinical reasoning and critical thinking can be fostered in a safe learning environment. Anonymous questionnaires utilising a graduated Visual Analogue Scale (VAS) were completed pre and post programme.

Observation:
11 nurses participated in the programme over the period of 3 weeks. Self reported scores indicated the following:

- Role Allocation
  - Pre-Programme Confidence - 11%
  - Post-Programme Confidence - 72%
- Equipment selection
  - Pre-Programme Confidence - 28%
  - Post-Programme Confidence - 82%
- Medication & Doses
  - Pre-Programme Confidence - 14%
  - Post-Programme Confidence - 74%
- ETT Position
  - Pre-Programme Confidence - 23%
  - Post-Programme Confidence - 86%

Overall, there was an increase of greater than 50% in self assessed confidence on each component identified within the role and responsibility of the nurse during intubation.

Discussion:
Designing a structured curriculum programme combining clinical workshops and simulated scenarios to facilitate acquisition of knowledge and skills can be an effective method to meet identified learning needs. In our Institution, nurses’ self-evaluated confidence in their role in endotracheal intubation has improved utilising this teaching strategy. Further research is needed on the transferability of the learned skills to an enhancement in clinical practice.

References:

Disclosure of Interest: None Declared

Keywords: endotracheal intubation, nursing education, simulation-based course

Simulation Instruction Design and Curriculum Development

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Paediatric Simulation Training – A Peer-Teaching Project to Improve Paediatric Life Support Skills

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Context:
Simulation-based learning methods enable a safe and cost-efficient way of acquiring routine and good-rehearsed teams[1]. The project “Paediatric Simulation Training” (PST) was established by students for students and provides high quality peer teaching at the Medical University of Vienna. The goal is to give students the possibility to practice paediatric emergency scenarios regularly as early as possible. Learning goals are human factors, critical risk management and skills for handling such situations. Participants get a questionnaire before and after the training to evaluate their self-perceived benefit of the offered training.

Description:
Hands-on-sessions are held by senior student tutors supervised by senior paediatricians. Two-step simulation trainings are offered to 8 participants per course. In the first unit a short theoretical introduction to paediatric life support according to current ERC-guidelines is followed by hands-on training on the Baby/Little Anne™ During a second unit the participants practice realistic paediatric emergency scenarios on the SimBaby™, recorded on video using SIMStation™. Video analysis after the simulation is used to give structured debriefing focusing on human factors but also to discuss decision-making and special skills. Dates for courses are continuously published on the university’s homepage as well as on Facebook.

Observation/Evaluation:
A total of 40 students participated from February to December 2013. 19 (47.5%) participants returned a completed questionnaire. Answers were classified
into four groups: very secure, secure, moderate and unsecure. Twelve (63.2%) participants felt unsecure in handling critically ill children before the training. A statistically significant improvement was observed and only one participant felt unsecure after the training (P=0.0004; Fisher's exact test). Moreover, 16 (84.2%) participants felt like in a real situation and all participants rated the simulation trainings as very important part of their medical education.

Discussion:
Medical Simulation is a powerful method for improving education and increasing patient safety. We could demonstrate a significant increase of the self-perceived skills in handling critically ill children. Students who pass the basic course and show interest are invited to become peer-tutors to ensure additional courses. Future evaluation should also include questions about the benefit of teamwork and non-technical skills. Furthermore, an expansion of the project to provide in-depth skills training is planned. Including nursing students in the project could improve interdisciplinary teamwork and add valuable clinical knowledge.

References:
[1] Role of simulation for paediatric proceduralists: practice makes perfect or trial and error?
Disclosure of Interest: None Declared

Keywords: peer-teaching, students, life support

Simulation Instruction Design and Curriculum Development
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Cit-Cat - Taking a Break from Standard Trauma Training

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Context:
Trauma is the leading cause of death in children in the UK, with patients often suffering complex, multiple injuries. Following a report in 2010, which described a 20 per cent higher in-hospital mortality rate for trauma patients in England compared to the US and highlighted deficiencies, trauma care in England was re-organised with the development of Major Trauma Networks (MTN). Our institution was designated a Major Trauma Centre (MTC) for children with network responsibility in April 2012 with full implementation in April 2013. Standard training at our institution includes Advanced Paediatric Life Support (APLS) with limited time spent on trauma care. Trauma was identified as a low frequency, high risk event requiring an education strategy based around simulation and clinical skills training.

Description:
A needs analysis was completed by email of UK doctors on the Paediatric Emergency Medicine (PEM) training programme, combined with an informal survey of the multi-professional trauma team at Sheffield Children's Hospital and focus groups of senior specialists. A two day Children's Advanced Trauma (CAT) course featuring pre-course reading, interactive lectures, clinical skills marketplace and immersive multi-professional simulations was designed. A pilot course was delivered and evaluated in January 2013 and a refined course followed in December 2013. In response to external peer review of our clinical MTC programme, a one day Children's Intermediate Trauma (CIT), to meet the needs of team members who have infrequent exposure, was delivered and evaluated in November 2013.

Evaluation:
36 candidates have attended the CAT course. 93% found the lectures engaging or fascinating; 98% felt they had learned something new. All candidates found the simulations engaging (51%) or fascinating (49%) and 60% felt the simulations were realistic and they had learned a lot. 70% considered it an excellent overall learning experience and 100% would recommend it to their colleagues. Key learning outcomes differed widely for different sub-specialty candidates. 18 candidates attended the CIT course. 94% found it ‘very useful’ or ‘extremely useful’. The simulation content was seen as the most useful for learning with 72% reporting that they had learned ‘a lot’. Management of massive haemorrhage was reported as the most important key learning outcome.

Discussion:
Results from the UK Trauma Audit and Research Network (TARN) national audit1 show that 1 in 5 patients who would have died before the development of the MTN system are now surviving severe injuries. We have created an education programme to support the successful reconfiguration of paediatric trauma care in our institution using immersive simulation. Feedback suggests we are meeting the identified training needs of our workforce. The challenge is to ensure that we meet the wider training needs of non-specialist hospitals in our network to maximise the potential benefits in improving patient outcomes.

References:
Disclosure of Interest: None Declared
Keywords: None
Faculty Development

**IPSSW2014-1106**

**Setting Up a Neonatal Simulation Training the Trainer Programme - Challenges and Feedback**

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**Introduction:**
Neonatal Simulation based education and training is increasingly being used for teaching and training of junior doctors, nursing staff, allied health professionals and consultants. However there are not enough trainers to deliver neonatal simulation based teaching in neonatal units in West Midlands, UK. In order to develop the faculty in West Midlands, neonatal simulation group in our hospital set up and delivered three training the trainer courses for neonatal consultants and senior nurses interested in setting up neonatal simulation programme in their local hospitals. The West Midlands Deanery agreed to fund training the trainer course.

**Objective:**
To share our experience of setting up a Neonatal Simulation Training the Trainer Course and its feedback

**Methods:**
Two days multidisciplinary simulation course was delivered by lead neonatal simulation consultant with support from 5 other faculty (1 consultant, 1 technician, 3 nurses). The programme included elements of adult learning theory and principles of CRM, demonstration of setting up the manikins, trouble shooting, programming the session, designing scenarios, debriefing training and practical sessions of scenario designing and performing simulation and sustaining the simulation programme locally. High and low fidelity manikins were used. During 3rd course high fidelity manikin malfunctioned. The feedback was collected from participants.

**Results:**
31 participants (neonatal consultants, general paediatricians, midwives, neonatal nurses and neonatal clinical educators) attended the course. 29 candidates gave feedback. They were asked to score each session from 1 to 5, 1 being unacceptable and 5 being excellent. Candidates asked for more time for practical and hands on sessions on setting up and programming, debriefing and practicing simulation sessions and less time for educational theory sessions.

**Day 1:** Introduction 4.5, Simulation demonstration 4.4, CRM lecture 4.2, adult learning lecture 3.9, set up demonstration 4.4, Trouble shooting demonstration 4.1, programming demonstration 4.1, scenario design lecture 4.3, group session scenario 4.3

Day 2: debrief lecture 4.5, Simulation group 1 - 4.6, simulation group 2 - 4.6, group session on programme 4.3, sustaining a programme lecture 4.3, conclusion 4.8, catering 4.4, faculty 4.7.

Overall score for the course was 4.4. The lowest scores for adult learning lecture came from medical staff who have already heard and were aware of the theory compared with nursing staff who scored it higher having less pre course knowledge.

All 29 candidates felt their their learning objectives were met.

**Conclusion:**
Overall the feedback was very positive. Candidates prefer more interactive hands on and practical teaching experience as part of the neonatal simulation Training the Trainer course and less theory subjects. Equipment failure did not affect the feedback.

**Disclosure of Interest:** None Declared

**Keywords:** Faculty, Neonatal, Trainer

**Debriefing and Teaching Methodologies**

**IPSSW2014-1108**

**Peer-Facilitated Education in Pediatric Emergency Assessment, Recognition, and Stabilization**

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**Context:**
Medical students entering their clinical years often feel under-prepared for recognizing and stabilizing critically ill patients, particularly children.1,2 The American Heart Association (AHA)'s Pediatric Emergency Assessment, Recognition, and Stabilization (PEARS) course offers simulation-based training in the evaluation and management of children at risk for severe cardiopulmonary distress. 3 Simulation training has been shown to improve student knowledge and skills in pediatric resuscitation,4-6 while peer-facilitated learning has potential unique benefit for both students7-9 and peer instructors.10 Utilizing senior medical students certified as PEARS instructors represents a novel application of this simulation curriculum and may serve as model for future peer-facilitated simulation education initiatives.

**Description:**
Students beginning clinical rotations with significant pediatric exposure were invited to participate in PEARS training. Courses were conducted according to AHA guidelines by a fourth-year medical student certified as a PEARS instructor. Participants received simulation training in 1) cardiopulmonary resuscitation and 2) early recognition
and stabilization of pediatric respiratory distress, shock, and cardiac emergencies. Team resuscitation concepts were highlighted. Students completed hands-on skills testing and a written, video-based knowledge assessment.

Observation/Evaluation:
All course participants (23 medical students and 8 physician assistant students) successfully completed PEARs training and submitted pre- and post-intervention questionnaires using 5-point Likert-type items (1=no confidence, 5=extremely confident). Paired, nonparametric data are presented as medians and interquartile ranges (IQRs) and compared with the Wilcoxon signed-rank test. Participants demonstrated increased self-perceived confidence in pediatric cardiopulmonary resuscitation (pre-course median 2, IQR 2 to 3; post-course median 4, IQR 2 to 4), assessing and treating critically ill children (pre-course median 2, IQR 2 to 4; post-course median 4, IQR 3 to 4), and performing as a healthcare team member (pre-course median 3, IQR 3 to 4; post-course median 4, IQR 3.5 to 4) [p < 0.001 for all items].

Discussion:
Peer-facilitated PEARs training appeared to improve perceived confidence in caring for critically ill pediatric patients among this group of students preparing for pediatric clinical rotations, and course participants demonstrated mastery of basic pediatric resuscitation knowledge and skills. Future evaluation is needed to measure the impact of this intervention on subsequent clerkship performance, as well to examine this modality’s potential benefits for peer instructors themselves. Faculty oversight and mentoring are critical to the development and sustainability of this novel simulation education program, which may be adapted to many pediatric clerkship settings.

References:


Disclosure of Interest: None Declared

Keywords: medical students, peer-facilitated learning, simulation-based course

Debriefing and Teaching Methodologies
IPSSW2014-1170

Impact of Video-Debriefing Following Simulated Neonatal Resuscitation in Interprofessional Teams

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Background:
Simulation and debriefing are increasingly used for both technical and non-technical skills training. Recent national and international guidelines recommend the use of simulation and video-debriefing for neonatal resuscitation training. The use of simulation and video-debriefing create significant challenges for educators in the delivery of standardized programs such as the neonatal resuscitation program (NRP). The effectiveness of this educational strategy remains unclear.

Research Question:
To examine the effectiveness of video-debriefing on the performance and beliefs of interprofessional teams following simulated neonatal training sessions.

Methodology:
This REB-approved prospective study examined the role of video-debriefing in improving neonatal resuscitation performance amongst neonatal teams in both technical and non-technical aspects. Teams included one of: respiratory therapists (RT), neonatal nurse and senior paediatric residents. Two standardized simulated neonatal resuscitation scenarios were offered using a high-fidelity simulation environment. Neonatal teams were
randomly allocated to receive video-debriefing or no debriefing after the initial simulated neonatal resuscitation and invited for a subsequent session 4-8 weeks later. Participants were assessed for NRP team performance by reviewers blinded to the intervention. Attitudes and beliefs of participants were collected regarding the use of debriefing for resuscitation and team behavioural skills.

**Results:**
A total of 25 study teams were recruited comprising 75 participants. 17 groups have returned to complete the study. The majority of participants (53%) had attended less than 5 simulations in the past. Of those who had previously attended, the vast majority had never been exposed to video-debriefing as part of their education. There were no significant differences in NRP performance (time to intubation and NRP score) between groups. In general, adherence to NRP guidelines was poor. Virtually all participants agreed that both the simulation and debriefing components resulted in improved learning in both technical and team behavioural skills. A greater number of participants strongly agreed that the simulation session assisted their acquisition of team behavioural skills (p=0.006).

**Discussion/Conclusions:**
In this study, the use of video-debriefing Interprofessional teams of simulated neonatal resuscitations did not result in significant improvement in subsequent simulated NRP performance. Team members believed the use of both simulation and debriefing resulted in enhanced acquisition of team behavioural skills in particular. The role of interprofessional team training using video-debriefing in this setting requires further study.

**Disclosure of Interest:** None Declared

**Keywords:** Debriefing, Interprofessional education, neonatal resuscitation

**Assessment (including use and validation of measurement and assessment tools)**

**IPSSW2014-1091**

**Validation of Tools for Multistation Assessment of Senior Pediatric Residents using Simulations**

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**Background:**
The Accreditation Council for Graduate Medical Education (ACGME) has mandated that residency programs demonstrate resident competence using appropriate tools that they describe as a “toolbox” (1). This statement by the ACGME encourages programs to move away from traditional assessment methodologies, such as faculty assessments and In-Training Examination (ITE), and instead incorporate many types of assessment from the toolbox. When used as a sole or main assessment methodology, faculty assessment forms and ITE scores have performed as inadequate measures of resident performance, as defined by having poor accuracy, rater agreement, generalizability and utility (2). Norcini et al. (3) also looked at the correlation between board certification exam scores and program director assessments of resident competency and found a slight correlation in overall competence, but little correlation when it came to professionalism and attitudes. The purpose of this study is to examine the reliability and validity of checklist assessment tools that I have developed to evaluate senior pediatric residents’ clinical and team skills during three simulated case scenarios of resuscitations. These novel tools will be analyzed using reliability measurements and a generalizability study. As there are few studies looking at validated tools for such an assessment in pediatric residencies, this study will provide valuable information for all pediatric residency programs.

**Research Question:**
Are the developed tools that will be used in the simulation-based cases during the assessment program of senior residents both reliable and valid?

**Methods:**
Three checklists were developed and applied to cases during an assessment program. Cases were video-recorded and reviewed by two raters. Results were examined for reliability, using a generalizability study and intra-class correlation coefficients. A decision study was performed to look at reliability with variation of the number of items on the checklist and the number of raters.

**Results:**
The checklists show good inter-rater reliability, with intra-class coefficients above 0.75 for all three tools. A generalizability study demonstrates variance is due to the affects of participants, question items and the interaction between these two facets. A design study demonstrates good reliability using the current number of checklist items. One rater yielded good reliability on the apnea and seizure stations, but the ventricular tachycardia station requires two raters to achieve acceptable reliability.

**Conclusion:**
These three checklist tools are reasonably reliable and valid, and may be used for assessment of pediatric resident resuscitation skills.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** None
Self-Assessment and Theoretical Knowledge in Neonatal Resuscitation

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Introduction:
Simulation has been widely implemented into under- and postgraduate medical education within the past decades [1]. We therefore implemented an elective simulation-based course aiming to teach structured assessment and resuscitation of newborns, and common neonatal diseases (e.g. transient tachypnea of the infant, wet lung, bacterial infection, hypoglycemic seizure, meconium aspiration). We evaluated the student’s self-assessment and their theoretical knowledge in neonatal resuscitation at the beginning of the first elective simulation-based course.

Methods:
We performed a questionnaire with 7 self-assessment questions and 10 theoretical resuscitation guideline questions. After finishing the elective simulation-based course, the same questionnaire will be performed.

Results:
Preliminary questionnaires were analyzed. 5/11 students already participated in basic neonatal and infant resuscitation training prior to our elective simulation-based course. However, all students estimated their basic knowledge in neonatal assessment, resuscitation and most common diseases to be little. Except 2 students, the majority estimated their knowledge in neonatal CPR and mask ventilation to be poor. Questions concerning resuscitation guidelines for newborns (e.g. ratio of ventilation and heart compression, depth of heart compression, first steps in treatment) and assessment of the newborn (Apgar) showed insufficient knowledge with a total of 55% right answers.

Conclusion:
Self-assessment was in accordance with basic theoretical knowledge in neonatal assessment, resuscitation and most common diseases. We emphasize the need for both, theoretical as well as simulation-based skills training to improve and consolidate resuscitation procedures in neonates.

References:

Disclosure of Interest: None Declared

Keywords: neonatal resuscitation, resuscitation guidelines, self-assessment
at baseline or declined. For maintaining skills, practicing airway management and intubation more frequently may be more important than using high fidelity.

Key words: Intubation, High-Fidelity, Residency

Disclosure of Interest: None Declared

Keywords: None

Time to Insertion i-Gel for Pediatricians without Anesthesia Background with Conventional Laryngeal

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Introduction:

It is rare for pediatricians to encounter patients whom they cannot ventilate with mask, but it may be unexpected. As shown in Pediatric Difficult Airway guidelines, subglottic airway devices such as laryngeal mask airway play important roles even in pediatric airway management. Ideally all of pediatricians are to be well-prepared for unanticipated cannnot-ventilation situations. New subglottic device, i-Gel, seems to make insertion easier than conventional LMA. We hypothesized that brief instruction video could improve time to insertion of i-Gel in a simulated difficult-to-ventilate infant, compared with that of conventional LMA even after 6 weeks.

Methods:

Study design: randomized crossover study. Participants are non-anesthesia physicians at Tokyo Metropolitan Children’s Medical Center. Participants were asked insert each of subglottic devices, such as i-Gel ((Intersurgical Ltd., Wokingham, UK) and LMA for an infant mannequin (SimBaby®, Laerdal Medical Corp., Wappingers Fall, NY) in random order after watching the brief instruction-video of each. They don’t receive any feedback and assistant during the assessment. After 6 weeks of the initial session, participants will be asked to come back to perform subglottic airway device insertion using each of them without watching instruction videos. Primary outcome is time to insertion at 2nd session. We defined the time to insertion as time between opening the packages of the devices and confirmation of endotidal carbon dioxide on the patient monitor of the simulator. It means that the time includes lubrication of the devices. Inferential statistical analysis will be done using t-test or Wilcoxon-Mann-Whitney test.

Results:

We have developed the brief instruction videos and recruited 10 subjects and all of them completed 1st assessment by January 7, 2014. At this moment, the mean insertion time was 60.4 +/- 11.4 seconds and 89.7 +/- 76.8 second for LMA and i-Gel, respectively. More subjects will be recruited. The result from the first assessment was and/or 2nd assessment will be presented at the conference.

Discussion/Conclusions:

Bobrow et al reported that Ultra-brief videos improved CPR skills. Our study is to examine the immediate and remote effect of brief instruction video for i-Gel, compared with that of conventional LMA.

References:


Disclosure of Interest: None Declared

Keywords: difficult airway, pediatric, brief video
Learning objective: Hypothermia is an independent risk for mortality. Secure peripheral venous access and wait for normothermia before attempting umbilical lines.

Incident-3: 26wk preterm infant with severe PIE deteriorates leading to extubation. Re-intubation performed 3 times even though Pedi-cap was changing colour on all occasions. This led to further deterioration.

Learning objective: Pedi-cap showing positive result but no clinical improvement needs more thought rather than just automatic re-intubations: Increased pressures, adjustment of ET tube length, ruling out pneumothorax etc.

Incident-4: 25wk preterm with 50-60% O2 requirement on admission had late diagnosis of esophageal intubation because of time pressures of umbilical lines insertion within golden hour.

Learning objective: Obtain CXR immediately if admission FiO2 is > 40%, before proceeding with central lines.

Incident-5: A term infant is born with no signs of life. Resuscitation proceeds beyond 18-20 minutes with no cardio output and although consultant advises to stop resuscitation, registrar gets difficulty in communicating with family due to language problems and at 30 min of age HR appears >100. Child gets cooled and eventually intensive care is withdrawn on day-4.

Learning objective: Decision to stop resuscitation need to made decisively by the resuscitation team where there is no cardiac output despite 10-15 minutes of full resuscitation.

Results: In our practice, simulating critical incidents that have occurred in recent past in clinical environment has tremendous impact on learning by reflection.

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement

Impact of Monitoring on Initiation and Quality of Paediatric Basic Life Support

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Background: Cardiac arrests (CA) in children are rare events but when they occur the outcomes are dismal. Survival rates from in-hospital cardiac arrests in infants and children range from 14 to 36%. Recent studies point out that the early initiation of basic life support (BLS) within the first 1-3 minutes is essential for survival and contributes to an improved outcome. Many in-hospital patients require monitoring to early recognise deteriorations of their vital signs. In these settings, monitors are used to “watch” patients continuously and alert clinicians to a change in the patient’s status. However, up to 94% of the alarms are false and result in a sheer number of monitor alarms overwhelming critical care personnel. A phenomenon called “monitor fatigue”. To make things worse, the presence of a normal ECG is often equated to cardiac output – which does not apply to pulseless electrical activity, one of the most common causes for CAs in children. The combination of this fallacy of misinterpreting monitoring data with the increasing “monitor fatigue” may lead to a delayed recognition of critical situations. Since literature on the impact of attached monitoring on the initiation of resuscitative measures is lacking, little is known about how its presence may influence the first responders’ perception when it comes to a paediatric CA situation.

Research Question: The aim of this study is to compare the time to initiation of first chest compressions in monitored versus non-monitored, simulated paediatric CA. We hypothesize that the presence of an ECG will result in a delayed recognition of the cardiac arrest and delayed initiation of BLS.

Proposed Approach to Addressing the Question: This study is designed as single centre, rater-blinded, randomised, controlled, trial. After obtaining ethics board approval and written informed consent, 60 residents regularly involved in the care of paediatric patients will be randomised to either the intervention (monitoring) or control (non- monitoring) group. Participants from both groups will have to manage a simulated paediatric cardiac arrest scenario. While the child will not be attached to monitoring in the non-monitoring group, the monitors will be attached to the patient in the monitored group. Otherwise the scenarios will be the same. The time to first chest compression will be assessed as primary outcome parameter. Adherence to current resuscitation guidelines by using a task specific checklist and subjective ratings by participants will be of secondary interest.

Implications: Early initiation and high quality BLS are key to optimal outcome after cardiac arrest. Significant differences in times to first chest compression between the two groups would indicate that monitoring could be a confounding factor impairing the delivery of BLS in paediatric cardiac arrest. This would mean that the high in-hospital mortality rates might be improved by specifically addressing this issue during training sessions.

References:

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement

IPSSW2014-1077

Embedding Simulation: Embedding Bugs

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Background:
Embedded simulation is fast becoming an integral part of all simulation programmes to enhance professional development. Simulation manikins, like other equipment in the clinical environment, have the potential to become contaminated. Moulage substances, in particular simulated body fluids such as blood, may provide an excellent medium for micro-organisms to grow in. This poses a risk in the clinical environment if they are not decontaminated or disposed of appropriately. Within our hospital there is no standardised cleaning protocol or surveillance mechanism for monitoring contamination of simulation equipment. Within our simulation suite, two episodes occurred in which simulated fluid was noted to be potentially contaminated. The first related to simulated blood in an ECMO circuit. This was noted to be offensive and looked to contain a mould-like substance. The second occurred when a novel moulage attachment used to simulate exomphalos in a neonate was inadvertently left attached to the manikin. Again, a mould like substance was noted after just 48 hours. We, therefore, decided to investigate the infection risks of embedded simulation. The results will help formulate a standardised decontamination regimen for simulation equipment and moulage adjuncts.

Approach:
We reviewed 3 manikin manufacturers’ websites for their decontamination advice. We also reviewed the ‘user guidelines’ provided with our simulation centre manikins. At monthly junior doctor training we will take swabs from the mouth and surface of simulation model and sample any fluid that used during the simulation. We will resample the fluid at 2 further time points (2 days and 7 days). This will be sent to our reference laboratory for culture and sensitivities. We will use the information obtained to devise a standard cleaning regimen for our equipment and provide advice re disposal or storage of moulage adjuncts. We will then complete an audit cycle by retesting equipment after the protocol has been introduced.

Results:
The study is in progress.

Conclusions:
We anticipate that the bacterial and fungal cultures of the samples will reveal a previously unidentified risk of embedded simulation. Implementation of a standardised cleaning regimen should eradicate this risk and ensure that patients are not placed at risk by embedded simulation programmes. IRB approval was not required for this project.

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement

IPSSW2014-1132

The On-Line Quality Management of Clinical Skills and Simulation Training in Yorkshire & The Humber

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Context:
The Yorkshire and Humber Strategic Clinical Skills Team developed an on-line quality management system to standardise and benchmark best practice for simulation based education and training. Drivers included recommendations from the Framework for Technology Enhanced Learning 1 which indicates a need to prove educational outcomes. Responding to the national drivers and outcomes set in the Clinical Skills and Simulation Strategy 2 plans were reviewed to develop and design a Clinical Skills/Simulation online system to verify that participating clinical skills and simulation trainers/centre’s achieve set Core and Educational Standards to attain quality assurance status.

Description:
Following extensive collaboration and consultation, quality assurance guidelines that include a quality framework, set 5 Core and 6 Educational Standards that trainers and assessors must achieve and various recommended assessment criteria were developed. In conjunction, a quality assurance web-based system was designed to help all stakeholders
across the region to meet clinical skills and simulation quality assurance requirements. The tool was launched by the Strategic Clinical Skills Advisors team in June 2011.

**Evaluation:**
To date, all of the Yorkshire and Humber Simulation centres undertaking Children’s and Neonatal Simulation have been successfully profiled and audited against the quality standards. The tool is currently being rolled out to the “in situ simulation” teams across the region too, providing a benchmark for simulation based training across all hospital sites. The tool is flexible to include any teams from neonates, Paediatrics and Emergency Medicine. The Quality Assurance audits are undertaken by appropriately trained independent auditors and ratified through the Clinical Skills Executive Board Meetings. They are currently reviewed annually.

**Discussion:**
The QA tool has the potential to highlight areas of poor practice which can be addressed through action plans and also highlight areas of good practice which can be shared and adopted regionally and nationally. www.qaclinicals Skills.co.uk

**References:**
3 Disclosure of Interest: None Declared
4 Keywords: Quality Improvement

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**Process Improvement and Organizational Change**

**IPSSW2014-1168**

“Nina” Center in Italy: A Model between Simulation in Neonatology and Technological Research

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**Context:**
Simulation is worldwide recognised as an effective strategy for education and training also in Neonatology 15. In Italy it has been being carried on only for few years. During the last national congress (Italian Society of Neonatology, SIN-October 2013) needs for simulation have been focused 23.

**Description:**
In 2008, we created, pioneers in Italy, the “NINA” Center for Neonatal Simulation and Advanced Training (in the Neonatology Unit, University Hospital, Pisa). Being strong from a decade of experience in traditional training courses, we started testing continuous education in Neonatology by means of high-fidelity simulation 24.

**Observation/Evaluation:**
“NINA” Center is original in Italy, being the first center linking education and training activities in Neonatology to a multidisciplinary research laboratory. As forwards education, we focus firstly on high-fidelity sessions for health staff to teach diagnostic and therapeutic skills or communication strategies. Moreover, we manage sessions for teams, dedicated to the staff working in our Unit (neonatologists and nurses), in order to guarantee a continuous retraining in specific procedures and to optimize communication and coordination in crisis resource management topics in NICU (neonatal intensive care unit). Finally, we are working now on new simulation sessions involving gynecologists too, for emergencies in delivery room. As regards research, “NINA” Center operates in two main fields. The first one, some years old now, is a close collaboration with The Biorobotics Institute in Scuola Superiore Sant’Anna (Pisa). By granted research projects, we have been working on innovative devices for simulation 24, 25. The newest collaboration is with the Regional Center for Education in Medicine and concerns psychological aspects of training by simulation and communication in simulation sessions.

**Discussion:**
In our opinion “NINA” Center is a great model of multidisciplinarity. We think that combining teaching and research could be the right way to optimize simulation strategies, exploiting novel ideas and technologies. Basing on that, we are carrying on a national survey, to explore both needs for training by simulation and resources availability in Italy. We aim to create a model of network to upgrade education in Neonatology. A two-years period will be necessary to implement the project. Hopefully, this model could be extended to national scientific societies of anesthesiologists and gynecologists too.

**References:**
2) www.neonatologia.it (last access: January 2014)
Ongoing Simulation in a District General Hospital; Pitfalls and Progress

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Abstract Body:
Ongoing Simulation in a District General Hospital; Pitfalls and Progress

Background:
“Simulation training in all its forms will be a vital part of building a safer healthcare system” 1
As directed by the Chief Medical Officer in 2008 we are striving to imbue simulation (sim) into regular teaching within paediatrics, aiming to improve patient safety.

Sim is being introduced at a time when study leave and budgets are at a premium and working hours restricted by EWTD. It is therefore proposed that ideally sim is delivered during working hours with minimal disruption to service provision.

Fewer staff, unfilled posts, frequent turnover of trainees and workload pressures all contribute to difficulties in having faculty available regularly to deliver sim scenarios in district general hospitals (DGHs).

Finding an appropriate time to deliver scenarios is therefore problematic. Fixed sessions within working hours are difficult to attend due to work pressures. Incentives to encourage trainee attendance are therefore required. In our DGH we now complete work-place based assessments (WPBA), a compulsory and valuable part of UK paediatric training 2, for all trainees taking part in a sim, increasing the enthusiasm to participate.

Research Question/Educational Goal:
How can DGHs provide training for faculty to allow sim teaching to continue?
Could sim provide a platform for completing WPBAs?

Proposed Approach to Addressing the Question or Goal:
Training is costly and time consuming. The ideal situation would be to establish a standardised “train the trainer” course suitable for delivery at different sites. Trainees could then attend from Registrar level upwards, enabling them to facilitate sim in any hospitals during their rotation.

An application for £3500 was made to the Peninsula Deanery Innovation Fund whose role is to “support the development of medical education and training” in our region and “innovatively improve postgraduate medical education and training” 4. This successful bid resulted in eight staff members receiving training in using high fidelity mannequin equipment and a structured format for feedback.

Some trainees remain apprehensive at the prospect of sim scenarios. The Royal College of Paediatrics and Child Health (RCPCH) could formally support sim participation as a way of completing compulsory assessments, enabling constructive evaluation and reward for those taking part.

This process is being successfully carried out in our DGH and informal feedback from trainees is that this is an excellent incentive to attend.

To summarise, training staff to run simulations, identifying training funds and using WPBAs to encourage participation will enable DGHs to continue to provide regular, high fidelity simulation.

Questions for Discussion:
Who should provide training to ensure Paediatricians are available to continue sim in DGHs?
Should RCPCH support sim as a platform for completing WPBA?

References:
1. Safer Medical Practice: Machines, Manikins and Polo Mints. Chief Medical Officer’s Report 2003
2. www.rcpch.ac.uk/training-examinations-professional-development/quality-training/work-based-assessments-assessm

Disclosure of Interest: None Declared
Keywords: faculty, safety, teaching

Qualitative Analysis: Development of a Classification System for Latent Safety Threats

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Background:
As Neonatal Intensive Care Units transition from open bay to single family room design, complex healthcare processes need realignment to maintain a highly reliable patient safety culture. Immersive simulation with facilitated debriefing reveals latent safety threats (ST). Multiple institutions have discovered ST prior to occupancy using Transportable Enhanced Simulation Technologies for Pre-Implementation Limited Operations Testing (TESTPILOT). Comparison between institutions is complicated by differing trajectories of ST discovery and resolution.
Objective:
To standardize a qualitative analysis tool for comparing latent safety threat discoveries between institutions.

Design/Methods:
A previously utilized ST severity and classification schema was reviewed by two physician process experts from separate institutions. Discrepant nodes were revised iteratively with explicit definitions. Examples from the severity schema include: a Hazard not addressed was likely to cause significant harm, whereas a Latent Safety Threat could potentially harm patient, family or staff if not addressed. Common contextual descriptors, such as “Code Blue”, were extracted from the primary documentation ST was performed using NVivo software. Sixty STs were then independently coded, followed by two cycles of consensus resolution. The final tool sorted primary classification and severity for all ST at two institutions.

Results:
The prioritization sorting scheme [figure] enabled distinct assignment of ST despite disparate importance weighed at each institution. Following a Boolean decision matrix, each issue was assigned to exactly one ellipse. When a novel institution-specific issue emerged, it was assigned to the most appropriate “other” category: training, communication or workflow. The final construct demonstrated excellent inter-rater reliability for both severity and primary classification.

Conclusions:
Process experts can effectively discriminate safety threats using qualitative analysis. Safety threats emerging in differing in priority and severity are comparable between institutions. Further institutional comparisons required to validate.

Disclosure of Interest: None Declared

Keywords: None

Process Improvement and Organizational Change

Rush Safely into a New Nicu…

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Background:
Neonatal Intensive Care Units (NICUs) are transitioning from open bay to single family room (SFR) design to optimize outcomes for premature infants and their families. Safety threats (ST) emerge as this transition alters complex healthcare systems. With focused attention, an institution can maintain its patient safety culture by translating processes and preparing staff. 1,3 Transportable Enhanced Simulation Technologies for Pre-Implementation Limited Operations Testing (TESTPILOT-NICU) is a simulation-based methodology that refines health care macrosystems prior to SFR occupancy. TESTPILOT-NICU had successfully been implemented in 2 SFR NICUs.

Objective:
To implement TESTPILOT-NICU in the new SFR NICU at Rush Children’s Hospital (RCH) prior to occupancy.

Design/Methods:
RCH was supported in their creation of an immersive in situ practice environment. ST identified at previous TESTPILOT implementations were shared. NICU physician and nursing leadership had modest debriefing experience, but no prior experience simulating healthcare macrosystems. An inter-professional team developed local learning objectives, scripted 6 scenarios, equipped 10 rooms, set mannequins, and orchestrated concurrent simulations. All disciplines performed their jobs in two progressive 30-minute in situ scenarios followed by 60-minute group debriefings which facilitated identification of specific ST. Two physicians qualitatively analyzed ST using NVivo software.

Results:
Active hazards (14), latent safety threats (64) and minor issues (65) were identified from post-simulation debriefing [Figure 1].The 4 major themes which emerged were ST related to workflow, facilities, ergonomics and communication devices, and the majority of active hazards related to communication devices. They were classified as primarily workflow (26), facilities (19), ergonomics (18), communication device (15), roles (13), supplies and equipment (12), family centered care (11), training, recruitment (7), other communication (5), staffing (2), wayfinding (1), scripting or written (2) issues.

Discussion:
Simulation is a powerful tool for mitigating ST in unproven healthcare environments. TESTPILOT-NICU, aimed at protecting the most vulnerable of patients, can be implemented with limited prior simulation experience. Full disclosure of prior institution ST does not promote safety. Complex processes must be modified and re-tested prior to occupancy.

References:

Disclosure of Interest: None Declared

Keywords: None
**Process Improvement and Organizational Change**

**IPSSW2014-1062**

**Transitioning New Grads into the ICU Nurse Role: How Simulation Can Help**

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**Introduction:**
According to the literature the greatest concern for most new graduate nurses (NGN), when transitioning from student to bedside nurse, is the fear of not knowing what to do in an unexpected crisis situation. Their lack of experience to provide safe patient care plays a significant role in their level of confidence as well. In the critical care setting, the acuity of the patients brings up concerns related to cognition, clinical judgment, and decision making skills with new graduate nurses.

Simulation allows the learner to utilize experiential learning by performing skills in a realistic yet safe setting. The learner is then able to take the experience and connect it to current and future events. Through the use of debriefing, the learners utilize reflective cognition to review the scenario, evaluate performance, and consider other interventions. We decided to try an innovative strategy to accomplish the same through a simulation workshop for NGNs just out of orientation in the PICU.

**Objectives:**
1. Attendants will be able to describe experiential learning in simulation.
2. Attendants will be able to identify the benefits of simulation in transitioning NGNs into the PICU nurse role.
3. Attendants will be able to summarize the process of planning and implementing a PICU Post Orientation Simulation Workshop.

**Methods:**
The purpose of this project was to increase NGNs’ knowledge, skills, ability, and confidence during code situations. This was accomplished through 4 hour workshops utilizing didactic instruction and participation in five simulation scenarios, based off areas of greatest concern from preceptor input. Participants gained information and knowledge about pediatric critical care emergencies and interventions. Knowledge was evaluated by pre and post exams. Learners also completed surveys pre and post-workshop to assess their perceptions regarding their own knowledge base, skill level, and confidence in participating in code situations.

**Results:**
Preliminary data showed increased levels of knowledge, ability, and confidence after participation in the training. We hope to demonstrate an improvement in patient outcomes, as well. Further data analysis is currently in progress.

**Conclusions:**
High fidelity simulation education in healthcare is evolving. As a result of the overwhelming response from the new staff and leadership regarding this education, it has been decided to integrate this simulation workshop into the current orientation track for all of the critical care areas within this facility. Simulation usage in academic settings is prominent in literature; however, little regarding its use for continuing education, particularly in the pediatric setting, has been reported. Therefore, in addition to adding simulation into the orientation process the facility is currently looking into developing a Critical Care Fellowship Program that will utilize simulation to provide the novice nurses with continued education for an additional year after orientation.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** None

**Process Improvement and Organizational Change**

**IPSSW2014-1128**

**Video Assisted Simulation of Paediatric Emergency Situations in the Surgery**

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**Abstract:**

Purpose: Video assisted simulation allows healthcare providers and learners to visualize a situation in a realistic setting to facilitate preparation for patient emergencies in the surgical suite. The purpose of this workshop is to determine the ability of nurses to recall surgical technical skills and proficiently perform critical steps in the management of pediatric emergency situations in the operating room (OR).

Method: Ten critical surgical emergency situations were presented to participants. Each participant was allowed five minutes to recall technical skills and perform critical steps in the management of each of the situations. The participants were evaluated using a checklist with critical steps that were essential to successfully perform each situation. The participants were evaluated as to the level of correctness and whether the participant was able to complete the critical steps.

Results: Preliminary data showed that the participants had a strong foundational knowledge base. The results for the participants showed that they were able to correctly identify a total of 47 critical steps from the situations. The participants had strong foundational knowledge in all the critical steps and were able to correctly identify a total of 95% of critical steps. There was an improvement of knowledge and confidence when participants were able to identify a total of 95% of critical steps.

Conclusion: The workshop was an effective method for increasing participant knowledge and confidence in the management of pediatric emergency situations in the OR.
Introduction:
Emergency situations in the surgery represent a formidable challenge for the whole surgical team. The aims of the presented method in the context of a risk analysis of the emergency situation “Paediatric postoperative haemorrhage after tonsillectomies” through video assisted simulation are the following:
- To analyse and optimize the processes
- To improve the management of resources in an emergency situation
- To enhance the self-assurance in action of each member of the surgical team
- To increase the patients safety in emergency situations.

Method:
The hospital “Krankenhaus der Elisabethinen Graz” developed in cooperation with the strategic partner Med-STA a video assisted program for process optimisation in order to train emergency situations and to optimize processes through intensive staff participation. The video assisted process optimisation program comprises the following seven steps:
- Definition of the problem
- Create the simulation scenarios including a script
- Determine success metrics and measuring parameter
- Implementation of the simulation on site with staff and video documentation
- Debriefing after each simulation cycle including determination of the optimisation measures for the next simulation cycle
- Report including presentation of the optimized process
- Training of the optimized steps of the process under video assistance including debriefing and personal coaching

Results:
In the context of the debriefing 18 suggestions of modification were elaborated for the emergency scenario “Paediatric postoperative haemorrhage after tonsillectomies” to optimize the processes and the use of resources. Especially striking were the suggestions of modification in the field of the distribution of roles among the various professions which merged in new processes of dense interdisciplinary collaboration. In a staff survey immediately after the video assisted simulation training an enhanced self-assurance in action of each member became visible. The shrinking of CIRS-reports concerning undesirable occurrences or risks in emergency situations can be seen as an indicator for the increased quality of treatment after a period of eight months of video assisted simulation.

Summary:
The video assisted simulation of emergency situations in the surgery including process analysis and optimisation through dense staff participation leads to:
- Practical guidelines (checklists) for emergency situations in the particular scope
- Professional team work
- Self-assurance in action also among inexperienced members of the team
- Improved interdisciplinary collaboration
- Improved communication skills in challenging situations
All these results cause an improved patients safety in emergency situations.

Disclosure of Interest: None Declared

Keywords: Paediatric postoperative haemorrhage after tonsillectomies, process analysis and optimisation, video assisted simulation

Crisis Resource Management/Human Factors and Teamwork
IPSSW2014-1176
Improving Teamwork Teaching in Multidisciplinary Simulation-Based Training in Newborn Emergencies

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Abstract Body:
Objective To measure effects of an educational workshop and self- and peer assessments to teamwork in multidisciplinary simulations in newborn emergencies.

Background Simulation training has become the standard for teaching neonatal resuscitation (1). Clinical evidence of newborn resuscitation has shown that current training is not transferred to real environment. Video analysis of resuscitation has shown that NPR guidelines are not followed more than 50 % of the time (2). Good teamwork is known to increase patient safety. Despite the importance of teamwork, no consensus exists what teamwork is good, how it should be taught and assessed. The self-assessment of one’s own activity has been used as a tool to measure competence in different professions (3). A validated teamwork assessment tools are needed in healthcare teams to identify areas for improvement and measure progress.

Research Question:
Does an educational workshop and self- and peer- assessments in multidisciplinary simulation-based training in newborn emergencies improve team performance?

Methodology:
104 persons of the medical staff of two big delivery hospitals participated into the study. 51 medical doctors, 33 midwives and 22 neonatal nurses volunteered for the study. 37 persons formed Group 1. 67 persons formed Group 2. From five to eight people were in each team. All scenarios were done in the emergency rooms of the delivery units using their own equipments (in situ) and using the same newborn simulator. The participants got pre-briefing for a simulation mannequin and training. All the teams performed two full scale neonatal emergency simulations.
and observed two. In addition, Group 2 received a lecture on teamwork and CRM principals before the simulations and filed after each scenario self- or peer-assessment forms before debriefings. The recorded scenario was scored by three experts using validated team scoring tool 46.

Results: In this randomized control study Group 2 which received the educational workshop and evaluated their teamwork with the self- and peer-assessment form did not improve their teamwork although the total self-assessment scores were better between the cases. In the self-assessment task management and situation awareness increased. When both the control and intervention teams were put together there was significant increase in the team scores.

Conclusion:
The self-assessment increases self-confidence in teamwork. The repetition of different scenarios improves teamwork. Further study with a few homogenous teams will be needed to show the real effect of self-assessment. The teamwork scoring seemed to be a valuable tool to use in real clinical settings to assess team performance.

References:

Disclosure of Interest: None Declared

Keywords: newborn emergency simulation, self-assessment, teamwork

Crisis Resource Management/Human Factors and Teamwork

IPSSW2014-1152

Using Simulated Transport Calls to Identify Diversity of Knowledge and Care Plans Among the Multidiscs

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Background:
Patients in the neonatal intensive care unit (NICU) are considered among the most vulnerable. Research has shown that patient safety and quality of care provided is affected by the knowledge, technical ability, and behavioral skills of each member of the multidisciplinary care team. Each member has a diverse background of training and experiential knowledge.

All NICU patients at Boston Children’s Hospital are born at outside facilities and nearly all infants are admitted via emergency medical transport. Thus transport call preparedness is fundamental to providing exceptional care for NICU patients.

Research Question:
Does significant variance exist among multidisciplinary team members in interpretation of transport call data and subsequent preparation that occurs when caring for critically ill neonates?

Methodology:
We utilized the BCH Simulator Program simulation suite to provide a realistic NICU setting for our multidisciplinary program. Three transport calls regarding a critically ill neonate were pre-recorded and received simultaneously by the multidisciplinary team (Nurse; Neonatal Nurse Practitioner (NNP); Respiratory Therapist (RT); Fellow; Attending). Each member completed a survey following each call (total, 12 questions).

After the final transport call, the patient arrived in the simulator suite and the remainder of the course progressed.

Results:
One hundred forty participants completed the course, including 85 RNs, 8 NNPs, 19 RTs, 16 Neonatal Fellows, and 13 Neonatology Attendants. After listening to the transport calls, 85.5% of participants categorized the patient as category, RED (Emergency/Urgent resuscitation-high acute status), while 14.5% of participants selected category, YELLOW (Clinical transition). The highest percentage group selecting YELLOW was the fellow group (18%), while 0% of the NNP group selected YELLOW. Blood pressure mean goal recommendations were more varied among the groups. Overall, 59.9% of participants selected 40-50, 27% selected 50+, and 11.7% selected 35-40. More specifically, 85% of attendings, 75% of NNPs, 75% of fellows, and 55% of RNs selected 40-50; while 15% of attendings, 25% of NNPs, 12.5% of fellows, and 33% of RNs selected 50+. The choice of a second inotropic agent in addition to Dopamine was less varied with 80.7% of participants selecting Epinephrine. Lastly, in response to changing coverage from Ampicillin/Gentamicin to Ampicillin/Cefotaxime, the response was 45% no vs. 55% yes. Yes response included 50% of RNs, 55% of fellows, 88% of NNPs, and 100% of attendings.

Conclusions:
Variance exists in regard to knowledge, experience, and practice among the multidisciplinary groups. Of the groups represented, attendings and NNPs tended to be more aligned with their assessment
and approach. Simulated transport calls provide a safe environment to uncover these differences and to allow for future study to improve teamwork and to provide the best care for the critically ill neonate.

References:
O’Daniel M, Rosenstein AH. Professional communication and team collaboration. Accessed April 8,2011 @ www.ahrq.gov/qual/nursehdbk/docs

Disclosure of Interest: None Declared

Keywords: Multidisciplinary team, Simulation based research, Transport

Simulation for Procedural and Psychomotor Skills
IPSSW2014-1127

Value of Simulation Based-Training for Chest Tube Insertion in Traumatic Pneumothorax

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Introduction:
Because chest tube insertion is associated with the risk of severe complications during the procedure, simulation-based training (SBT) may be a very helpful teaching technique. SBT was reported to improve success rate of chest tube insertion. Nevertheless no study reported its benefit when surgical insertion is necessary for a traumatic pneumothorax, as recommended by the ATLS course.

Objective:
To evaluate success rate, performance score, and dissection time during simulated chest tube insertion.

Methods:
65 participants (47 Emergency Physicians (EPs), 18 residents) were included from May to November 2013, and randomized in SIM+ group (receiving SBT on a specific model when developed for one hour with individual debriefing, n=34), and in SIM- group (without SBT). Both groups had received at first a didactic lesson on surgical chest tube insertion. One month later an evaluation was performed on the model with the use of a validated specific evaluation scale we designed (submitted).

Results:
SIM+ participants had a greater success rate (97% vs 58%, p=0.0002) and a better performance score (16.29±1.82 vs 11.39±1.67, p=3.13 10—8) than SIM- participants. SIM+ participants had a greater success rate (97% vs 58%, p=0.0002) and a better performance score (16.29±1.82 vs 11.39±1.67, p=3.13 10—8) than SIM-. SIM+ participants had a greater success rate (97% vs 58%, p=0.0002) and a better performance score (16.29±1.82 vs 11.39±1.67, p=3.13 10—8) than SIM-.

Nevertheless no study reported its benefit when surgical insertion is necessary for a traumatic pneumothorax. This benefit may be linked to the specific steps (dissection) of the procedure.

References:

Disclosure of Interest: None Declared

Keywords: None

Simulation for Procedural and Psychomotor Skills
IPSSW2014-1179

Risk Reduction of a Procedural Skill Secondary to Deliberate Practice

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Background:
The intraosseous route has been shown to be a safe, fast[12] and effective means for vascular access. However, it is still an underutilised modality in the paediatric population[13]. This could be due to several factors, including lack of training and confidence in its use.

We postulate that existing skills can be improved and skill loss prevented by delivery of short, focussed point of care training to paediatricians. Use of a mobile trolley with a simulated set-up in a clinical area can bring high-quality simulation-based teaching to the workplace.

Research Question:
Do focused training sessions for use of EZ-Io (intraosseous access device, manufactured by Vidacare) amongst paediatricians using a mobile simulation trolley improve confidence and practical skills?

Methodology:
The study population consisted of 26 paediatric doctors working in Bristol Royal Hospital for Children. Participants completed a pre-training questionnaire to determine pre-existing knowledge and confidence in use of EZ-Io. Following this, they undertook a practical training session using a mobile trolley with a simulated EZ-Io training set up. 3 months later a post-intervention questionnaire and practical assessment were completed to evaluate knowledge and perceived versus objective skill in EZ-Io needle insertion.

References:
Advanced Trauma Life Support, Student Course Manual, 9 ed., Chicago; 2012:119-20
Validation of a complete training model for chest tube insertion in traumatic pneumothorax. Simul Healthc (in press)
Results:
Following training, there was an increase in self-assessed confidence, 67% of participants reporting themselves to be fairly or very confident in EZ-Io insertion, compared with 42% pre-training. There were similar improvements in knowledge regarding correct needle size (27% pre- to 50% post-training correct), infusions (82% to 95% correct) and flushing of the catheter (91% to 100%). Practical skills were assessed against a checklist of recommended steps for insertion. Average scores 3 months after training were 75% for equipment preparation, 81% for needle insertion and 68% for needle removal. Only 1 participant scored less than 50%. Only 14% of participants had used an EZ-Io needle in the period between training and reassessment.

Conclusions:
This study demonstrates that a focussed training session on use of EZ-Io is effective in increasing confidence in its use and knowledge of correct use. Both skills and knowledge were largely well-retained after 3 months. Implications for future paediatric training include the adoption of regular focussed IO needle training sessions. A mobile trolley is an effective tool in providing this training in the workplace.

References:

Disclosure of Interest: None Declared

Keywords: Intraosseous , Paediatric , Simulation

Simulation for Procedural and Psychomotor Skills

IPSSW2014-1161

On-Site Pediatric Skills’ Training Boost Confidence in Airway Management in High Volume Care Center

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Context:
The recent introduction of a simulation center in our Hospital, has required the development of strategies to design different skills’ practices. We hypothesized that the implementation of an airway management-training program, using on-site simulation laboratories would optimize the teaching-learning process. Our aim was to facilitate skills practice to impact the acquisition and maintenance of skills for the proper handling of pediatric airway.

Description:
Design: Intervention study with pre/post evaluation of an educational intervention. Setting: CeSim Garrahan.

Objective: To design, implement and evaluate the impact of a multi-level educational program to optimize the care of patients with acute respiratory failure.

Population: Physicians, nurses and respiratory therapists.

The instructional material (videos and literature) was designed and posted on the course’s webpage. A pre- and a post- confidence survey, a web pre-test and a satisfaction survey were designed, and posted on the webpage. Specific skills were prescribed at multiple stations, 8 participants were scheduled for each practice session. All of whom had access to all the material, and were informed to fulfill the requirements (performing prepractice confident survey, pretest, reading the literature and viewing the videos) to proceed to the practice sessions. After the practice, the recipients completed the post-confident survey and the satisfaction survey.

Observation/Evaluation:
96 participants completed the first level, of which only one reprobat the pretest, the average score was 8.45 out of 10 points. A maximum score was achieved in 5 participants. From the checklists done during skills’ practice, only 2% of the participants needed to repeat the practice for not reaching the minimum level necessary for acquisition of skills. Pre-practice: 61.25%, 57% and 4.2% reported ‘feeling confident’, ‘little confident,’ and ‘not confident’, respectively. Post-practice confidence: 4.3%, 23%, 69%, 2.17%, reported feeling ‘highly confident’, ‘very confident’, ‘confident’ and a ‘little confident’, respectively. In the satisfaction survey 47.2 % reported that the ‘module fulfilled their expectations’, 83.33 % reported the ‘course material was complete and adequate’, 63.40 % said the ‘organization of the practice was very complete and proper’, the 63.40 % though the ‘course was a great contribution to their daily practice’.

Discussion:
Incorporating simulation as a method of teaching, training and assessment, through specific programs as proposed. The characteristics of a multiprofessional and multilevel program leaded to the hospital’s health team. The virtual components on web campus and hands-on in the Simulation Center. The difficulty to assess the real impact of these practices on patients’ care. The feasibility, the excellent results on the acquisition of skills in the airway program, and the great increase on recipients’ confidence in their future performance with patients.

References:

Disclosure of Interest: None Declared

Keywords: oxygen therapy, respiratory failure, simulation

Simulation for Procedural and Psychomotor Skills

IPSSW2014-1056

Effectiveness of Simulation Training for Umbilical Vascular Catheterization for Pediatric Residents

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Background:
Umbilical vascular catheterization (UVC), is a skill learned during pediatric residency. Survey data indicates UVC competency is deficient in graduating US pediatric residents (PR). Simulation based skill training (ST) is increasing in medical education, but its use is limited in neonatal medicine.

Research Question:
Is Performance and knowledge of UVC of PGY1 PR who received simulation-based educational intervention superior than those of PGY3 PR who received traditional clinical UVC training alone?

Methodology:
We conducted a prospective cohort study comparing a PGY1 PR intervention group (IG) with a simulation-based UVC educational intervention to a PGY3 PR control group (CG) who had traditional clinical UVC training only. IG completed a knowledge test comprising multiple choice questions (MCQ) on UVC followed by sequential viewing of a UVC procedural training video and simulator-based UVC manakin skills and knowledge training. CG had only UVC video review training. Both groups underwent performance testing with a real umbilical cord simulation model and MCQ knowledge testing two weeks after ST. The performance was assessed with a check list. Comparison group had a survey with 10-point Likert scale (1; not real, 10; very real) regarding reality of a real umbilical cord simulation model used for performance testing. Descriptive statistics are presented as medians with IQR. Data was analyzed with Wilcoxon signed-rank test and Mann-Whitney’s U test. Statistical significance was set at p < 0.05.

Results:
Eight PGY1 and PGY3 PR enrolled. Seven in each group were analyzed since one in each group did not complete testing. Pretest and posttest knowledge of IG improved from 55% (46.3-62.5) to 80% (76.3-88.8) (p<0.05). Posttest knowledge of CG was 60% (56.3-75.0). Posttest performance
was 83% (55.3-88.0) for IG and 58% (43.0-66.0) for CG. Between group differences in post-test knowledge and performance were not significant. Median score of 10-point Likert scale regarding reality of a real umbilical cord simulation model was eight out of 10.

Conclusions: The potential to improve knowledge and performance of PR. This model can be used as a proxy for various real procedures in enhancing confidence and performance success of trainee doctors.

Key words: Umbilical, catheterization, simulation

Disclosure of Interest: None Declared

Keywords: None

Interprofessional Education (IPE)

IPSSW2014-1154

Team Members’ Stress Response during Immersive Simulation of Infant Shock: Preliminary Results

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Introduction: Stress may impair clinical performance and be responsible of poor medical management (1). It can be also present in simulation-based training with the same consequences (2,3). In an immersive simulation, multidisciplinary team (MDT) members may all face stress. We hypothesized that stress was more important in leaders than in other team members and that it decreased after debriefing.

Objectives: 1/ to objectively evaluate stress level before, during simulation, and after debriefing. 2/ to compare stress level of members of MDTs.

Methods: Study approved by the Clinical Investigation Center – INSERM 0802 Scientific Committee and the Faculty of Medicine Research Board. 48 participants signed informed consent and were randomized in 12 MDTs (emergency physician, nurse, and paramedic, all with < 6 years of experience, and resident) for a high fidelity simulation session (infant in hypovolemic shock – SimNewB, Laerdal*). Each session was followed by a good-judgment debriefing. Stress was assessed by salivary cortisol (SC) and Holter analysis. A saliva sample was taken the day prior (T0) to the simulation session, immediately after the session (T1) and after debriefing (T2), to assess SC by enzyme-linked immunosorbent assay. Holter analysis provided time analysis of:

- SC level was identical at T0 in the 12 teams regardless of the status: 0.13±0.03, p=0.17. SC significantly increased at T1 (0.36±0.24, p=2.2E-8) and T2 (0.25±0.15, p=2.5E-6). It significantly decreased between T1 and T2 (p=0.008), independently of the status. HR increased from T0 (65±10) to T1 (86±11) (p=6.69E-14), and remained unchanged during debriefing (86±12, p=0.97). PNN50 significantly decreased between T0 and T1 (19.4±15.9 vs 9.43±8.43, p=0.0003), and remained unchanged during debriefing (10.1±9.5, p=0.71). Similarly LF/HF decreased between T0 and T1 (3.04±1.59 vs 6.35±3.43, p=7.30E-8) and remained unchanged during debriefing (6.06±3.06, p=0.67).

Discussion/Conclusion: Immersive simulation in this population was a source of stress for all MDTs regardless of status. During debriefing, biological stress (SC) decreased while markers of electrophysiological stress remained high. Future studies should investigate this dissociative state of stress (electrophysiological but not biological) and focus on the evolution of markers of stress with repetition of simulation sessions, and their relation to performance and educational possibility.

Disclosure of Interest: None Declared

Keywords: Evaluation, MDT, Stress

Interprofessional Education (IPE)

IPSSW2014-1157

“In Situ” Neonatal Simulation Training - Analysis of Learning Outcomes

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Context: A regular “in situ” Simulation Programme was developed on a tertiary level regional newborn intensive care unit. It is aimed at junior doctors and nurses, as part of their training to afford candidates an opportunity to practise skills required in real-life scenarios, within a safe environment. Each session is run weekly usually with a group of 4 candidates – two doctors (one senior grade, Specialty Trainee (ST) years 4-8 level doctor and one junior doctor, ST year 2 level doctor) and two nurses (a junior and a senior). The duration of each session is 60 minutes and is facilitated by two consultants who co-ordinate the scenario and provide the debrief. The scenarios include common newborn delivery room and newborn intensive care situations. These simulation sessions have had excellent subjective feedback, however deep learning has not been assessed.

Description: Following the debriefing, each participant is asked to provide 3 learning points which they propose to use in their future clinical practice. For analysis, the learning points were categorised as described below:
- Clinical: Practical technique, Clinical assessment, Resuscitation management and Equipment
- Human Factors: Communication, Team working and Situational Awareness

Observation/Evaluation:
In 20 simulation sessions learning points were collected from 2 student nurses, 21 nurses, 5 Nurse Practitioners (hereafter denoted as “nurses” group) and 18 ST2 + 14 ST4-8 doctors (hereafter combined in the “doctors” group).

<table>
<thead>
<tr>
<th></th>
<th>Nurses</th>
<th>Doctors</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No.</td>
<td>28(44%)</td>
<td>32(56%)</td>
<td>60</td>
</tr>
<tr>
<td>Learning points</td>
<td>100(44%)</td>
<td>129(56%)</td>
<td>229</td>
</tr>
<tr>
<td>Clinical</td>
<td>45(45%)</td>
<td>66(51%)</td>
<td>111</td>
</tr>
<tr>
<td>Human Factors</td>
<td>55(55%)</td>
<td>63(49%)</td>
<td>118</td>
</tr>
</tbody>
</table>

The most notable difference in learning points were as follows:

Clinical: A higher proportion of doctors identified points on assessment and management (23% vs 11%) and more nurses identified points on equipment management (17% vs 6%)

Human Factors: Doctors focused more on leadership (4.6% vs 2%) and nurses focused on role and task allocation (13% vs 7%).

Situational awareness was reported more frequently by doctors (3.8% vs 2%).

Discussion:
- Each participant identified at least 3 learning points indicating that learning occurs in all professionals following a multiprofessional simulation experience.
- Both clinical and human factor learning points were identified in almost equal proportions by both groups, suggesting that participants value the importance of human factors in addition to clinical learning.
- Leadership and effective handover were highlighted more commonly by the doctors whilst nurses focused more on role/task allocation and on sharing of the mental model, possibly in order to anticipate the team leader’s next interventions (e.g. preparing equipment for intubation).
- The “take-home” learning points identified by the individual groups reflect the nature of their roles in the care of the newborn.

Disclosure of Interest: None Declared

Keywords: in situ Simulation, learning points, neonate

Interprofessional Education (IPE)
IPSSW2014-1172

Nurses’ Perception of the Value of an Interprofessional Simulated “In Situ” Team Training Programme

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Context:
The validated interprofessional “in situ” SPRinT (Simulated Paediatric Resuscitation Team Training) programme was established in our paediatric directorate in 2008, in order to improve team performance and therefore patient safety during critical events. Simulation based team training has been demonstrated to improve self-efficacy and perceptions of teamwork and safety within a team, but the perception of training effects may be different for individual professional groups.

Description:
A retrospective study to evaluate nurses’ perception of SPRinT courses with reference to crisis resource management & patient safety from May-Dec 2013 throughout paediatrics in a specialist cardiorespiratory hospital. Interprofessional SPRinT courses consist of didactic crisis resource management teaching, high fidelity simulated critical event scenario, and video assisted debriefing by trained interprofessional faculty. Participants completed anonymous post-course self-evaluation forms assessing impact on confidence and teamwork utilising a 0-100% score indicating level of agreement with statements. Each questionnaire had 17 quantitative and 3 qualitative questions (most useful, least useful aspects, free text comments). >80% score indicated a strong level of agreement.

Evaluation:
58 nurses (35 band 5 Registered Nurses; 15 band 6 specialty certified charge nurses; 8 band 7 specialty certified senior charge nurses) attended 16 SPRinT Courses. Overall course mean evaluation = 90% (range 65-100). Quantitative response rate= 983/986 (99.7%).

<table>
<thead>
<tr>
<th>Nurses’ Perception, Quantitive response</th>
<th>Mean level of agreement (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPRinT simulation courses have increased my confidence to manage similar future clinical events.</td>
<td>84% (50-100%)</td>
</tr>
<tr>
<td>SPRinT simulation courses will help me to better manage critical situations in areas I work.</td>
<td>87% (60-100%)</td>
</tr>
<tr>
<td>SPRinT training may help me to provide safer patient care in the future.</td>
<td>89% (50-100%)</td>
</tr>
<tr>
<td>Interprofessional simulation training is useful as we spend most of our time working in teams.</td>
<td>91% (60-100%)</td>
</tr>
</tbody>
</table>

Qualitative response rate =86/174 (49%). Most useful aspect response rate =47/58 (81%); debriefing (38%, 18/47), the scenario (30%, 14/47) and interprofessional communication (21%, 10/47) were the most commonly reported. Least useful aspect response rate=25/58 (43%); 16/25 (64%) answered least useful aspect of course with “nil”/“all was useful”, 3/9 (33%) identified the ice breaker as least useful. Free text comment response rate=14/58 (24%). These included “have learnt importance of speaking my thoughts” and “useful to know that other professionals had similar worries.”
Discussion:
Nurses self-report high impact on providing safer patient care and on ability to manage future critical situations following participation in “in situ” simulated interprofessional team training courses. Debriefing and empowerment to speak were identified as key aspects of the course.

References:

Disclosure of Interest: None Declared

Keywords: crisis resource management, interprofessional education, patient safety

Interprofessional Education (IPE)

IPSSW2014-1075

How can we Better Prepare Doctors at Induction to Work in Paediatric Intensive Care Retrieval

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Introduction: Established in 2001, the Children’s Acute Transport Service (CATS) is a specialised mobile paediatric intensive care service to ensure that intensive care is rapidly available when and where it is needed.

Objectives: The aims of this action research were to understand the medical trainees’ needs during their placement on the team, what their experiences were of our current induction programme and in what way might medical simulation enable their learning?

Methods - Qualitative Action Research:

Thematic Analysis: Semi-structured retrospective interviews with trainees’ who had undergone the original format of induction and the consultants who deliver it. Trainees’ n=5, Consultants n=2

Results: The three main themes emerging from the data collection were:

1. Lack of pre-induction information and preparation undertaken

Question – “Did you do any preparation to joining the CATS team?”

“A little bit, I read the guidelines on line, but they’re for everyone aren’t they?”

“no, I meant to but I didn’t – partly time and also i didn’t know where to find stuff”

2. Need for training in logistical and team-working skills in practice

Question – Do you think our fellow induction programme was fit for purpose? “Yes, but more maybe practical scenarios or some hands on stuff, I’ve found that really useful before”

“Yes, but I think it could be better, maybe more teamworking stuff, mock referral taking or stretcher handling”

“Yes, but only including the trainees supervised retrievals, and we could include more practical or logistical stuff without any patient contact”

“Yes, and we should have ongoing learning for things like logistics and team values.”

3. Simulation training was proposed to enhance the current induction programme

Question – what else do you think should be included in the induction? “I would like some practice scenarios, like simulation training. I’ve done some before and it really helped me.”

“I’d like to practice how to take a referral, you know how to talk to senior staff and stuff on the phone... maybe we should add in simulation training”

“I think there should be simulation training throughout our time, not only on induction”

“We should debrief more and rerun the difficult cases in a simulation session to help us all learn”

Conclusion: All of the above quotations and further responses have provided us with important data surrounding our original induction programme that we currently offer. While nearly all think it’s a programme that is fit for purpose all agree that it could be improved upon to aid the trainees’ learning. As a result of this action research the following recommendations should be considered:

1. Formulate and propose a new induction programme to include e-learning and simulation training

2. Benchmark our new programme against other paediatric intensive care retrieval teams induction programmes for new staff nationwide

3. Assess the effectiveness of the programme by interviewing staff six months after implementation

References:


Disclosure of Interest: None Declared

Keywords: None
Interprofessional Education (IPE)

IPSSW2014-1155

Interprofessional Education using “In Situ” Paediatric Simulation in an Academic Hospital: First Steps

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Context:
Our hospital is a 1000-bedded academic acute centre, with 70 paediatric/neonatal beds, 18000 Accident and Emergency (A&E) paediatric visits and 4000 paediatric anaesthetics per year. There is no formal simulation suite and most of the non-medical staff has never been exposed to the simulated environment. High fidelity, “in situ” simulation can be cost-and space-effective, with the opportunity for involvement of local teams, allowing analysis of system dynamics 1,2,3.

Aims:
- Develop high-fidelity “in situ” paediatric simulation scenarios for all clinical areas and teams delivering acute paediatric care
- Utilize simulation to:
  1. Introduce Crisis Resource Management (CRM) concepts to participants.
  2. Refresh practice guidelines.
  3. Identify elements of risk and improvement in specific local clinical settings.

Description:
The project started in mid-2012. The initial faculty included two consultant paediatric anaesthetists, one senior theatre nurse and two anaesthetic trainees.
- A high-fidelity infant manikin, operating laptop, compressor and electronic console are transferred to the relevant clinical area with a mobile cart.
- Each session takes place during working hours and lasts for one hour.
- Participation is voluntary. Candidates are allocated either to their usual roles or to observe.
- CRM principles are followed during the debriefing.
- Anonymous feedback forms are distributed. Specific questions over local flaws or areas of improvement are asked.

Session structure: 1. Introduction to the simulated environment and manikin. 2. Scenario performance. 3. Debriefing. 4. Guidelines refresher.

Observation/Evaluation:
- 11 sessions have been run so far. 5 sessions in operating theatres, 5 in PACU, one in the Children’s Acute Unit, one in A&E and one in ICU. Two sessions were cancelled due to a concomitant clinical priority.
- 118 members of staff have participated so far (46 nurses, 27 anaesthetic assistants, 25 doctors, 5 support workers, 15 other).
- Feedback was positive for perceived realism, increased confidence, recommend scenario to other colleagues, suggestion of new scenarios. Feedback allowed to highlight system issues:
  1. Paediatric emergency trolley setup and specific emergency equipment/drugs.
  2. Familiarisation with emergency equipment.
  3. Refresh of specific guidelines.

Discussion/Conclusions:
We aimed to introduce paediatric simulation in a busy academic hospital with a considerable amount of paediatric medical and surgical activity but without a simulation suite and a relatively ‘sim-naïve’ staff. “In situ”, high fidelity simulation may successfully reach a considerable number of staff members in their actual workplace 4, adding relevance and the potential to identify specific local organizational and training issues to address 5. The small number of providers poses frequent logistical challenges, requiring coordination between different teams and operational flexibility. A key element in development of our project will be the involvement and training of new faculty.

References:
1. The acutely or critically sick or injured child in the district general hospital - DoH 2006
2. RCoA. Guidance on the provision of paediatric anaesthesia services. Royal College of Anaesthetists, 2010.

Disclosure of Interest: None Declared

Keywords: None

Certification

IPSSW2014-1180

Incorporating Simulation-Based OSCE’s into Israeli National PICU and NICU Nursing Registration Exams

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Background:
Until 2008 the registration exams for Israeli post graduate clinical specialty courses were Multiple Choice Tests (MCT). In recognition of the need to add performance measures to the registration process, a Simulation-Based-Test (SBT) was developed to replace the MCT. The new SBT was developed in a unique professional collaboration between MSR, the Israel Center for Medical Simulation, the National Institute for Testing and Evaluation and the Ministry of Health – Nursing Division. The SBT measures proficiencies in clinical skills, clinical reasoning, decision making and increases the authenticity of the assessment method.
The registration exams began in 2008-9 encompassing 15 nursing specialties from Acute Care - ICU, OR, ER, PICU to Chronic Care – Geriatrics, Oncology, and Psychiatry. Over 1000 nurses are tested annually and over 100 of these nurses are from Pediatric and Neonatal Intensive Care.

**Methods:**

The PICU and NICU exams consist of 7 OSCE stations: 4 simulator stations, 1 SP station and 2 Video/PPT case-based analysis. In addition, a short MCQ exam is given separately. The stations are 20 minutes each and the total test time is 4 hours. Test materials are based on pre-defined test blueprints for each specialty by teams of Nurse Specialists, sim-experts and psychometricians. Trained raters (NICU/PICU NS) rate examinees on structured scoring forms. Total test score is the average score across OSCE stations and MCQ (weighted as 2 stations).

The simulator-based stations present scenarios such as: cardiac, complex respiratory cases, advanced resuscitation, pediatric trauma, sepsis, hepatitis, and heart defects in children and preemies. The main skills measured are history taking, differential diagnosis and treatment of patient. The treatment includes items such as: physical exam, respiratory and cardiac care, interpretation of blood tests, ECG and x-rays, drawing medications, airway management, chest tube insertion, central line insertion, Arterial line, BLS, ALS and complex ventilated patients etc.

The SP-based station assesses skills related to guidance and instructions for patient and communications skills.

**Discussion:**

Throughout 2008-2013 223 PICU nurses and 293 NICU nurses were examined in a simulation-based test. There are many advantages to this method including:
- Measurement of actual performance
- Measuring various aspects: knowledge, technical skills, clinical skills, communication, case management
- Context and environment is similar to the clinical field
- Multiple, independent observations
- Testing of pre-defined cases (common and rare)
- Enables standard practical test

However, while the SBT is considered a better test than the traditional MCT there are still challenges including: Human raters and judgment biases, “team work” measurement is complicated, the time frame is limited, not everything is measurable (limitations of technology and measurement tools) and it is costly.

**Disclosure of Interest:** None Declared

**Keywords:** National Registration Exams in Nursing, PICU and NICU

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**Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)**

**IPSSW2014-1146**

**Vision of an Open Source Simulation Platform: How to Combine High Quality and Low Cost**

Francesco Dojmi Di Delupis ¹, Paolo Pisanelli ², Giovanni Di Luccio ³, Paolo Testani ¹, Matteo Kutufa ⁴

¹ Inter-institutional Integrated Department, University of Florence and Careggi University Hospital, Florence, Italy, ² Emergency Department, Florence Health Authority, ³ Trasit, Florence, ⁴ Brain Technology spa, Sesto Fiorentino, Italy

**Background:**

Simulations in pediatric healthcare can be performed by use of simple or complex devices, with various levels of fidelity. The market offers very heterogeneous simulation devices that go from simple mannequins without any electronic parts to others with highly sophisticated hardware and software. The most common devices differ in features, characteristics and costs and variable levels of fidelity. Flexible devices are on the market today at very high costs and so complex to use that professional technical guidance is needed to make them work. Our aim is to achieve an extremely flexible device, adaptable to most of the needs, with characteristics easy to use at a contained cost.

**Proposed Approach:**

The integration of the most sophisticated hardware and software technologies on a cloud platform which dialogues with the pre-existing simulation devices enhances the performance, the usability and fidelity with maximum flexibility and effectiveness. Delegating the control to an integrated software sole platform can simplify complex functions of mannequins on the market that are often characterized by external peripheral computers control, complex structure, technical problems, obligatory maintenance consequently increasing costs. Further, the miniaturization of hardware integrated with a more powerful software can almost entirely elaborate the functions. The cloud technologies, considering the continuous trend to use wireless connections without having to use hardware solutions and licenses, permits the development of a new concept of simulation through open source usable with a vast choice of possible devices: tablets, smart phones, laptops, etc.

**Discussion:**

This passage to a new concept offers a drastic reduction of production costs and re-engineering permitting the recycling of obsolete mannequins improving fidelity levels of simulation and interaction with the student. The advancement of this type of simulation platform based on stable software technology and on low cost hardware could provide the possibility of having a large number of people cooperate and participate to its growth starting
simply sharing scenarios, creating software upgrading and new peripheral devices that could interface the simulator. This approach would make free from dedicated structures, made “ad hoc” bringing the simulation externally and more usable in unorganized situations. The simulation would be both of high quality and very accessible without high costs for start-up and depreciation. This would bring high levels of education which were accessible up to now at high costs even when a low budget would not permit to maintain high quality standards.

**Disclosure of Interest:** None Declared

**Keywords:** open source, simulation, manikin

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### Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)

**IPSSW2014-1162**

**QCPR Training Tool to Interface with Clinical CPR/Defibrillation Electrode Pads**

Julie Campbell 1, 2,*, Robert Allen 1, James Fackler 1, Jordan Duval-Arnould 2, 3, 4, Elizabeth Hunt 2, 3

1Whiting School of Engineering, Johns Hopkins University, 2Johns Hopkins Medicine Simulation Center, 3School of Medicine, 4Bloomberg School of Public Health, Johns Hopkins University, Baltimore, United States

**Context:**

Quality CPR (QCPR) metrics include chest compression depth, rate, and recoil, which can be measured in practice by QCPR-capable clinical monitors to provide real-time and post-event performance feedback. During simulation-based training, these metrics can be provided via simulators, clinical devices, and skill-reporting sensors. Use of a clinical device may be ideal in terms of realism, which has been shown to affect rate of skill decay and translation to practice (1), but can be prohibitive in terms of training device costs, learner to device ratio, and data collection. This system addresses limitations of using actual clinical devices during simulation-based training by emulating the clinical device interface, while using clinical QCPR sensors to provide data on chest compression quality.

**Description:**

This system interfaces pre-existing CPR performance measurement devices with customizable performance assessment and visualization applications. The device’s hardware includes clinical defibrillator pads with integrated accelerometer (ZOLL OneStep™ Complete Pads) and an analog-to-digital converter. Raw data are continuously sampled from the accelerometer output of the QCPR sensor, smoothed, and transmitted to software components. Digital accelerometer data is filtered and is translated to position via linear estimation; QCPR metrics are evaluated from calculated position data. The user interface emulates the ZOLL R Series® defibrillator real-time QCPR visual and audio cues, providing a customizable model for realistic BLS training. An interactive QCPR score sheet is displayed at the end of training with compression metrics graphed in relation to AHA guidelines.

**Observation/Evaluation:**

Calculated CPR metrics were compared to output CPR metrics from the ZOLL R Series® defibrillator. The variance in calculated position between the QCPR outputs is modeled by an $R^2 >= 0.8$. This device is currently being incorporated into nursing education programs. A qualitative survey assessing the realism of the user interface and the perceived benefits of quantitative feedback is completed by users after training.

**Discussion:**

Despite the existence of many technologically advanced devices to provide QCPR feedback, it has been repeatedly demonstrated that CPR quality during training and clinical practice does not meet AHA guidelines (2). BLS courses include repeated rounds of chest compression practice to achieve psychomotor skill proficiency; however, trainers often give QCPR feedback based on observation alone and as a result feedback is limited. QCPR feedback technology is not always incorporated into BLS courses due to the expense and when feedback is provided it is usually has limited detail. In addition, the differences between training-specific device interfaces and those used clinically can lead to trainee confusion and incomplete translation to practice. This technology provides effective CPR training that is both low-cost and clinically realistic.

**References:**


**Disclosure of Interest:** None Declared

**Keywords:** Accelerometer, Performance feedback, Quality CPR
Flipping the classroom. Blending e-Learning with Simulation.  
RESUS4KIDS – A Novel Australian Paediatric Simulation Program

Fenton O’Leary 1, 2, 3, Kathryn McGarvey 2, 3, Jason Hort 1, 2

Introduction:
Flipping the classroom, or providing learners with key content prior to a face to face interaction, enables learners to move towards a more active learning model, focusing on higher order thinking skills. In a healthcare environment teaching time is often scarce and the ability to deliver standardised knowledge content flexibly is an added benefit. The aim of this project was to produce an evidence based, easily accessible paediatric resuscitation program that equipped local trainers to deliver the simulation to local participants after they had already completed an on line e-learning package. This would help shorten the time required for face to face contact and enhance participant learning.

Method:
We developed a validated e-learning module on paediatric resuscitation based on Guideline 12.1 of the Australian Resuscitation Guidelines. This was used in the ‘flipped classroom’ method as pre-learning for the face to face component. A ninety minute ‘Short Practical Course’ was then developed with 30 minutes devoted to teamwork, leadership and communication using a game and videos as prompts to facilitate discussion. The final sixty minutes used low fidelity simulation in a pause and discuss format to allow participants to practise the clinical skills required during a resuscitation and to consolidate the e-learning knowledge.

Results:
To date 350,000 e-Learning lessons have been accessed, with 23,000 completions of the entire module, throughout Australia. 12,000 participants have completed the Short Practical Course. Over 1000 educators have been trained to provide this course locally. There is no cost to participants to attend the course.

Round the Table Teaching: A Novel Method for Small Group Teaching using a Simulated Learning Environment

Fenton O’Leary 1, 2, 3, Kathryn McGarvey 2, 3, Jason Hort 1, 2, Karen Scott 2

Abstract:
This poster describes a novel small group teaching methodology which combines a number of evidence-based, teaching methods into an engaging, practical format for teaching any clinical skill that requires a structured approach. In our program we have focused on paediatric resuscitation, intravenous access and tracheostomy emergencies but the method equally applies to history taking or the assessment of a trauma patient.

The instructor-to-student ratio is 1:6-8 ensuring all participants can engage with the course content and the group, and have ample hands-on practical time. Rather than teaching clinical skills in isolation, a low fidelity simulated learning environment is used, with a ‘pause and discuss’ format, allowing the instructor to enhance and direct learning and provide regular feedback.

Using a simulated learning environment and clinically relevant scenarios allows the participants to reflect on past experiences, modify their thinking and actively re-experiment, following the principles of Kolb. We also utilise an approach similar to the Fishbowl method, enabling participants to learn from watching each other whilst also undertaking individual practice.

Using e-Learning as prelearning enables the student to learn new knowledge prior to the simulation and then test this knowledge when they apply it to practical skills during the scenarios. Through the ‘testing effect’, students learn more and retain knowledge and skills longer when tested on recently studied material.

The method is particularly engaging in an interprofessional environment or where different grades learn together within one profession as the emphasis is on learners participating individually and as a group.
Title ????

**IPSSW2014-0003**

"In Situ" Paediatric Simulation Programme for General Practice Trainees

James Edelman BM MRCPCH, 1 Kim Sykes 2
1 Wessex Deanery Quality Improvement Fellow, Salisbury District Hospital, Oadstock Road, Salisbury, Wiltshire, 2 Paediatric Intensive Care Consultant, University Hospital Southampton, UK

**Background:**
GP trainees are employed in the majority of paediatric SHO posts throughout the UK. These jobs expose them to acute and outpatient paediatrics and allow them to enhance their confidence in managing children. Recent recommendations 1,2 have suggested GP training should include more focus on paediatrics to develop skills and expertise in the recognition and treatment of acute childhood illness.

**Description:**
Using existing curricula from the Royal College of General Practice and the Royal College of Paediatrics and Child Health, we have developed a programme of twenty simulation scenarios that cover common acute paediatric presentations to primary and secondary care. These simulations will be delivered on a weekly basis in a ward environment using a high-fidelity mannequin (SimBaby). The scenarios are accompanied by a written educational summary of the topic that will cover the presenting features and recommended treatment pathways for primary and secondary care, and highlight important points for recognition of the sick child.

Following each scenario teaching, trainees will complete a questionnaire to assess changes in their confidence levels toward management of the specific topic and of the acutely unwell child. A further questionnaire will be completed at three points during the programme to assess knowledge retention. A control group working in a comparable paediatric department will also complete the questionnaires without the simulation training to assess the impact of the educational intervention. Institutional Review Board review was not applicable for this project.

**Progress to Date:**
We are currently in the process of refining the scenarios and educational material. The programme will commence in February with a new group of trainees and will have three months of data by April.

**Discussion and Expectations:**
Based on previous studies 3, 4, we hypothesise that confidence levels and knowledge retention will increase faster in the intervention group compared to the control group. If this does, this module can be incorporated into future training programmes to ensure better recognition and management of unwell children in both a primary and secondary care setting.

References:

Conflicts of Interest: None

**Key Words:** General Practice, Acute Paediatrics, Confidence
our Simulation Laboratory. The total cohort was divided into four groups based on training level. Participants included six incoming Interns without PALS certification or simulation experience. The remaining sixteen were all in the final month of their PGY-1, PGY-2 or PGY-3 training years, having both PALS certification and simulation experience. All participants were individually asked to perform a lumbar puncture on a high-fidelity mannequin, Laerdal SimBaby, as they would customarily do. The mannequin was rigged with a novel and inexpensive mechanism to realistically simulate the procedure. A clinical scenario of an infant who develops respiratory decompensation was predetermined. A physiologic, hypoxia trend was started from the moment of fluid collection with a clinical recovery trend initiated if specific interventions were performed. Ten skills indicative of successful performance of a complicated procedure were selected for analysis based on PALS and customary Critical Care guidelines. Individual timestamps related to the time of resuscitation maneuvers were recorded and analyzed. A rank order table was generated to evaluate the successful demonstration of skills of both individuals and groups. Performance of each participant was video recorded for debriefing.

Results:

We failed to accept our hypothesis. None of the residents performed all ten of the expected skills and many failed to initiate critical tasks such as recognition of deterioration and early initiation of positive-pressure ventilation. Using the Kruskal Wallis Test we found a significant difference in performance between groups. With the Spearman Correlation Test, we saw a 69% positive correlation between successful completions of 10 resuscitative skills (Table 1) with level of training. PALS certification and simulation experience trended towards better performance.

Table 1

<table>
<thead>
<tr>
<th></th>
<th>Checks Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Recognizes Deterioration</td>
</tr>
<tr>
<td>3</td>
<td>Stops Procedure</td>
</tr>
<tr>
<td>4</td>
<td>Places Patient in Supine Position</td>
</tr>
<tr>
<td>5</td>
<td>Opens Airway</td>
</tr>
<tr>
<td>6</td>
<td>Performs Assessment (ABC)</td>
</tr>
<tr>
<td>7</td>
<td>Attaches EKG leads</td>
</tr>
<tr>
<td>8</td>
<td>Starts PPV</td>
</tr>
<tr>
<td>9</td>
<td>Activates Emergency Medical Service</td>
</tr>
<tr>
<td>10</td>
<td>Initiates CPR</td>
</tr>
</tbody>
</table>

Conclusion:

During this simulation it appeared that residents’ ability to recognize and manage respiratory complications arising while performing a procedure improves with level of training. This is likely attributable to both clinical exposure and PALS & SBME training. However, the timely initiation of proper resuscitative efforts remained delayed, even among the best performers. We therefore conclude that Pediatric residents are not ready to manage respiratory complications during procedures and additional training in the identification and management of clinical deterioration through simulation experience is advisable.

References:

Assessment of Pediatric Advanced Life Support Skills Using Simulation: A Teaching Hospital Experience

Gargi Shikhare MD, Michelle Dyes RN, Rogelio dela Cruz MD

**Background:**
Pediatric Advanced Life Support (PALS) is designed to teach providers the skills needed during pediatric emergencies, especially codes. Resuscitation techniques are assessed during mega codes using low-fidelity mannequins and readiness is assumed adequate with certification. However, due to comparative infrequency of Pediatric codes, knowledge and skills decay may occur. Over a ten year period (2000-2009), survival of in-hospital cardiac arrest has improved by more than thirty percent. This increased survival is a result of improvement in both pre and post-resuscitation care until discharge. However, the risk of severe brain damage appears to have remained unchanged during the same period. Since the brain is most vulnerable to hypoxic-ischemic injury during the acute phase of cardio respiratory arrest, timely provision of high quality resuscitation care is mandatory.

**Aim:**
The aim of this study was to assess the quality and timeliness of resuscitation care and to identify common skill deficiencies during simulated pediatric codes. We hypothesized that certified PALS providers are skilled to provide effective CPR.

**Methods:**
PALS certified participants were presented a variety of pulse less arrest code scenarios ranging from Pulse less Electrical Activity (PEA) to unstable Supraventricular Tachycardia (SVT) at the Center for Innovative Learning on a high fidelity mannequin, Laerdal SimBaby. Majority had simulation experience. Nine skills deemed essential in providing a high quality CPR was collected from all participants and recorded by an independent observer using a modified debriefing form.

**Results:**
Twenty pediatric residents, 13 pediatric nurses, and one anesthesiologist participated in the study. All participants were pediatric advanced life support (PALS) certified. Ninety five percent of the physicians and 46% of the nurses had prior simulation experience. The results for both groups are given in Table 1. The physicians performed significantly better than the nurses in airway management (P = 0.04). However, both groups performed poorly on immediate provision of chest compression and defibrillation. Provision of high quality CPR was the most common unsatisfactory skill with delay in starting chest compression being most common, followed by asynchrony with ventilation, frequency of less than 100 per minute and failure to rotate chest compressors. Although, correct rhythm was recognized, decision to defibrillate or cardiovert was delayed in 50% and 75% of physicians and nurses respectively. The performance of both groups was similar in most of the parameters tested.

**Conclusion:**
Pediatric codes are high stress events. Outcome depends on immediate provision of high quality CPR which can be achieved with regular multidisciplinary simulation based medical education. PALS certification does not guarantee satisfactory CPR. SBME can help identify and strengthen resuscitation skills. Simulation based medical education is an integral part of all pediatric training programs.

<table>
<thead>
<tr>
<th></th>
<th>Residents</th>
<th>RNs</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of encounters</td>
<td>21</td>
<td>13</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td>Number of participants</td>
<td>21</td>
<td>12</td>
<td>33</td>
<td></td>
</tr>
<tr>
<td>PALS certification</td>
<td>21/21 (100%)</td>
<td>13/13 (100%)</td>
<td>34/34 (100%)</td>
<td></td>
</tr>
<tr>
<td>Prior SIM lab experience</td>
<td>20/21 (95%)</td>
<td>6/13 (46%)</td>
<td>26/34 (76%)</td>
<td>0.005</td>
</tr>
<tr>
<td>Satisfactory Compressions</td>
<td>11/20 (53%)</td>
<td>6/12 (50%)</td>
<td>17/32 (53%)</td>
<td>0.7</td>
</tr>
<tr>
<td>Satisfactory defibrillation/cardio version</td>
<td>5/10 (50%)</td>
<td>6/8 (75%)</td>
<td>11/18 (61%)</td>
<td>0.5</td>
</tr>
<tr>
<td>Satisfactory leadership</td>
<td>18/21 (86%)</td>
<td>8/13 (62%)</td>
<td>26/34 (76%)</td>
<td>0.2</td>
</tr>
<tr>
<td>Satisfactory use of meds</td>
<td>17/21 (81%)</td>
<td>10/13 (77%)</td>
<td>27/34 (79%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Team dynamics</td>
<td>18/21 (86%)</td>
<td>9/13 (69%)</td>
<td>27/34 (79%)</td>
<td>0.4</td>
</tr>
<tr>
<td>Correct algorithm</td>
<td>17/21 (81%)</td>
<td>10/13 (77%)</td>
<td>27/34 (79%)</td>
<td>0.8</td>
</tr>
<tr>
<td>Satisfactory Airway mgmt</td>
<td>21/21 (100%)</td>
<td>10/13 (77%)</td>
<td>31/34 (91%)</td>
<td>0.04</td>
</tr>
<tr>
<td>Equipment</td>
<td>21/21 (100%)</td>
<td>12/13 (92%)</td>
<td>33/34 (97%)</td>
<td>0.2</td>
</tr>
<tr>
<td>Satisfactory vascular access</td>
<td>21/21 (100%)</td>
<td>13/13 (100%)</td>
<td>34/34 (100%)</td>
<td>1</td>
</tr>
</tbody>
</table>
WORKSHOPS

Programme Development/Administration and Programme Management

IPSSW2014-1097

Challenges of Growing a Simulation Program

Jennifer L. Arnold 1,*, Cara Doughty 2, Dan Lemke 3, Kevin Roy 3

1Pediatrics-Neonatal-Perinatal, 2Pediatric Emergency Medicine, 3Pediatric Critical Care, Baylor College of Medicine, Houston, United States

Abstract Body:
Healthcare simulation programs across have developed in many ways: within a physical, centralized center vs “in situ”, within a single department vs across an institution, within academics vs hospitals. Common goals for all programs are to improve patient safety through education of healthcare providers. Regardless of how each program is started, the challenge is how to grow within available resources without sacrificing quality. Key factors affecting how a program can grow to meet the needs of its learners include resources, instructor availability and expertise, and most importantly governance and organizational structure.

Overall Goal/Outcome:
Participants will explore the various ways to grow their simulation program, meet its goals while minimizing pitfalls based on their particular organizational structure and resources. Participants will leave with a plan for growth that they can apply to their institutions. Three key learning objectives:
1. Greater understanding of the operational and structural challenges facing new, growing, and existing simulation programs based on structure-centralized vs. decentralized
2. Will acquire a framework shared for describing and categorizing the specific challenges to successful growth in their institutions
3. Develop a plan for overcoming their institutional barriers to growing their simulation programs within their institution’s resources and organizational structure

Method of Delivery:
Case discussion and small group break outs led by workshop faculty to achieve desired outcomes.
Intended Audience:
All simulation educators and administrators at any level.

Relevance to the Conference:
As healthcare simulation spreads across all healthcare institutions, the challenges of how to develop and grow programs without sacrificing quality applies to any attendee. The content of this workshop will not only include experience from the faculty of a large pediatric and obstetrical simulation program, but also the experience and expertise of the workshop participants. The format is interactive and will include tools participants can take home.

Workshop Timeline:
- Introduction of faculty and participants, workshop objectives (10 minutes)
- Overview of potential types of challenges facing growing simulation programs based on resource and structural constraints by faculty (10 minutes)
- Small group sessions- small groups led by faculty will describe, categorize, and document on provided worksheets, the challenges facing growth of their programs (20 minutes)
- Large group session- Groups will have an opportunity to share the current governance model of their program and the top 3 barriers to growth in their institutions (15 minutes)
- Small group sessions- Each group develops feasible solutions to these challenges utilizing a worksheet created by faculty based on operational, governance, and resource limitations (20 minutes)
- Final summary and questions (15 minutes)

Expected/Preferred Number of Participants:
20-40

Special Requests: round tables- 6-10 people

References:

Disclosure of Interest: None Declared

Keywords: Simulation program development

Debriefing and Teaching Methodologies

Strategies for using “In Situ” Simulation in your Clinical Environment

Kevin Roy 1,2, Cara Doughty 2, Jennifer Arnold 3, Daniel Lemke 2, Patricia Bastero 1
1Pediatrics, Section of Critical Care Medicine, 2Pediatrics, Section of Emergency Medicine, 3Pediatrics, Section of Neonatology, Texas Childrens Hospital, Houston, United States

Overall Goal/Outcome:
Participants will develop an understanding of the benefits of “in situ” simulation and strategies for “in situ” simulation. In small groups they will develop program plans for “in situ” simulation in their clinical area or department.

Aims and Learning Outcomes:
1. Participants will be able to identify various methodologies and applications for “in situ” simulation that can be implemented at their institutions
2. Participants will design an “in situ” simulation process for a group of learners or clinical area, including identifying stakeholders and addressing potential barriers and solutions
3. Participants will formulate a plan to increase the use of “in situ” simulation programs as an effective teaching and patient safety methodology

Methods of Delivery:
Participants will begin by large-group brainstorming of potential benefits and barriers to “in situ” simulation. An interactive panel discussion will give perspectives on varying “in situ” simulation methods. Participants will then divide into small groups and brainstorm specific “in situ” programs which would be valuable to their group, including stakeholders and barriers. In large groups, solutions for potential barriers will be proposed. Each participant will leave with a plan for “in situ” simulation in their environment, and resource list.

Intended Audience:
Pediatric medical professionals interested in implementing “in situ” simulation in a variety of clinical environments

Workshop Outline:
1. (15 min) Introductions
a. Needs assessment answering: “A barrier to using in situ simulation in my environment” and “Key stakeholders for in situ simulation in my environment”
2. (15 min) Panel discussion on “in situ” simulation
a. Multidisciplinary involvement
b. Learner teams vs. usual code teams
c. “Just-in-time” in situ simulation
d. Using “in situ” simulation to address patient safety threats
e. “in situ” from the simulation center perspective
f. Technology challenges
3. (15 min) Small groups divided based on clinical areas and interest
- brainstorm and choose sites for “in situ” simulation
- identify learner groups and key objectives
- identify stakeholders
4. (15 min) Small groups pair to identify barriers and potential solutions
5. (15 min) Large groups report back general themes and lessons learned
6. (15 min) Conclusions and evaluations

Relevance to Conference:
Medical professionals can prepare for high-risk, low-frequency situations in their normal environment in an “in situ” simulation program. “In situ” simulation is a powerful learning tool, which has been shown to improve multidisciplinary education, teamwork and communication; as well as to enhance patient safety and identification of latent safety threats if barriers to “in situ” simulation can be overcome.

- Final summary and questions (15 minutes)

Expected/Preferred Number of Participants: 24 -48

Equipment Needs:
None, though a Flip Chart for 5-6 Groups would be beneficial.

References:

Disclosure of Interest: None Declared

Keywords: None

Debriefing and Teaching Methodologies
IPSSW2014-1051

Practical Application of Learning Theory to Simulation-Based Education

Lindsay Johnston 1*, Anne Ades 2, Heather French 3, Taylor Sawyer 3, Stephanie Sudikoff 4
1Pediatrics, Yale University School of Medicine, New Haven, 2Pediatrics, Children’s Hospital of Philadelphia, Philadelphia, 3Pediatrics, University of Washington, Seattle, 4Yale-New Haven Health System, New Haven, United States

Learning Objectives:
After this workshop, participants will:
1. Understand key principles of various learning theories, and application to medical education.
2. Implement specific instructional techniques based upon LT to facilitate knowledge acquisition during SBME.
3. Utilize effective debriefing strategies based upon LT concepts.

Session Details:
Simulation is a powerful tool for medical educators, and attendees of IPSSW can make their sessions more effective through practical application of key LT concepts. Intended audience is educators at the basic/ intermediate level of knowledge.

I. Introduction:
Juxtaposed videos will introduce effective and ineffective teaching methods, and large group will critique. An interactive didactic session will review LTs, and participants will discuss relevant personal experiences:
1) Humanism: Past experiences, perceptions and emotions influence ability to learn, and allow for maturation and personal development. Real world applications: self-directed learning, transfer of simulated knowledge to the clinical environment.
2) Constructivism: Learning is an active process, and knowledge is constructed when people interact socially about shared issues. Real world applications: situated learning, experiential learning, and reflective practices.
3) Behaviorism: Focus on observable behavior, the environment’s role in shaping behavior. Contiguity and reinforcement are key for learning. Real world applications: modeling desirable behavior/ extinguishing undesirable behavior; procedural skills training.
4) Cognitivism: Individuals use their own mental processes, perceptions and insight to make sense of their environment. Prior knowledge and “meaning” are important, and solutions are found through a process of trial-and-error. Real world applications: simulation as a substrate for problem solving; “learning how to learn.”

II. Next, we will discuss practically implementation of LT into SBME. Four groups will be formed based upon which learning theory participants’ identify with, and each will choose an educational challenge to address through application of their LT. Groups will report summary to large group.
III. We will then discuss utilization of LT to optimize the effectiveness of debriefing sessions. Participants will participate in a “think-pair-share,” where individuals brainstorm about a topic individually, then discuss their thoughts with another participant to gain clarity or obtain feedback. Volunteers will report back to large group, and large group can discuss pertinent topics (transfer, reflection, “higher order” thought.)

IV. Wrap-Up

Outline:
I. Introduction & Overview of LT (30 min)
II. Practical Implementation of LT in SBME (25 min)
III. Effective Debriefing Strategies (30 min)
IV. Wrap-Up (5 min)

Expected/Preferred Number of Participants: 40-50

Special Requests/Equipment Needs: Projector

Disclosure of Interest: None Declared

Keywords: None

Assessment (including use and validation of measurement and assessment tools)

Simulation to Assess Milestones

Manu Madhok 1,*

1 Emergency Medicine, Children’s Hospital and Clinics of Minnesota, Minneapolis, United States

Abstract Body:
Goal: Objective Assessment of Milestones using Simulation

Objectives:
1. Understand the complexity of assessing milestones
2. Feel comfortable utilizing provided assessment tool for assessing professionalism and interpersonal communication skills
3. Modify and build scenarios to meet the needs of assessing specific milestones

Method of Delivery:
Powerpoint presentations, video review of simulations, small group discussions

Intended audience: Program directors, simulation educators

Relevance:
The ACGME has developed milestones for specialty and sub-specialities that define behaviors in each competency domain along a continuum from novice to expert. This provides the simulation educators and program directors opportunity to collaborate and develop scenarios that can assess trainees in terms of milestone marker placement. This course presents a technique for mapping simulation scenario objectives to milestone markers, using a milestone assessment tools useful to training programs. Learning activities include discussions, assessment of videotaped simulations, working with tools to assess trainees and building scenarios to meet specific needs.

Timeline:
The 90 minute session will include - overview of Milestones and various assessment tools (20 Minutes)
video of two simulated scenarios with participants assessing Professionalism and Interpersonal and Communication skills (40 Minutes)
discussion on building scenarios to assess specific milestones and sharing templates for assessment tools (15 minutes)
questions (15 Minutes)

Expected/Preferred Number of Participants: 20-30

Equipment Needs: laptop and LCD projector, flip charts

References:

Disclosure of Interest: None Declared

Keywords: None

Patient Safety and Quality Improvement

Simulation as a Technique for a System Check of Medical Departments

Benedikt Sandmeyer 1,*; Julian Kerth 1; Marc Lazarovic 1; Julia Keil 2; Florian Hoffmann 2

1 Institut für Notfallmedizin und Medizinmanagement (INM), 2 Dr. von Haunersches Kinderspital, Klinikum der Universität München, München, Germany

Abstract Body:
State the overall Goal or Outcome:
Introduction and discussion of simulation training as a technique for a system check and such as a relevant factor for patient safety embedded into modern risk management. System checks are perfectly suited for dry test runs in newly built or refurbished departments. Thus, hidden error sources or problematic processes can be uncovered before patients are being treated in the respective unit. Along with potential application fields we will develop together with the participants specific observation focusses, possible stumbling blocks and tips for organizing such a system check. The goal of the workshop is to offer the participants basic information on how and where to use simulation training to perform system checks.

Define your Learning Objectives:
Method of delivery:
After a short introduction the participants will develop different topics using the 4-corner-procedure in small groups, while being supported by the
faculty staff. The results will be presented for the whole group. After that the participants will have the opportunity to watch a video of a system check and discover relevant room for improvement using the list of observational focusses created before.

**Intended Audience:**
The workshop addresses on a basic level persons responsible for all medical divisions, as well as simulation instructors, technicians and other interested people.

**Relevance to the Conference:**
The workshop demonstrates the possibility to use simulation in a novel context and with a different focus than usual. At the same time it provides insights into a relevant part of modern risk management and patient safety issues. It provides the participants with all important information for using simulation in performing a system check. Beside the transfer of the necessary knowledge this workshop offers by the usage of the 4-corner technique a great deal of interactivity and hopefully a lot of fun.

**Workshop Timeline:**
Faculty and participant introduction, objectives (15 min.)
short presentation on system checks (10 min.)
Topic development using 4-corner-method (5 min method introduction) (25 min.)
Presentation of the results (20 min.)
Rating of the video of a system check and discussion (15 min.)
Wrap-up and workshop closure (5 min.)

**Expected/Preferred Number of Participants:**
The preferred number of participants is between 8 and 24.

**Special Requests/Equipment Needs:**
We need flip chart paper and markers, one table in every corner, chairs for every participant, beamer and loudspeakers, pin boards or the possibility to attach the flip chart papers to the wall.

**Disclosure of Interest:**
B. Sandmeyer Honoraria Support from: The author earns part of her/his revenues as trainer in simulation trainings, some of them with a focus on system check.
J. Kerth Honoraria Support from: The author earns part of her/his revenues as trainer in simulation trainings, some of them with focus on system check.
M. Lazarovici Honoraria Support from: The author earns part of her/his revenues as trainer in simulation trainings, some of them with focus on system check.
F. Hoffmann Honoraria Support from: The author earns part of her/his revenues as trainer in simulation trainings, some of them with focus on system check.

**Keywords:** observation focus, risk management, system check
and Kotter’s 8-step model for guiding change. Educational methods will include short didactic segments, facilitated large group discussions, and small group breakout sessions.

Participants will have the opportunity to work through a change problem from their home institutions, apply some of the principles discussed and be able to bring back a framework to continue after the workshop.

Experienced faculty members are trained in change management, PDSA, and Lean. Faculty members have led large (Unit & system) and small (individual) scale changes though and as a result of simulation activities. Faculty have also conducted multiple simulation workshops at previous conferences.

References:


Disclosure of Interest: None Declared

Keywords: None

Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)

IPSSW2014-1036

Think Tank on the Improvement of Paediatric and Neonatal Manakin Fidelity and Functionality

George J. Bender 1,*, Paolo Testani 2, Doug Campbell 3
1Pediatrics, Women & Infants Hospital, Providence, United States, 2Pediatric and Adult medical simulation, TrasIT, Florence, Italy, 3Pediatrics, University of Toronto, Toronto, Canada

Overall Goal:
The purpose of this workshop is to garner international international input to formulate specific recommendations to industry partners regarding future mannequin and task trainer development.

Results will be kept anonymous, but collated to align development efforts with technology gaps and needs from the perspective of pediatric and neonatal simulationists.

Learning Objectives:
Participants will:
- Rate mannequins, partial task trainers and audio-visual recording devices for realism, usability, reliability, and functionality.
- Identify technology gaps for specific applications of these devices, along with modifications made desired improvements
- Review technical limitations and opportunities with independent developers and industry representatives

Method of Delivery:
This is a structured forum for developers and users to cross-fertilize technology innovations. In the first half of workshop, simulationists will have an opportunity to respond to collated survey results, discuss and prioritize issues. Desirability and technical feasibility will be discussed with industry representatives in second half of workshop. Potential for live demonstrations if prototypes available.

Intended Audience:
All levels of simulation technologists, educators and developers may be interested in contributing in this workshop.

Relevance to the Conference:
Mannequins and task trainers are our media for immersion; helping developers advance realism and reliability for the neonatal / pediatric market is important for all of us.

Topic Activity Time Methods
I. Introduction: faculty and participant introductions, disclosure, workshop objectives, agenda 5

II. Background: 5

Powerpoint
Survey developed with serial cognitive interviews. Resulting survey emailed to IPSS membership one month prior to IPSSW 2014. Resent to each participant

III. Interactive review of survey ratings 15

Powerpoint, Group discussion
Manikins, partial task trainers for neonates and pediatrics, Audiovisual recording and playback system

IV. Technology Wish List! Identify technology gaps for specific applications 20

Interactive discussion
Manikins, partial task trainers for neonates and pediatrics, Audiovisual recording and playback system

V. In the Pipeline! Review technical limitations and opportunities 25

Interactive discussion
Feasibility, Prototype live demos

VI. Summary and questions 10

Expected/Preferred Number of Participants: Targeting 15-30 participants, not limited.

Special Requests/Equipment Needs: None

Disclosure of Interest: None Declared

Keywords: None
**Programme Development/Administration and Programme Management**

**IPSSW2014-1164**

**Making "In Situ" Surgical Simulation Happen in your Institution**

Lori Arsenault 1, Gi Soo Lee 2, Bistra Vlassokova 3, Mark Volk 2*

1Nursing, Boston Childrens Hospital, 2Otolaryngology, 3Anesthesia, Boston Children’s Hospital, Boston, United States

**Goal:**
Enable the participants to develop an in situ Operating Room Simulation program for teaching Crisis Resource Management (CRM) in their home institution

**Learning Objectives:**
1) Understand the advantages and disadvantages of in situ simulation in the OR
2) Define a timeline of progression from simulation center-based to in situ OR-based simulation training in your organization.
3) Articulate three ways to obtain administrative buy-in to an in situ simulation program.
4) Discover pitfalls in initiating and maintaining an “in situ” program and learn ways to overcome them.

**Method of Delivery:**
This workshop will utilize small group discussions, video demonstrations, role play and simulation. In order to address the individual needs of the participants, the attendance will be limited to 20 participants.

**Overview:**
Want to bring simulation-based surgical CRM training to a new level in your institution? Not sure how to make the leap from simulation in your sim suite to in situ simulation in your OR? This workshop, which is appropriate for any level in simulation, will appeal to surgeons, anesthesiologists, nurses, simulation technicians and administrators who want to bring simulation into the operating room environment. Over the past 6 years the multidisciplinary facilitators have gained significant experience in working with several surgical services to bring simulation into the Boston Children’s Hospital operating rooms. By the end of the session the participants will know the steps involved in making in situ simulation a reality in their practice environment. This will include how to gain support from hospital, departmental and OR leadership, overcoming some of the pitfalls in scheduling and logistics, setting the boundaries of simulation within an actual, working operating room as well as tailoring scenarios for OR use. Time will be set aside to answer individual questions and troubleshoot perceived obstacles.

**Workshop Timeline:**
- **Introduction:** 10 minutes
- Facilitator and participant introductions/ Disclosures/Agenda
- **Goals of Course/Needs Assessment** – Interaction with participants: 15 minutes
- **Topics** - Interactive session: 40 minutes
- The rationale of teaching CRM using native teams in native environments
- Road map for transitioning to in situ OR simulation
- Setting the stage: Gaining buy-in within your organization
  - Who, When and How?
  - Using simulation to promote simulation
- Planning ahead – Time, Space, Personnel and Participants
  - OR time and space
  - Instructors/Facilitators
  - Nursing, anesthesia and surgical personnel
- Unique aspects of in situ simulation scenarios
  - Simulation within a working operating room
  - Codes and Quality control
- Troubleshooting
- **Discussion/Questions:** 20 minutes
- **Conclusion:** 5 minutes

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** “in situ” Simulation Programme, multidisciplinary, operating room

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**Simulation Instruction Design and Curriculum Development**

**IPSSW2014-1111**

**Simulation to Maintain Skills: Boosters, Refreshers and More**

Anne Ades 1*, Heather French 2, Don Boyer 3, Lindsay Johnston 4, Taylor Sawyer 5, Dana Niles 6, Roberta Hales 7

1Pediatrics, 2Perelman School of Medicine at the University of Pennsylvania, 3Critical Care Medicine, The Children’s Hospital of Philadelphia, Philadelphia, 4Pediatrics, Yale University School of Medicine, New Haven, 5Pediatrics, University of Washington, Seattle, 6The Children’s Hospital of Philadelphia, Philadelphia, United States, 7Center for Simulation, Innovation and Advanced Education, The Children’s Hospital of Philadelphia, Philadelphia, United States

**Abstract Body:**
Technical skills deteriorate as soon as 2 months after training. Boosters, Rolling Refreshers, Just-in-Time and Low-Dose/High-Frequency training help maintain and reinforce skills that are critical for successful resuscitation. Learn how to overcome...
logistical challenges and develop and implement training to achieve skill competence and retention.

**Goal:**
Workshop participants will be able to utilize novel simulation-based approaches to creatively optimize skill maintenance.

**Learning Objectives:**
1. List 3 strategies to help maintain skills using simulation.
2. Develop a simulation-based curriculum for maintaining a specific skill that is important for your organization.
3. Identify a barrier to implementation and describe at least 2 strategies to overcome this barrier.

**Method of Delivery:**
Large group discussions, video review, facilitated small-group problem solving session.

**Intended Audience:**
Simulation and other educators involved in the development and implementation of programs for maintenance of skills. No previous knowledge is needed. This workshop is appropriate for all levels.

**Relevance to Conference:**
Many simulation-based activities focus on initial training. However, it is well known that skill retention is poor, especially if not frequently used clinically. This workshop will help participants develop and implement programs that focus on maintenance of skills that are critical to ensure safe and effective care.

**Workshop Timeline:** (90 minutes)
1. Introduction: Faculty and participant introductions, verbal faculty disclosure, review of workshop objectives and agenda (5 minutes)
2. Review of skill maintenance techniques such as Boosters, Rolling Refreshers, Just-in-Time and Low-Dose/High-Frequency training. (10 minutes)
3. Full group discussion of participants’ experience and ideas about these and other strategies to enhance maintenance of skills. Discussion of specific skills that would result in the greatest benefit. (15 minutes)
4. Small group breakouts to develop a simulation-based skill maintenance program using Kern’s 6 steps as a framework. Identify possible implementation barriers (30 minutes)
5. Full group debrief of issues that arose in the small group with development and implementation of the proposed curriculum (25 minutes)
6. Questions and wrap up (5 minutes)

**Expected/Preferred Number of Participants:**
25-30

**Special Requests/Equipment Needs:**
Audio and Video capability, large tablets, 5-6 tables for small group discussions.

**Disclosure of Interest:**
None Declared

**Keywords:**
just-in-time, maintenance, simulation
these instructional gaps and develop improvement strategies. The methods covered are applicable to various domains in healthcare and will prove useful to pediatric simulation specialists interested in raising the bar in simulation education where educational intervention is linked to outcomes.

Outline:
A. Introduction: 5 minutes
B. Disclosures: 5 minutes
C. Educational theory and instructional design review, design of the tool, using the tool to analyze learner performance (video-based) as a reflection of instructional design: 75 minutes
D. Conclusions: 5 minutes

Total: 90 minutes

References:

Disclosure of Interest:
J. Anderson Consulting of: SimHealth Group; S.T.A.B.L.E. Program, M. Seropian: None Declared

Keywords: faculty development, instructional design, learner gaps

Simulation Instruction Design and Curriculum Development

IPSSW2014-1110

Curriculum Design: A Systematic Method of Simulation Scenario Development

Roberta L. Hales 1,*, David L. Rodgers 2
1Center for Simulation, Advanced Education and Innovation, The Children’s Hospital of Philadelphia, Philadelphia, 2Clinical Simulation Center/Resuscitation Sciences Training Center, Penn State Hershey Medical Center, Hershey, United States

Proposed Format:
This interactive workshop features problem-solving sessions focusing on the necessary steps required for designing a simulation from start to finish. The workshop will link an established instructional/curricular design model that can be easily adapted for use in simulation. Participants will be actively involved in designing or evaluating several key aspects of the simulation including: needs analysis, instructional analysis, creating goals and objectives, and determining an evaluation plan.

Goal or Outcome:
Participants will be able to implement an established curriculum design model in their simulation scenario process.

Learning Objectives:
The participants will be able to:
1. State the required elements of one established instructional/curricular design process.
2. Perform key elements of the instructional design process in the creation of a simulation scenario including needs analysis, instructional analysis, creating goals and objectives, and determining an evaluation plan.
3. Relate how this instructional/curricular design process can be translated into their work setting.

**Method of Delivery:**
The method of delivery for this workshop will be interactive discussion with hands-on practice sessions using the tools introduced in the workshop.

**Intended Audience:**
The intended audience includes simulation educators, curriculum designers, simulation technicians, and simulation faculty.

**Relevance to the Audience:**
This workshop topic is relevant to the intended audience because when an organized and rigorous instructional/curricular design process is implemented and followed, simulation scenarios have a greater chance of achieving their instructional goals to meet the needs of the learners.

**Workshop Timeline:**
Introduction of faculty, disclosures, overview of workshop agenda (5 Minutes)
Background (10 minutes): Why use an instructional design process?
Applying that model to simulation (60 minutes)
Needs analysis and establish instruction goal
Activity 1 – Case review in work teams determining learning or performance need and writing instructional goal
Task analysis and learner analysis
Writing educational objectives
Activity 2 – Based on case presentation and instructional goal established in Activity 1, work teams define three educational objectives
Develop an assessment strategy
Activity 3 – Referencing learning objectives established in Activity 2, work teams determine an assessment strategy
Identify the best simulation modality
Develop, test and revise scenario
Implement and evaluate
Activity 4 – Referring to the case presentation, individual participants compare this process to their current curriculum design process.
Summary, group debriefing, questions (15 minutes)

**Expected/Preferred Number of Participants:**
No more than 40 participants

**Special Request/Equipment Needs:**
Will need computer projector, flip charts (6) with easels and markers.

**Disclosure of Interest:**
None Declared

**Keywords:**
None

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**Proposed Format:**
This will be an interactive workshop that features problem-solving sessions focusing on building a simulation scenario that links to objectives and overall instructional goals. Work group sessions will include designing a scenario with multiple branching pathways that utilizes design templates and contains all necessary information to run or program the scenario.

**Goal or Outcome:**
Participants will be able to design simulation scenarios ranging from the simple to the complex.

**Learning Objectives:**
The participants will be able to:
1. Translate learning objectives into a simulation scenario capable of achieving those objectives
2. Define the required elements for a successful simulation including information for the simulator operator/programmer
3. Identify supporting materials needed to effectively set the stage
4. Create a branching scenario based on a set of predefined learning objectives

**Method of Delivery:**
The method of delivery for this workshop will be interactive discussion with hands-on practice sessions using the tools introduced in the workshop.

**Intended Audience:**
The intended audience includes simulation educators, curriculum designers, simulation technicians, and simulation faculty.

**Relevance to the Audience:**
This workshop topic is relevant to the intended audience because educational objectives established by simulation educators must be effectively integrated with the scenarios developed and implemented by simulation technicians.

**Workshop Timeline:**
Introduction of faculty, disclosures, overview of workshop agenda (5 Minutes)
Background (15 minute)
- Learning objectives and instructional goal – The drivers behind the scenario
- Translating learning objective into scenarios
- Key elements in scenario design
Activity 1 (20 minutes) – Participants will use a case example to create a simple linear scenario
Adding complexity with branching scenarios
Activity 2 (35 minutes) – Participant will use a case example to build a moderately complex branching scenario
Summary, group debriefing, questions (15 minutes)

**Expected/Preferred Number of Participants:**
No more than 40 participants

**Special Request/Equipment Needs:**
Will need computer projector, flip charts (6) with easels and markers.

**Disclosure of Interest:**
None Declared

**Keywords:**
None
**Faculty Development**

**IPSSW2014-1059**

**Leadership Training for Resuscitation Leaders**

Heather French 1, 2, Aaron Donoghue 1, Roberta Hales 2, Taylor Sawyer 3, Lindsay Johnston 4, Anne Ades 1

1Pediatrics, Perelman School of Medicine at the University of Pennsylvania, 2Children’s Hospital of Philadelphia, Philadelphia, 3Pediatrics, University of Washington School of Medicine, Seattle, 4Pediatrics, Yale University School of Medicine, New Haven, United States

**Abstract Body:**
Increasing evidence shows that physician leadership during resuscitations significantly impacts patient outcomes [1-5]. The overall infrequency for resuscitation leadership at the level of the individual acute care provider presents a challenge for acquiring and maintaining optimal code leadership skills.

**Overall Goal:** The goal of this workshop is to provide practical instruction in leadership training for physicians who are involved in resuscitations.

**Learning Objectives:**
1) Identify the key qualities necessary for effective leadership during a resuscitation.
2) Develop simulation exercises for resuscitation leaders designed to highlight identified leadership qualities.
3) Discuss strategies for identifying leadership gaps and educating faculty peers on leadership skills.

**Method of Delivery:**
Case discussions, small group brainstorming sessions, and video and live demonstrations will be used in this workshop.

**Intended Audience:**
Simulation educators and educators interested in faculty development at the intermediate to advanced level of knowledge.

**Relevance to Conference:**
Pediatric faculty development using simulation is an underdeveloped area to date. Given the rarity of resuscitation leadership at the individual level coupled with the fact that most resuscitations are led by faculty and not trainees, development and retention of faculty leadership skills is very relevant and important for patient outcomes. The format of the workshop will be interactive in both small and large group settings.

**Workshop Timeline:**
1) Introduction: Faculty and participant introductions, verbal faculty disclosure, workshop agenda (5 minutes)
2) Review of leadership concepts and of the current literature regarding leadership skills during resuscitation (5 minutes)
3) Full group brainstorming session on qualities of effective and ineffective resuscitation leadership with development of themes for use in #4 (15 minutes)
4) Small group break out sessions with focus on development/design of simulation exercises that will address the themes identified in #3 (20 minutes)
5) Small groups will report back to full group with discussion (25 minutes)
6) Full group brainstorming session about overcoming the challenges of educating faculty peers about resuscitation leadership (15 minutes)
7) Questions/Wrap-up (5 minutes)

**Expected/Preferred Number of Participants:**
30-40

**Special Equipment:**
Large tablets, several tables or room large enough to break into small groups, computer/projector

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** None

**Debriefing and Teaching Methodologies**

**IPSSW2014-1084**

**Moving Debriefing from Simulation to the Actual Clinical Environment**

Cara B. Doughty 1, 2, Jennifer Arnold 1, Kevin Roy 1, Daniel Lemke 1

1Pediatrics, Baylor College of Medicine, 2Texas Children’s Hospital, Houston, United States

**Overall Goal/Outcome:**
Participants will gain increased understanding of methods to incorporate debriefing after high-stakes clinical events into their actual clinical environment, based upon models provided by the faculty.

**Learning Objectives:**
1. Participants will be able to articulate the benefits of debriefing in the clinical environment, describe simulation-based debriefing principles that are most critical for debriefing in actual clinical environments, and discuss links between debriefing in actual clinical environments and simulation.
2. Participants will be able to compare different methods of debriefing application in the clinical environment.
3. Participants will leave the workshop with a written plan for implementing debriefing in their own clinical environment, including triggers, timing, debriefing techniques and checklist, and means for feedback.

**Intended Audience:**
Simulation-based medical educators who practice in clinical environments, with a range of expertise

**Relevance:**
Experts in simulation-based medical education are increasingly called upon to translate their simulation skills into the clinical environment. Debriefing after clinical events offers similar benefits in education, patient safety, and communication as debriefing in simulation, but is used much less frequently.

Debriefing clinical events also offers an additional benefit of support and protection for healthcare workers exposed to critical events.

Simulation experts can translate their knowledge in debriefing to use in the clinical environment, and establish programs for systematic debriefing of critical events in their clinical environment. Results from clinical event debriefings can be systematically used for development of simulation-based learning objectives, and for system-based practice improvement. In this workshop, we will discuss different models for clinical debriefings currently in use in one institution, including triggers, timing, team-based vs individual, techniques, and feedback to both simulation education and QI efforts.

**Timeline:**
1. Introductions of faculty and participants, workshop objectives, agenda, and assessment of learner’s experience with the topic (10 minutes)
2. Background-Presentation of 4 different clinical event debriefing methods used in one large children’s hospital, including EC, ICU, floor, and delivery room (15 minutes)
3. Small group sessions-divided by clinical areas, participants will use planning worksheets and sample debriefing checklists to develop their own plan for debriefing, including triggers, debriefing methodology, systems-based approach, team-based vs. individual, debriefing review plan (25 minutes)
4. Group feedback (5 minutes)
5. Small group will then develop a debriefing checklist with plans for specifics techniques (20 minutes)
6. Final summary, conclusions, questions (15 minutes)

**Expected/Preferred Number of Participants:**
Ideal 20-30, up to 50 ok

**Equipment needs:**
Participants should bring laptops if possible.

Electronic and paper resources available.

**References:**

**Disclosure of Interest:** None Declared

**Keywords:** None

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**Rapid Cycle Deliberate Practice: Structure and Practical Application to Team-Based Resuscitation Scenario**

Daniel Lemke 1*, Cara Doughty 2, Kevin Roy 3, Jen Arnold 4, Marjorie L. White 5, Pavan Zaveri 6, Elizabeth Hunt 7

1Pediatric Emergency Medicine, 2Baylor College of Medicine, Houston, Texas, United States,
2Pediatric Critical Care, Baylor College of Medicine,
3Simulation Center, Texas Children’s Hospital,
Houston, Texas, 4Pediatrics, University of Alabama, Tuscaloosa, AB, 5Pediatric Emergency Medicine, Children’s National, Washington, DC, 6Pediatric Critical Care Life Support instructors*,
7Simulation Center, Johns Hopkins, Baltimore, MD, United States

**Goal:**
Learners will teach each other resuscitation using Rapid Cycle Deliberate Practice techniques in order to learn its practical aspects.

**Learning Objectives:**
1. Define RCDP and contrast it with traditional simulation, highlighting specific methods and educational content best suited for this technique.
2. Outline key components of an RCDP teaching sequence, focusing on how learner practice integrates with directed feedback.
3. Apply RCDP techniques while teaching resuscitation to a group of learners.

**Method of Delivery:**
This workshop will focus on the practical aspects of RCDP. As a panel, we will discuss how to divide a resuscitation case into smaller pieces. We will discuss the development of a list of skills that must be performed correctly before participants can move to a more difficult scenario. We will also explain how to create lists of praise points for desirable behaviors.

The instructors will distribute RCDP lesson plans. We will review techniques we have found helpful. We will share sequences that range from low to high complexity. We will discuss how to use lists of required and desirable behaviors.

Half of the groups will teach the other half using RCDP. Those who are most comfortable with adult resuscitation will teach the participants most comfortable with pediatric resuscitation and vice-versa. We will break for a feedback session and flip the learner and instructor teams.

We will end by summarizing key points and distribute electronic resources.
Intended Audience:
Experienced Educators

Relevance to the Conference:
Traditionally, debriefing sessions have followed completion of simulation scenarios, allowing learners to participate in reflective practice to find their own reasons for why they did what they did during the preceding scenario. A feature of simulation-based education that has been shown to improve learner performance is deliberate practice that requires ample opportunities to perform a specific skill combined with rapid expert feedback.1 Trials of mastery learning as a method for teaching procedural skills show its cost-effectiveness.2 Students in basic life support classes demonstrate increased skills with increased time spent practicing.3

As described by Elizabeth Hunt, an alternative to traditional debriefing called Rapid Cycle Deliberate Practice applies deliberate practice to a resuscitation team. In RCDP, less time is spent figuring out the underlying frame of reference of participants, and instead they practice. This workshop is an opportunity for learners to experience this method of teaching by each other using predesigned curricula for adult and pediatric resuscitation.

Timeline:
5 min Welcome; 15 min Building RCDP Sequences from Traditional Scenarios; 10 min Introduction to scenarios; 20 min Teaching Session 1; 10 min Feedback; 20 min Teaching Session 2; 10 min Wrap up

Expected/Preferred Number of Participants:
Minimum: 10-40

Special Requests/Equipment:
6 Flip Charts
Mid fidelity Mannequins, 1 for every 10 learners

References:

Disclosure of Interest: None Declared

Keywords: None

Debriefing and Teaching Methodologies

High Quality Debriefing of Technical Skills: Implementation of a Practical Approach

David Grant1, 2,*, Will Marriage 1, Paul Sampson 1, Caroline Box 3
1 Bristol Paediatric Simulation Programme, Bristol Royal Hospital for Children, 2 Bristol Medical Simulation Centre, 3 Bristol Paediatric Simulation Programme, University Hospitals Bristol NHS Foundation Trust, Bristol, United Kingdom

Abstract Body:
There is a growing amount of literature that highlights the central role of high quality educational feedback as the most important feature of simulation-based education to ensure effective learning.1 Additionally there is emerging evidence that supports the notion that debriefing can be harmful if misused.2 Contrary to conventional thought, studies have shown that even where the educational objectives are largely technical skills, participant technical skills failed to improve if they were not debriefed.3 Though there are sentinel papers that outline the merits of debriefing with good judgment, they stop short of discussing practical methods to implement such a debriefing methodology and deal predominantly with the debriefing of professional skills such as Human Factors and Teamwork rather than Cognitive Technical Skill acquisition.4, 5

Our workshop will equip candidates with a practical approach to the debriefing of cognitive technical skill/high signal subject matter in a learner centred fashion using our iTRUST model.

Learning Objectives:
1. Understanding of suitable settings to utilise the iTRUST model.
2. Familiarity with ITRUST model and supportive material
3. Ability to practically deliver and debrief simulation scenario using iTRUST model

Method of Delivery:
- Interactive tutorial to familiarise candidates with iTRUST model
- Video review of scenario
- Hands-on practice debriefing using iTRUST: Faculty members in roles of video actors.
- Group discussion: Faculty will facilitate the debriefing of the debriefing.

Intended Audience:
Workshop suited for simulation educators of all levels of experience.

Relevance for Conference:
Debriefing is central to the implementation of high quality simulation educational methods. The workshop is designed to deliver an experiential learning experience which will appeal to audience.

Workshop Timeline:
1. Introduction of iTRUST model and resources. 15 minutes
2. Video review 15 minutes
3. Hands on debriefing using iTRUST 45 minutes
Pessach 1, 2
High signal debriefing
Cognitive Technical Skills, Debriefing, Keywords:

Disclosure of Interest: None Declared

References:

Method of Delivery:
Following a brief introduction and theoretical background the attendees will take part in a hands on live video based interactive debriefing session analyzing real time and authentic videotaped scenarios. Various techniques as well as common situations will be demonstrated and practiced followed by a group discussion.

Relevance to the Conference:
A common phenomenon in simulation education is the under-utilization of video to support formative learning during and post-simulation, especially when done “in situ”. This session will appeal to those interested in exploring how to use video during in situ training and how to shift learning from single-loop to double loop-learning.

Workshop Outline:
Part I: Introductions and Reactions to being videotaped (10 minutes)
Participants will engage in an interactive simulation followed by a discussion focused on exploring the “felt” experience of being video-taped.
Part II: Integrating Theory into Practice (10 minutes)
This interactive part will focus on the relationship between educational theory and video-based learning; and why video-based learning supports double loop learning and fosters deep understanding among learners.
Part III: Practice video-based debriefing using the MSR Video-Based Debriefing methodology (50 minutes)
During this interactive session, the MSR Video-based Debriefing methodology will be introduced. Participants will practice both how to introduce the video and how to debrief the learning objective. Simulation-based scenarios will be used to demonstrate how to optimize the debrief experience.
Part IV: How to set up video based “in situ” debriefing (10 minutes)
Various video based debriefing technological solutions will be presented. We will focus on simple, low cost and readily available solutions that allow quick and easy application for “in situ” training.
Part V: Questions and take home messages (10 minutes)
During this interactive wrap up session, participants will discuss key points and take home messages from this session. Questions will be addressed by facilitators.

Target Audience:
Health care providers, educators and curriculum designers, novice to advanced.

Expected/Preferred Number of Participants:
50 participants

Special Requests/Equipment Needs: None

References:
Disclosure of Interest: None Declared

Keywords: Debriefing, “in situ” simulation, Video Based debriefing

**Debriefing and Teaching Methodologies**

**IPSSW2014-1190**

**Breaking Bad News to Parents:**

**Reflecting Team Debriefing Methodology**

T. Kent Denmark 1,*, Christopher Kennedy 2

1Emergency Medicine, Loma Linda University, Loma Linda, 2Emergency Medicine, Children’s Mercy Hospital, Kansas City, United States

**Abstract Body:**

The goal of this workshop is to introduce the participants to the Reflecting Team methodology and provide them an opportunity to demonstrate these tools during debriefing.

**Learning Objectives:**

1. Be able to describe the Reflecting Teams Methodology
2. Understand the categories of pediatric simulation that are appropriate for this style of debriefing
3. Demonstrate the Reflecting Team skills during debriefing

**Method of Delivery:**

Following a brief description of Reflecting Teams, there will be a videotape review of an end of life scenario utilizing this methodology. Finally, participants will utilize hands on practice to demonstrate these tools.

**Intended Audience:**

Educators at the intermediate to advanced level

**Relevance to the Conference:**

At some time in our careers providing care for children, most of us have had to break bad news to a family. This can be a difficult skill to teach, and while simulation with standardized family members is effective, sometimes the debriefing brings up delicate issues for the participants. This methodology provides an additional tool for the educator to safely address latent issues in the debriefing that may be preventing the learner from fully engaging and/or benefiting from the simulation experience.

**Workshop Timeline:**

- Introduction: Faculty and participant introductions, verbal faculty disclosure, review of the objectives and agenda. (10 minutes)
- Brief review of participant educators previous experiences trying to teach how to break bad news (10 minutes)
- Brief didactic providing background and framework of reflecting teams (10 minutes)
- Video review of a pediatric end of life scenario and debriefing utilizing the Reflecting Teams methodology (15 minutes)
- Hands on practice simulation scenario (40 minutes)
- Final summary and questions (5 minutes)

**Expected/Preferred Number of Participants:**

12

**Equipment Needs:**

Projector capable of connecting to a laptop, projection screen

**References:**


**Disclosure of Interest:** None Declared

**Keywords:** Bad news, Debriefing, end of life

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**Patient Safety and Quality Improvement**

**IPSSW2014-1122**

**Orchestrating “In Situ” Simulation for Safety in New Healthcare Environments**

Beverley Robin 1,2,*, George J. Bender 2,3

1Pediatrics, Rush University Medical Center, Chicago, 2Pediatrics, Women and Infants Hospital, 3Pediatrics, Warren Alpert Medical School at Brown University, Providence, United States

**Abstract Body:**

This interactive workshop presents a pragmatic guide to HCE testing using simulation. Participants will draw upon multiple institutions’ experience with preparation, orchestration of simultaneous scenarios, and facilitated multidisciplinary co-debriefing.

**Learning Objectives:**

1. Recognize the importance of identifying safety threats (ST) posed by discrepancies between existing and new processes prior to occupancy of a new healthcare environment (HCE)
2. Identify key stakeholders and resources necessary for simulation-based HCE testing
3. Outline development and orchestration of simultaneous multidisciplinary in situ simulations for HCE testing

**Method of delivery:** Alternating small group (by specialty) and large (entire) group discussions, worksheets, video review and brief Powerpoint.

**Intended Audience:** Simulation specialists, quality improvement, risk management, administrators and nursing leadership with intermediate or advanced simulation experience.

**Relevance to Conference:** This interactive workshop presents a pragmatic guide to HCE testing using simulation. Participants will draw upon multiple institutions’ experience with preparation, orchestration of simultaneous scenarios, and facilitated multidisciplinary co-debriefing.

**Background:** Transition to a new HCE requires integration of new and existing processes. Such changes pose ST which may remain unrecognized until patients move in. In situ simulation has been used to identify ST in new emergency departments 1 and hospitals 2. Prior to opening an 80-bed single family room NICU, an in situ simulation program designed to test processes “TESTPILOT-NICU” was developed. 3 Scenarios were scripted for a cohort of patients realistic to a busy NICU day. All disciplines performed their jobs in two progressive 30-minute scenarios followed by 60-minute group debriefings which facilitated identification of specific ST. Since then, three additional university hospitals have successfully implemented TESTPILOT-NICU.
Patient Safety and Quality Improvement
IPSSW2014-1114

Using Simulation-Based Research Methods to Answer Clinically Important Questions

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Goal:
At the conclusion of this workshop participants will be able to design a research study using simulation-based investigative methods.

Learning Objectives:
1. List the key elements of a simulation-based research study.
2. Generate a sample hypothesis and discuss how to develop appropriate methods, conduct an experiment, gather and interpret data, and prepare an abstract and manuscript.
3. Understand how to critique published simulation-based research.

Detailed Course Description:
Simulation is a tremendously powerful tool for evaluating human performance. Simulation is an especially useful research methodology for investigating questions that are difficult to study in the real clinical environment such as decisions carrying life-or-death outcomes, procedures requiring completion under intense time pressure, and complex situations that demand highly coordinated teamwork and effective communication. Obtaining informed written consent in these situations is extremely difficult and often ethically questionable. In a properly designed simulation-based study of human performance, all aspects of a clinical scenario are standardized so that a high degree of uniformity exists in the non-human facets and the only variable is the performance of the human subject(s). Just as with the assessment of human performance, simulation is also a useful methodology for assessing system performance. Simulation is being used with increasing frequency to assess the design and function of physical environments and the equipment used within them in order analyze interactions between humans and their environment. In this session participants will generate a sample hypothesis and discuss how to develop appropriate methods, conduct the experiment, gather and interpret data, and prepare an abstract and manuscript.

Method of Delivery:
This workshop will be delivered by reviewing an example of peer-reviewed simulation-based research published in a major international journal and, using that example as a guide, identifying a clinically important question and walking through the process of designing a study to answer that question.

Intended Audience:
This workshop is appropriate for anyone (at any level of experience) interested in using simulation as a research methodology.

Workshop Timeline:
Time (Minutes)
- 10 Introduction, disclosures, objectives, multidisciplinary groups within specialty
- Explore potential safety threats posed by discrepancies between existing and new HCE
- 5 Small groups: List 5 differences between current and new environment (layout, communication, etc.)
- 10 Large group: Participants view trigger videos to identify foreseeable and unexpected ST
- 5 Small groups: List 5 potential ST in your new environment based on differences above
- 10 Large group debrief: Formulate into learning objectives to explore potential ST

Preparing for the reality of in situ simulation-based HCE testing
- 5 Large group: Identify key stakeholders, simulation team roles, estimate/delegate workload
- 10 Small groups: Identify simulation support resources required, staff recruitment, equipment
- 10 Large group debrief—Refine scope: # scenarios, # sessions, # participants

Development and orchestration of simultaneous simulations
- 10 Small groups: Creating immersive simulations; translate learning objectives into scenarios
- 10 Large group: Conferate preparation, high vs. low tech, orchestrating simultaneous scenarios, structured debriefing
- 5 Wrap up, questions

Expected/Preferred Number of Participants:
Limited to 24.

Equipment Needs:
Projector, Audio

References:

Disclosure of Interest: None Declared
Keywords: Safety Simulation
Look before you Leap! Using Simulation to Prepare for a New Clinical Process or Environment

Lennox Huang 1,*, Jennifer Arnold 2, David Kessler 3, Vinay Nadkarni 4, Marjorie White 1, Kimberly Stone 5, Jennifer Reid 6, Marc Auerbach 7, Anthony Amorese 8, Gary Geis 9, Jennifer Manos 10, Ehud Rosenbloom 11, Keven Cabrera 12

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Process Improvement and Organizational Change

IPSSW2014-1115

Relevance to the Conference:
This workshop will be an interactive exploration of a question that is likely to be of interest to a large segment of the audience. Attendees will be able to return to their host institution with a new/refined skill set.

Workshop Timeline: (90 minutes)
10 min: Introduction and review of the key components of a simulation-based research study
20 min: In depth review of a peer-reviewed simulation-based research study
55 min: Crafting a simulation-based research study (audience participation)
5 min: Question and answer

Expected/Preferred Number of Participants: 20 - 100

Equipment Needs: LCD projector, extra-large flip chart, easel, black and red felt tip markers

References:

Target Audience:
This workshop is open to both novices and experts in simulation; is targeted specifically at nurses, physicians, technicians, administrators or any health care professionals that are planning or interested in using simulation to help with planning for a new clinical space or process of care.

Aims and Learning Outcomes:
1. Develop a simulation-based assessment plan for a new space or process
2. Learn to utilize video review or structured debriefing to measure latent safety threats in an environment
3. Identify an assessment tool that can be used to evaluate workload and efficiency for a new space or process

References:
Teaching Pediatric Procedures in the Simulated Setting: Beyond the Checklist

Marjorie White 1, 2*, Dawn Peterson 1, Taylor Sawyer 1, Amber Youngblood 1, Daniel Lemke 4, Cara Doughty 1, Todd Chang 1

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Abstract Body:
What are the best practices for teaching procedures? This workshop will demonstrate an evidence-based training model developed and implemented through INSPIRE, the International Network for Simulation-based Pediatric Innovation, Research and Education, at over 30 centers worldwide. The model has six phases: preparation (LEARN), demonstrations (SEE), simulation-based training (PRACTICE), summative assessment on a simulator (PROVE), clinical performance (DO), and continued training and performance (MAINTAIN). The presenters will review the literature on procedural competence and checklists with a primer on checklist development and validation. The participants will use and critique procedural checklists with video review. Group discussion will emphasize the pros and cons of each checklist and how to establish competency. In summary, workshop participants will take away a process for competency-based assessment for procedures from start to implementation.

Learning Objectives:
1) Describe key concepts in the development of procedural checklists, competency, and training.
2) Appraise and apply checklists to simulated procedures.
3) Create a plan to implement competency-based assessment programs for various procedures with a four step process.

Method of Delivery:
The workshop will employ multiple methods including didactic and small group video-tape review using checklists.

Intended Audience:
Faculty interested in training, assessment, and curriculum development for procedures.

Relevance to the Conference:
In the simulation paradigm of see one, practice many, and then do one, how “many” is enough? Pediatric procedural training is an important part of the pediatric simulation field. Pediatric simulationists are often tasked with documenting procedural competency for trainees and practitioners alike. This workshop will present the current best evidence for assessment of procedural competency and equip participants with hands-on practice in documenting these skills. Participants will leave the workshop with strategies for implementing checklists in a competency-based assessment program for procedures at their own institutions.

Workshop Timeline:
Introduction: Faculty introductions, verbal faculty disclosure, workshop objectives, agenda and assessment of learner’s experience with this topic (10 minutes) Background (20 minutes) – Competency-based Assessment Overview; Overview of six phases of procedural skills training (LEARN, SEE, PRACTICE, PROVE, DO, MAINTAIN) Review four steps of implementation: Choose procedure, Educate, Assess, Buy-in.; Interactive session (45 minutes) – Small group sessions to review videos of simulated procedures and discuss components of competency assessment.; Final summary and questions (15 minutes) – Small groups report back lessons learned.

Expected/Preferred Number of Participants:
No preference.

Special Requests/Equipment Needs:
Tables for small-group break out sessions. LCD/Screen, Sound Patch

References:

Disclosure of Interest:
None Declared

Keywords:
None
Simulation Technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)

IPSSW2014-1118

Working with Industry to Create the Tools that you Need

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Goal:
At the conclusion of this workshop participants will be able to generate a list of features desired in a simulator.

Learning Objectives:
1. Know what must be considered when developing a list of desired simulator features.
2. Be able to craft a request for proposals (RFP) that specifies the type of product you wish to see developed.
3. List the types of challenges (legal, financial, political, social, etc.) that present themselves when professionals or their representative organizations interact with private industry.

Detailed Course Description:
The Neonatal Resuscitation Program (NRP) of the American Academy of Pediatrics (AAP) serves as the de facto national standard of care for newborns in the delivery room. As the NRP has transitioned from a textbook, lecture and skills station-based program to a simulation-based learning methodology, the need for appropriate technologies, including a realistic human neonatal patient simulator, became apparent. In this session the participants will review the creation of two RFP's ("Desired Features for Industry for the Development of a Realistic Neonatal Human Patient Simulator" and "Desired Features for Industry for the Development of a Realistic Premature Neonatal Human Patient Simulator") issued by the AAP to formally collaborate with industry in the development of sophisticated full term and premature neonatal simulators and the importance of ensuring that the features of these simulators align with the NRP's learning objectives. Attendees will be asked to designate simulator features as "necessary", "nice to have but not necessary", and "not needed" in order to develop an appreciation for the complexity of designing technologies that are robust yet practical in terms of cost, production time and durability. They will then develop a RFP for a novel simulator that they deem needed to achieve their learning objectives.

Method of Delivery:
This workshop will be delivered by first reviewing a RFP that resulted in the commercial production of a patient simulator and then, using that example as a guide, crafting a proposal for a novel simulator as specified by the participants.