IPSSW 2016
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GLASGOW, UK

8th International Pediatric Simulation Symposia and Workshops

Book of Abstracts

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All abstracts listed in IPSSW2016 Book of Abstracts have been assigned a prefix for the type of presentation, a number for the session they are running in and a sequential abstract number. The authors’ whose names are marked with an asterisk (*) are the presenting authors.

Abstracts have been divided in 11 topics as follows:

1. Simulation for procedural and psychomotor skills
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9. Educational Outreach (including remote, rural and international simulation education)
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11. Programme development/ Administration and Programme Management

Hanging and removal of posters

Poster boards will be marked with the final assigned numbers (which differ from the abstract submission numbers).

**Poster mounting time:** Monday, 9 May, as of 07:30. Posters need to be mounted prior to Monday, 9 May at 09:00.

**Poster removal time:** Wednesday, 11 May, as of 15:30. Posters that have not been removed by 17:30 will be disposed of by the organisers.

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ID: IPSSW2016-14

PO 14-2 Just-In-Time Training for Intraosseous Needle Insertion and Defibrillator Use in Pediatric ED
Taichi Itoh
ID: IPSSW2016-1051

PO 14-3 Breaking Silos: A Collaborative Approach to Enhance Operating Room Nursing Orientation
Elaine Ng
ID: IPSSW2016-1063

PO 14-4 Pediatric Anaphylaxis in the Operating Room for Anesthesia Residents: A Simulation Study
Nancy Tofil
ID: IPSSW2016-1097

PO 14-5 Organizational Change: A Simulation-Enhanced Perioperative Nurse Residency Program
Liana Kappus
ID: IPSSW2016-1147

PO 14-6 ‘Swimulation’ An In-Situ simulation in a New Paediatric Hydrotherapy Unit for Education and System Safety
Sally Richards
ID: IPSSW2016-LS-09

PO 15-1 Simulation-Based Pre-Departure Training for Global Health Electives During a Pediatrics Residency
Haley de Vries
ID: IPSSW2016-1112

PO 15-2 A Novel Simulation Curriculum Targeting Pediatric Interns as Early In-Hospital Medical Responders
Tehnaz Boyle
ID: IPSSW2016-1151

PO 15-3 Using Simulation to Aid Neonatal Staff in Logistics and Parental Communication when Reorienting Care
Jonathan Hurst
ID: IPSSW2016-1189

PO 15-4 Devising a Simulation Programme for Advanced Neonatal Nurse Transport Practitioners
Jonathan Hurst
ID: IPSSW2016-1164

PO 15-5 Improving the Admission Practices of Sick Neonates using Simulation and Other Educational Media
Jonathan Hurst
ID: IPSSW2016-1241

PO 15-6 SCiPE - Not Just a Bush Kangaroo Simulation Course in Paediatric Emergencies - SCiPE
Roger Alcock
ID: IPSSW2016-1107

PO 16-1 Helping Babies Survive: Implementing Simulation to Improve Neonatal Outcomes
Lloyd Jensen
ID: IPSSW2016-1208

PO 16-2 A Wireless, Cost-Effective, and Customizable Data Capture Solution for Simulation Events
Don Stephanian
ID: IPSSW2016-1213

PO 16-3 Keeping It Real: The Paediatric Surgical Airway Mask
Fiona Hignett
ID: IPSSW2016-1233

PO 16-4 Simulation Training to Improve Skills Based Mastery for Junior Paediatric Trainees
Alison Belfitt
ID: IPSSW2016-1053

PO 16-5 Pediatric Surgical and Anesthesia Teamwork in Guatemala
Luis Moya-Barquin
ID: IPSSW2016-1242

PO 16-6 Simulation Improves Decision Making in Pediatric Postgraduate Students in Guatemala
Luis Moya-Barquin
ID: IPSSW2016-1230

PO 17-1 Utilizing Simulation to Identify Latent Safety Threats during Neonatal MRI Intramural Transport
Douglas Campbell
ID: IPSSW2016-1207

PO 17-2 Use of Simulation in Canadian Neonatal-Perinatal Medicine Training Programs
Douglas Campbell
ID: IPSSW2016-1211

PO 17-3 Evaluation of Teaching Techniques and Simulation-Based Methodology
Andres Sacristan
PO 17-4 Simulation-Based Learning in Pediatrics: An Experimental Study
Andres Sacristan
ID: IPSSW2016-1067

PO 17-5 Rolling Refresher Simulation to Improve PICU Nursing Code Cart Management
Kimberly Allen
ID: IPSSW2016-1035

PO 17-6 Development of a Simulation Course for Pediatric Anesthesiology Fellows
Elizabeth Eastburn
ID: IPSSW2016-1243

PO 18-1 Facilitators of Effective Teamwork during Resuscitations - An Analysis of In-Situ Simulations in NICU
Zeynep Salih
ID: IPSSW2016-1216

PO 18-2 Facilitating Post-Simulation Debriefing – Eye-Opening Behaviors
Klas Karlgren
ID: IPSSW2016-1167

PO 18-3 Paediatric Resuscitation and Stabilisation (PReS): A Simulation Outreach-Training Program
Christopher Vas
ID: IPSSW2016-1026

PO 18-4 Making It Real - Utilizing Simulation Environments to Enhance Learning for Critical Care Transport
Christopher Vas
ID: IPSSW2016-1043

PO 18-5 Enhancing Residents' Neonatal Needle Thoracentesis Competency Through a Novel, Low Cost Model
Lindy Winter
ID: IPSSW2016-1225

PO 18-6 In-Situ Simulation to Assess Hospital Preparedness For Trauma Designation in a Pediatric Hospital
Leslie Catron
ID: IPSSW2016-1169

PO 18-7 Building and Maintaining Skills for Multidisciplinary Team Members in a Level One Neonatal Unit
Eva Wooding
ID: IPSSW2016-LS-32

PO 18-8 Teamwork Interventions in Paediatric Simulation - A Literature Review
Eva Wooding
ID: IPSSW2016-LS-33

PO 19-1 Extremes of Age; Combining Paediatric and Geriatric Simulation – Can it Work?
Kathryn Smith
ID: IPSSW2016-LS-15

PO 19-2 Marshmallows and Spaghetti; Interactive Adjuncts to Clinical Simulation
Kathryn Smith
ID: IPSSW2016-LS-16

PO 19-3 What do Emergency Departments Really Need to Know about Newborn Resuscitation?
Kathryn Smith
ID: IPSSW2016-LS-17

PO 19-4 Differences between High-Fidelity Simulation and Traditional Mannequin in Neonatal Resuscitation: Our Experience
Alessandro Arco
ID: IPSSW2016-LS-18

PO 19-5 Simulation - A Participant’s Perspective
Alexandra Childs
ID: IPSSW2016-LS-19

PO 19-6 Implementation of a Paediatric Simulation Programme in a Paediatric Emergency Department
Charlotte Durand
ID: IPSSW2016-LS-20

PO 19-7 Development of a Simulation-Based Procedural Sedation Curriculum for Senior Pediatric Residents
Steven Rathgeber
ID: IPSSW2016-LS-21

PO 20-1 Child Health Inter-Professional Resuscitation Pilot (CHIRP)
Coral Rees
ID: IPSSW2016-LS-22

PO 20-2 Workshop Integrated in Interprofessional Non-Technical Skills (NTS) Simulation
Kurt Bjarne Nielsen
ID: IPSSW2016-LS-23

PO 20-3 How Low Can You Go? A Low Fidelity In-Situ Simulation in the Paediatric Emergency Department
Jennifer Mann
ID: IPSSW2016-LS-24

PO 20-4 Cross Regional Collaboration to Test Protocol for Management of Paediatric Status Epilepticus
Alexandra Quayle
ID: IPSSW2016-LS-25

PO 20-5 Paediatric Emergency Medicine Made Easy... – Multidisciplinary Learning from Home to Hospital
Zoe Roberts
ID: IPSSW2016-LS-26

PO 20-6 Developing an In-House Neonatal Simulation Training Programme – Experience and Challenges
Srabanami Samantha Bharadwaj
ID: IPSSW2016-LS-27

PO 20-7 Multi-Platform Simulation Course Improves Health Professionals' Knowledge and Skills of Paediatric Emergency Care in a Low Resource Setting
Jideofor Menakaya
ID: IPSSW2016-LS-28
WS 01 - Validity of Simulation Based Assessment Tools

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

Submission ID: IPSSIW2016-1074

Briseida Mema1,*, Anne Kawamura2,*, Afrothite Kotsakis1
1Critical Care Medicine, Hospital for Sick Children, 2Pediatrics, Holland Bloorview Kids Rehabilitation Hospital, Toronto, Canada

Overall goal and outcome: Assessment tools and judgments that are made as a consequence of those assessments are important and actions made on assessment scores should be compatible with assessment strength (validity). We share our experience of having built an OSCE for assessment of competence in Critical Care Medicine trainees and having validated the OSCE using Messick’s five-point, unified construct validity framework. The workshop focuses on discussion and application on planning to implement an OSCE and preparing the necessary data for validity evidence based on Messick’s five-point, unified construct validity framework that is: content, response process, internal structure, relationship to other variables, and consequences.

Learning objectives:
- Identify the sources of validity evidence for OSCE scores using Messick’s unified validity framework
- Practice setting an examination blueprint
- Practice scoring a performance with a Global Rating Scale and checklist and identify potential issues with rater scoring

Methods of delivery and timeline:
Introduction of faculty and participants: 10 min
Introduction to unified validity framework (sources of evidence): 5 min
  - Mini-lecture
Introduction to Content evidence: 25 min
  - Mini-lecture
  - Activity in groups: set an examination blueprint
Introduction to Response process evidence: 25 min
  - Mini-lecture
  - Activity in groups: individually assess 2 video performances using GRS and Checklist, discuss in small groups potential issues with rater’s scoring
Introduction to Internal structure, Relationship to other variables and Consequences: 15 min
  - Mini-lecture & discussion in large groups
Summary and conclusions: 10 min
  - Large group discussion


Relevance to the conference: In a recent systematic review of simulation based assessment Cook et al found that from 217 eligible studies only 6 provided a unified five source validity framework and call for more robust studies with good validity evidence.

References:
Overall goal: Participants will become familiar with the concepts behind Rapid Cycle Deliberate Practice (RCDP) and apply this technique to their current educational offerings at their institution. A question remains whether traditional simulation and debriefing techniques are the best method to improve performance, teamwork, skill retention, and individual assessment of competence/confidence, or whether alternative educational techniques exist. Deliberate Practice (DP) is repetitive performance of skills until the learner performs correctly and independently. Rapid Cycle Deliberate Practice (RCDP) capitalizes on the concepts of DP extending the idea into a prolonged simulation. The focus is not only individual skill acquisition, but also team-based roles by applying automation, over learning, muscle memory, and team-based roles to complex tasks. In RCDP, constructive real-time feedback is given and mistakes are turned into learning opportunities. The RCDP process continues until all members of the team achieve individual skill mastery, and team closed-loop communication, performance, and teamwork principles are solidified. In RCDP, progression of a scenario halts once the first error is encountered, allowing for immediate correction and learning. The scenario is then reset until the next error is encountered; scenario difficulty adjusts based upon the success of the learners as a team.

Learning objectives:
- After attending the workshop, participants will become knowledgeable about RCDP and how it differs from traditional teaching strategies.
- Participants will have an opportunity become competent in RCDP techniques by leading an RCDP scenario during the workshop.
- Participants will be provided tools for adapting any algorithmic structured task into an RCDP simulation.

Method of delivery: This workshop is structured to be an interactive learning environment. After a brief didactic discussion introducing the need for RCDP, and basic concepts behind RCDP learning, participants will observe an RCDP role play simulation. After the role-play simulation, the large group will break into small interactive groups where they will devise an RCDP scenario and use the concepts of RCDP with hands-on practice.

Intended audience: Educators will benefit by learning about the key concepts behind devising an educational program encompassing RCDP. Technicians will learn how to adapt and/or devise scenarios incorporating RCDP. This workshop is intended for participants with intermediate and advanced skill sets.

Relevance to the conference: RCDP simulation is uniquely suited to individual and team-based learning and is widely applicable to algorithmic processes such as CPR, NRP, PALS, ACLS, and ATLS.

Timeline:
- Introduction (10 minutes)
- Background (10 minutes)
- RCDP demonstration (20 minutes)
- Interactive session (45 minutes)
- Summary and questions (15 minutes)

References:


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WS 03 - Turning Your Everyday Activities into Scholarship: Developing Your Scholarship Roadmap
Faculty Development
Submission ID: IPSSW2016-1019

Nicole A. Shilkofski1,*, Mary McBride2,*, Elizabeth Hunt1, Linda Brown3,4
1Pediatrics, Anesthesiology and Critical Care, Johns Hopkins University School of Medicine, Baltimore, 2Critical Care, Northwestern School of Medicine, Chicago, United States

Goal: Equip junior faculty and trainees with faculty development training to contemplate scholarly projects within the field of medical education and simulation, with a focus on developing individual scholarly productivity within the context of their everyday educational activities.

Learning objectives:
- Discover ways to develop scholarship from everyday opportunities by redefining types of scholarship, features of scholarly integration, and standards for scholarship according to the Glassick criteria
- Explore barriers and facilitators for individual scholarship development
- Design and discuss individualized scholarship roadmap
- Explore a toolbox of relevant resources for implementation of scholarship, including potential funding mechanisms, collaborative networks, and appropriate places for publication of medical education projects

Method of delivery: Case discussion, small and large group discussion formats, individual work on a scholarship roadmap

Intended audience: Trainees and junior faculty/educators early in their careers who feel they would benefit from mentorship on scholarly projects. The workshop will present basic to intermediate concepts within medical education.

Relevance to conference: The workshop is intended to link academic productivity to activities many individuals within the simulation community may already be undertaking (educational projects, curriculum development and program evaluation) within their own institutions.

Timeline:
- Introductions: 10 minutes - Purpose/ goals for attending, review workshop objectives
- Large Group Discussion: 20 minutes - Interactive discussion about reasons to produce scholarship, qualities of successful scholars, types of scholarship, examples of everyday scholarship/ opportunities, review of components of a scholarly "roadmap"
- Completion of Individual Scholarly Roadmap: 15 minutes - reflective independent work as individuals or in dyads with template provided by workshop faculty
- Small Group Review of Roadmaps: 25 minutes - Discuss roadmaps within small roundtable groups facilitated by workshop faculty to receive constructive peer feedback
- Large Group Discussion: 10 minutes - Small groups report and share lessons learned, successful implementation strategies, review resources for possible implementation (grant funding, network development, publication etc)
- Wrap-up and evaluation: 10 minutes

References:

WS 04 - Making the Transition to In Situ Surgical Simulation in Your Institution

Programme development/ Administration and Programme Management
Submission ID: IPSSW2016-1253

Mark Volk1,*, Lisa Petras2, Gi S. Lee1,*, Christopher Roussin3,*
1Otolaryngology, 2Nursing, 3Simulator Program, 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:
- Understand the advantages and disadvantages of in situ simulation in the OR
- Define a timeline of progression from simulation center-based to in situ OR-based simulation training in your organization.
- Articulate three ways to obtain administrative buy-in to an in situ simulation program.
- 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 rooms1,2 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: 10 minutes
Topics - Interactive session: 45 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
WS 05 - Moulage Workshop Fundamentals: From Skins to Burns

**Innovation/ Future Direction and Outreach Simulation**

Submission ID: IPSSW2016-1179

Aleksandra Wojtowicz²,*, Nathan Walsh¹,*

¹Rush Center for Clinical Skills and Simulation, Rush University, Chicago, United States

Learning objectives:
- Differentiate the process, mixture and cure time for a variety of silicone-based products and recognize the various consistencies and colors while making basic skin layers.
- Construct skin reinforcements, making pediatric suture pads and injection pads, and assess their utilization in pediatric simulation.
- Demonstrate moulaging techniques including abrasions and burns for use in pediatric simulation.

Method of delivery: Small-group hands-on practice and facilitated large group discussion using brief PowerPoint, worksheets and Smooth-on silicone-based materials.

Intended audience: Includes simulationists with basic or intermediate experience.

Relevance to conference: This interactive workshop (between small and large group interaction) will allow participants to evaluate the need for synthesizing skins and body parts in order to enhance both simulation skills and the use of pediatric standardized participants in simulation. Skills learned during the workshop will allow learners to reinforce simulation realism.

Background: Simulation bridges both didactic education and clinical skills in order to allow students to make critical mistakes in a secure environment. In the last several of years, there has been an extensive increase in medical simulation due to three main reasons: a large increase of medical student population, a growing patient awareness of medical litigation and a huge technology improvement.² As simulationists, we strive to create the most realistic training setting, to ensure students the greatest outcome. Moulaging techniques enhance the realism of simulation and thus is crucial to developing simulation programs³. Often times, without moulage, much of the realism within a scenario does not exist. Moulage helps minimize the gap of lack of realism in medical simulation, as well as in pediatric simulation. Whether it may be making basic skins and wounds on a mannequin or on a standardized patient, moulage helps learners be able to make a definitive diagnosis of injury, and be able to treat appropriately.³ The purpose of this workshop is to be able to understand and construct basic skins and injuries.

Workshop timeline:
Introductions, disclosures, course flow, split into groups of 4 – 10 minutes
Introduction to different silicone-based products
8th International Pediatric Simulation
Symposia and Workshops – BOOK OF ABSTRACTS

- Large group: brief lecture - 10 minutes
- Small groups: gather necessary equipment and learn to mix basic skin layers - 20 minutes

Understand the cure times for the different Smooth-On products
- Large group: Discuss importance of “double mixing” and differentiate cure versus pot-life time - 5 minutes

Construct pediatric suture pads and injection pads
- Large group: demonstration of reinforcement methods, differentiate skin, fat and muscle layer - 15 minutes
- Small groups: identify 3 difference in each layer - 10 minutes

Moulaging pediatric standardized patients
- Large group: demonstrate burn on participant using appropriate product - 15 minutes
- Wrap up, questions - 5 minutes

References:

WS 06 - Debriefing Clinical Events
*Patient safety and quality improvement*
Submission ID: IPSSW2016-1193

Jennifer L. Arnold¹*, Cara Doughty²*, Daniel Lemke²*, Kevin Roy³*, Patricia Bastero³*, Kerry Sembera⁴, Julia Lawrence⁵
¹Neonatal-Perinatal, ²Pediatric Emergency Medicine, ³Pediatric Critical Care, Baylor College of Medicine, ⁴Pediatric Critical Care, ⁵Respiratory Care, Texas Children's Hospital, Houston, United States

**Overall goal:** Experts in simulation-based medical education are increasingly called upon to translate their debriefing skills into the clinical environment. In this workshop, participants will discuss methods to incorporate debriefing after high-stakes clinical events into their actual clinical environment, based upon models provided by the faculty. Participants will leave the workshop with a framework for developing a clinical debriefing program in diverse environments.

**Learning objectives:**
- 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.
- Participants will be able to compare different methods of debriefing application in the clinical environment.
- 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.

**Method of delivery:** Respecting that all participants are adult learners; the faculty team will make the case for the importance and directly connect to each learner’s local institutional challenges with respect to clinical debriefing. The workshop will have an embedded active learning component, in which participants actively plan for clinical debriefing programs in small groups with dedicated facilitators. The large number of facilitators will allow for all learners to be engaged during the teaching exercise. The combination of large group and small group exercises will allow for variability in the learning environment.

**Intended audience:** All disciplines in healthcare who provide patient care or oversee patient care.
Relevance to the conference: Simulation experts can translate their knowledge in simulation 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. Anyone involved in patient care and simulation education will benefit from exploring this important topic.

Workshop timeline:
- Introductions of faculty and participants, workshop objectives, agenda, and assessment of learner’s experience with the topic (10 minutes)
- Background - Presentation of 3 different clinical event debriefing methods used in one large children’s hospital, including EC, ICU/floor, and the delivery room (Neo) (20 minutes)
- Small group sessions - 3 groups: (30 minutes)
- Group report back and comparison/discussion (20 minutes) consider flip charts. Hand out clinical debriefing planning sheet
- Final summary, conclusions, evaluations (10 minutes)

References:
Learning objectives:
- After the workshop, attendees will be able to develop simulations designed to remediate staff/trainees in the areas of decision-making, leadership, communication and procedural skills.
- After the workshop, attendees will be able to develop simulations designed to prepare supervisors and mentors to remediate staff/trainees in the areas of professionalism and communication.
- After the workshop, attendees will be able to outline methodologies to minimize the perception(s) of simulation-based remediation as being punitive or personal.

Content description: Ensuring minimal acceptable standards in each of these domains essentially requires three components: specific expectations, valid assessments and methodologies for remediation. Although the primary focus of the workshop is designing simulated-based remediation scenarios, it is necessary for us to review expectations and assessments.

Expectations: There will be discussions on how clinical leaders can develop effective and non-ambiguous expectations. In medicine, it is not uncommon for healthcare providers to be unclear, or unaware, of what is expected of them. For this reason, it is important for us to review this area as a prelude to our primary workshop focus.

Assessment: This must be discussed in this workshop because one does not want to remediate a trainee/staff member (who is truly competent) because the assessment tool/measure has poor validity. Alternatively, the assessment tool/measure must also be designed not miss those trainees or staff members who are indeed not meeting the minimal acceptable standard in a particular area.

Remediation: We will present common issues in each of the domains in a multidisciplinary case-based format. We will work in small groups to develop simulation-based scenarios to address a specific trainee or staff member’s area of concern. There will be two types of simulation-based scenarios:
  1. Simulations to remediate the staff or trainee in the domains of decision-making, leadership, communication or procedural skills
  2. Simulations to train mentors, supervisors and clinical leaders to remediate staff or trainees in the areas of professionalism and communication.

Because communication is such an important component of safe and effective patient care, this workshop will address this domain in both types of simulation. Professionalism can be difficult to remediate; accordingly, we will only discuss simulations which are designed to help those who need to approach a subordinate who is ‘unprofessional.’

References:

WS 08 - The Difficult Neonatal Airway - 'A Human Factors Approach'
Simulation for procedural and psychomotor skills
Submission ID: IPSSW2016-1226

Alok Sharma1,2,* Anushma Sharma3,4,* Ranjit Gunda2,3,*
Overall goal: Paediatric and neonatal trainee's world over are required to achieve proficiency in managing the neonatal airway. This is achieved through experiential learning but failure or difficulty necessitates the need for rapid decision making where time might be critical. We aim to provide training in a clinical pathway to 3 situations:

1. First Failed Intubation
2. Can't Intubate Can Ventilate
3. Can't Intubate Can't Ventilate

We will be using a human factors approach known as Situation, Escalation and Management. The key focus is on escalation involving a multidisciplinary approach involving Neonatology, ENT and Paediatric Anaesthesia which can be adapted depending on local circumstances using a traffic light approach.

Learning objectives:

- Learn strategies to manage a neonate after not being able to intubate it the first time including alternatives to intubation depending on the reason for failure.
- Learn strategies for establishing a secondary airway
  - Bougie intubation
  - Glidescope Use
  - Alternative Ventilation (LMA/I Gel)
- Learn how to escalate based on local circumstances if there is a can't intubate can't ventilation scenario

Method of delivery: We will be using an approach known as OPEN (Observation, Perception and Experiential Learning). This will involve 2 simulated workshops focussing on the first 2 problems with modified mannequins to allow experiential learning. The 3rd session will be a simulated scenario involving a Can't Ventilate Can't Intubate mannequin. To reinforce learning after the training each participant will be provided videos for each approach.

Intended audience: Paediatricians and Neonatologists, Paediatric and Neonatal Trainees

Relevance to conference: This workshop is intended for paediatricians and neonologists skilled in neonatal airway management who are interested in advanced airway management, learning how existing mannequins can be modified to provide appropriate fidelity for experiential learning, and who want to deliver a multidisciplinary educational approach to difficult airway management incorporating human factors. In addition, the proposed guideline provides a framework that can be locally adapted to encourage multidisciplinary management with ENT and or Paediatric Anaesthetists.

Workshop timeline:
- Introduction and Approach - 15 minutes (Whole Group)
- 3 smaller groups rotating
- First Failed Intubation Workshop - 20 minutes
- Can't Intubate Can Ventilate Workshop - 20 minutes
- Can't Intubate Can't Ventilate Scenario - 20 minutes
- Summary and Questions (Whole group comes together) - 15 minutes

References:
WS 09 - Rapid Cycle Deliberate Practice: Structure and Practical Application

Simulation Instruction design and curriculum development

Submission ID: IPSSW2016-1088

Cara B. Doughty1,*, Bram Welch-Horan2, Karen Patricia3, Jennifer Arnold3,*, Marideth Rus1,*, Marjorie Lee White4,*, Patricia Bastero5, Daniel Lemke1,*

1Pediatrics, Emergency Medicine, Baylor College of Medicine, Houston, 2Pediatrics, Emergency Medicine, Children’s Hospital of Philadelphia, Philadelphia, 3Pediatrics, Neonatology, Baylor College of Medicine, Houston, 4Pediatrics, Emergency Medicine, University of Alabama, Birmingham, 5Pediatrics, Critical Care, Baylor College of Medicine, Houston, United States

Goal: Develop increased understanding of RCDP and develop a novel RCDP case sequence.

Learning objectives:
- Define RCDP and contrast it with traditional simulation, highlighting and demonstrating specific methods and educational content best suited for this technique, including novel uses.
- Outline key components of an RCDP teaching sequence, focusing on how learner practice integrates with directed feedback, and discuss an approach to creating new RCDP sequences.
- Develop a new novel RCDP sequence, utilizing a novel approach to setting, learner group, or content area.

Course content: Rapid cycle deliberate practice maximizes the time learner teams spend in deliberate practice, with multiple opportunities with progressively more challenging scenarios. Key components of RCDP include repetitive practice and focused expert feedback. As such, RCDP techniques are best used in scenarios requiring complex team-based behaviors, with known best practice, such as ACLS or PALS-type
scenarios. Faculty provide evidence-based feedback for common team performance dilemmas, with chances to implement those solutions in subsequent scenarios. Learners are able to see rapid performance improvement.

We will begin with a brief didactic, focusing on appropriate learning objectives for RCDP scenarios, and comparing and contrasting RCDP to “traditional” debriefing. We will focus on how to divide a typical resuscitation case into smaller segments suitable for RCDP. We will discuss the development of a checklist of skills that must be performed correctly before participants can move to a more difficult round, and praise points. The instructors will distribute RCDP lesson plans, and review techniques we have found helpful when teaching using RCDP. We will share sequences that range from low to high complexity, and we will show one video example of RCDP technique.

We will briefly highlight and discuss current and potential novel uses of RCDP. Then we will divide into groups based on areas of expertise and interest, and the groups will work closely with a facilitator to develop a new RCDP scenario sequence, focusing on novel uses. Using a standardized approach, the groups will begin development of several rounds of a full RCDP sequence, highlighting key curriculum development considerations for RCDP. We will end by summarizing key points and distribute electronic resources, including RCDP scenarios and lesson plans.

**Method of delivery:** Didactic, video and demonstration, large group discussion, small group writing exercise

**Intended audience:** Intermediate to advanced simulation instructors

**Relevance to the conference:** This workshop will include opportunities for participants with varied learning styles to advance their knowledge, skills and attitudes towards implementation of resuscitation curriculum. The workshop will have an embedded active learning component, in which participants actively choose appropriate RCDP content and design a novel RCDP scenario sequence.

**References:**


**WS 10 - So You Want to Build an Assessment: Basic Tools to Develop Your Assessment Program**

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

**Submission ID:** IPSSW2016-1016

Arika Gupta1,*, Lindsay Johnston2,*, Kelly Kadlec3,*, Mary McBride1,*

1Pediatrics, Ann & Robert H Lurie Childrens Hospital of Chicago, Chicago, 2Pediatrics, Yale University, New Haven, 3Pediatrics, Childrens Hospital and Medical Center, Omaha, United States

The knowledge, skills and attitudes an educator plans to achieve with a curriculum will inform the selection of an assessment tool. This workshop will focus on formative assessment rather than summative, although the use of both modalities will be discussed. We will begin with introductions and an informal needs assessment of the participants; these processes will ensure that the workshop will be learner-focused. Subsequently, different existing assessment tools will be reviewed and discussed. We will highlight the importance of assessment design as a factor for its success. Factors such as content, environment, simulator fidelity, and standardization across sessions will be presented and reinforced. When considering assessment
tool implementation, this workshop will emphasize the concept of context and options for information that may be recorded and evaluated to accurately assess learners’ knowledge and performance. Items such as skills checklists and computerized feedback from a mannequin (i.e. chest compression depth) are examples that will be reviewed.

The didactic session will then explore the definitions and applications of validity and reliability. The types of statistical analyses that lead to reliability will be mentioned but not covered in great detail. The different components of validity evidence will also be discussed, as well as the importance of establishing validity evidence for each situation in which the assessment tool is utilized.

Many simulation studies, as well as assessment programs, incorporate checklists and global -rating scores into simulation assessment. The advantages and disadvantages for utilizing each type of assessment tool will be explored using examples from the literature. The value of combining both methods will also be reviewed.

Maintaining psychological safety during formative or summative assessments can be quite challenging for simulation-based educators. Therefore, techniques to overcome these challenges, while effectively assessing performance in a non-judgmental manner, will be reviewed. The workshop will specifically address these issues, both in the didactic and small-group sessions. Participants in the small-group discussion will also review and analyze various assessment tools described in the literature, including each assessment tool’s benefits, deficits, and appropriate context for implementation. Following this exercise, each group will summarize their discussion and engage in discussion with the other small groups.

References:

WS 11 – Simulation at Discharge: Preparing Parents & First Responders for Medically Complex Emergencies
Simulation Instruction design and curriculum development
Submission ID: IPSSW2016-1172

Christie J. Bruno¹ *, Kelly Kadlec² *, Lindsay C. Johnston¹ *, Tiffany Simon² *, Natalie McCawley² *
¹Pediatrics, Yale-New Haven Children's Hospital, New Haven, CT, ²Children's Hospital & Medical Center, Omaha, Nebraska, United States

Goal: To develop a simulation-based curriculum to prepare parents and responders for emergency situations of medically complex children.

Learning objectives:
• Describe various conditions and issues typically associated with a medically complex child.
• Outline potential simulation benefits, based on the current literature, to parents and first-responders.
• Design 1-2 simulation scenarios likely to be encountered for a particular medically complex child.

**Method of delivery:** Interactive sessions with multidisciplinary groups

**Intended audience:** Educators, healthcare providers/professionals - Appropriate for any level

**Relevance to the conference:** Curriculum development and disseminating the utilization of effective simulation are goals of IPSS

**Workshop timeline:**
Introduction (10 minutes) - Faculty introduction, disclosures, informal poll regarding parents and first providers’ comfort levels with emergencies in medically complex children

Background (10 minutes)
- Discuss typical attributes of a medically complex child
- Parents of chronic and medically complex children may experience profound anxiety as they take on the care of their child who has frequently been managed by others.1,2
- Parental anxiety may impact confidence and ability to appropriately care for that child.1,2
- Medical providers, outside the tertiary care setting, may lack adequate familiarity and comfort with emergencies involving medically complex children.3,4
- Medically complex children disproportionately utilize the emergency medicine system; optimal management of these children may decrease ER visits.5,6

Interactive Session (50 minutes) - Divide group into individual groups of 5-8 learners. Each group will be assigned one medically complex child:
1. Child with tracheostomy
2. Former premature infant with history of apnea/bradycardia
3. Child with congenital heart disease/high risk for arrhythmia
4. Child with short gut syndrome, central line and total parenteral nutrition (TPN) dependent
5. Child with static encephalopathy and high risk for seizures

Each group will outline 2 emergency scenarios simulations for their patient. Each scenario should include method of simulation (e.g. task trainer, high-fidelity), general description of patient events, expected interventions and key learning points (30 minutes).

A group representative will present to the larger audience one scenario, including method, general description, expected interventions, key learning points as well as challenges in developing the scenario(s) (20 minutes).

Final Summary and Questions (20 minutes) - We will solicit any concerns that learners wish to discuss. Areas of discussion may include: role of assessment/remediation in these simulations, particularly parents and first-responders of medically complex children.

**References:**

WS 12 - The IPSS Curereus Channel: A Portal for Easy, Fast, Free and High-Impact Publications

Faculty development
Submission ID: IPSSW2016-1116
Taylor Sawyer1,*, Edward J. Rovera2, Liana Kappus3
1Pediatrics, Seattle Children's Hospital, Seattle, 2Nursing Pedagogy & Simulation Educator, SFSU School of Nursing, San Francisco, 3SYN:APSE Center for Learning, Transformation and Innovation, Yale New Haven Health System, New Haven, United States

Learning objectives: After this workshop, participants will:
- Understand the IPSS Cureus Channel process for manuscript submission and review.
- Identify common pitfalls in submission to the IPSS Cureus Channel and how to avoid them.
- Consider components of high-quality submissions to the IPSS Cureus Channel.

Method of delivery: Mixture of didactic large group discussion and small group sessions.

Intended audience: Individuals interested in submitting manuscripts for peer-reviewed publication, including technical reports, original research, editorials and review articles.

Relevance to the conference: This workshop is designed to promote and support the dissemination of scholarship to the pediatric simulation community using the IPSS Cureus Channel. The dissemination of scholarship is of vital interest to IPSS.

Workshop timeline:
- Introduction and Background (15 minutes)
- Small Group Interactive Session #1 – Brainstorming an idea for submission (5 minutes)
- Didactic - Components of high-quality submission (5 minutes)
- Small Group Interactive Session #2 – Moving from manuscript to submission (15 minutes)
- Didactic – Pitfalls of submissions (5 minutes)
- Large Group Interactive Session – Identifying common pitfalls and mitigation strategies (10 minutes)
- Didactic - Demystifying the review process (5 minutes)
- Small Group Interactive Session #3 - Review example submissions with reviewer guidelines (15 minutes)
- Final summary and questions (15 minutes)

References:

WS 13 – Build it and They Will Train: How to Create a Simulation Instructor Course for Your Institution
Faculty development
Submission ID: IPSSW2016-1125

Taylor Sawyer1,*, Kim Stone1, Jennifer Reid1, Joan Roberts1, Douglas Thompson2, Don Stephanian3, Moraima Castaneda3, Leslie Harder4, Pamela Christensen4
1Pediatrics, 2Anesthesia, 3Learning and Simulation Center, 4Nursing, Seattle Children's Hospital, Seattle United States

Learning objectives:
- Understand the importance of an internal simulation training course to the success of a simulation program
- Be able to develop a course agenda for a pediatric simulation instructor course
- Create an implementation plan for conducting a simulation instructor course at their own institution

Method of delivery: Mixture of small group and individual sessions and large group discussion and didactics.

Intended audience: Individuals involved in running a simulation program, or those interested in creating and conducting simulation instructor courses. Groups of attendees from the same simulation program are highly
encouraged. Attendees who already run an instructor course and would like to learn how others do it are also welcome.

Relevance to the conference: This workshop is designed to promote and support multi-disciplinary simulation-based education and training for providers that care for infants and children. The propagation of methods to train pediatric simulation-based instructors is of vital interest to IPSS.

Workshop timeline:
- Introduction and Background (15 minutes)
- Small Group Interactive Session #1 – Understanding what you Really Need: Instructor Course Needs Assessment (10 minutes)
- Small Group Interactive Session #2 – Developing a Course that Fits Your Needs: Instructor Course Agenda Development (30 minutes)
- Small Group Interactive Session #3 – Getting it done: Instructor Course Implementation (20 minutes)
- Final summary and questions (15 minutes)

WS 14 – Debriefing: Practical implementation of Advocacy Inquiry
Debriefing and teaching methodologies
Submission ID: IPSSW2016-1093

David Grant1,*
1Bristol Paediatric Simulation Programme, Bristol Royal Hospital for Children, Bristol, United Kingdom

Delivery methods & timeline:
- AI Exercise – 45 minutes
  - View video; make observations of the actions of individuals in video.
  - Ask AI question of a member of group who will answer in role. (role-play)
- Personalisation and facilitation of problem solving exercise – 15 minutes
- Summary – 5 minutes

Intended audience: Educators of any level of knowledge; novice, intermediate or advanced.

Relevance to the conference: The workshop purposely has a very narrow focus as our experience has taught us that though many educators understand the principle of advocacy inquiry, they struggle to skillfully implement it in a meaningful way. This is true whether they are novices or experienced faculty members. We believe that our practical hands on workshop will deepen their understanding of the fundamental principles that underpin the successful implementation of AI as a technique.

References:

WS 15 – Juggling Many Balls and Spinning Many Plates: Exploring Multi-Patient Simulation
Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1048

Carol Lynn O'Dea1,*; Roberta Hales2; Kevin Ching3; Frank Overly4; Marc Auerbach5; Heather French6,*; Marjorie Lee White7,*
1Neonatology, Children's Hospital at Dartmouth, Hanover, 2Center for Simulation, Advanced Education and Innovation, Children's Hospital of Philadelphia, Philadelphia, 3Pediatric Emergency Medicine, Cornell Weill Medical Center, New York City, 4Pediatric Emergency Medicine, Hasbro Children's Hospital, Providence, 5Pediatric Emergency Medicine, Yale New Haven Children's Hospital, New Haven, 6Neonatology, Children's Hospital of Philadelphia, Philadelphia, 7Pediatrics, University of Alabama, Birmingham, United States
Course goal: Participants will receive practical instruction in multi-patient simulation design, application and evaluation.

Learning objectives:
- Describe the strengths and limitations of multi-patient simulation and recognize necessary resources for its application.
- Identify the clinical, cognitive, human factors, and patient safety applications of multi-patient simulations.
- Formulate a multi-patient simulation design for an identified institutional need where one-patient/one-provider team simulation training is limiting.

Method of delivery: This workshop provides participants with an introduction to the utility of multi-patient simulation. Participants will work with facilitators to design a multi-patient simulation and identify needed resources for implementation. The workshop begins with video presentations of multi-patient simulations that will engage the participants, particularly auditory and visual learners. Visual learners will also benefit from the resources provided, specifically example templates for designing multi-patient simulations. There will be a large group brainstorming exercise followed by small group discussions focused on design of a multi-patient simulation. The variation in large and small group exercises engages learners by breaking up learning objectives into small pieces, preventing both mental and physical fatigue.

Intended audience: The workshop is appropriate for advanced learners. Targeted learners include physicians, nurses, respiratory therapists, simulation educators and simulation technicians.

Relevance to the conference: Multi-patient simulations involve the use of multiple simulated patients within one simulation exercise. This type of simulation can involve one or many active participants in addition to confederates and provides an opportunity to educate and assess a wide range of technical and non-technical skills including clinical decision-making, triage and communication. Participants will leave the workshop with an understanding of the strengths and limitations of multi-patient simulation design and tools to develop and implement a multi-patient simulation for research and/or educational purposes at their home institutions.

Timeline:
- Introduction of the faculty and objectives (5 minutes)
- Review of multi-patient simulations in the literature and current simulation design (5 minutes)
- Review of faculty experiences in multi-patient simulation design and implementation (10 minutes)
- Full group brainstorming session on applications of multi-patient simulations with development of themes for use in #5 (10 minutes)
- Small group break-out sessions with focus on development/design of multi-patient simulations exercises applying themes developed in #4 (20 minutes)
- Full group session for small groups to report back about the design ideas generated during #5 (20 minutes)
- Questions/ Wrap-up (5 minutes)

References:


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**WS 16 – Developing, Designing and Conducting an Effective Workshop**

*Faculty development*

Submission ID: IPSSW2016-1134

Beverley Robin1,*, Lamia Soghier2,*, Jennifer Owens3,*

1Pediatrics, Rush University Medical Center, Chicago, IL, 2Neonatology, Children's National Health System, 3The George Washington University School of Medicine and Health Sciences, Washington, DC, United States

**Learning objectives:**

- Recognize the essential components of an effective workshop.
- Design an interactive workshop utilizing sound educational theory and instructional design.
- Describe specific strategies that can be used for conducting an effective simulation workshop.

**Background:** A workshop is defined as “a structured set of facilitated activities for a group of participants working together to explore a problem and its solutions over a short period of time, in a defined location”. An effective workshop highlights the tenets of adult learning, with emphasis on active learning, interactive participation and experiential learning. Despite the frequent use of workshops as an educational strategy, there is a paucity of literature about workshops and few resources outline their design, development and implementation [1-4]. Healthcare educators, therefore, have limited knowledge and skill in this educational arena.

**Method of delivery:** The workshop will include an “opening” agenda and icebreaker activity (5 minutes) followed by a brief didactic (4 PowerPoint slides) introducing the 10 key elements of workshop design (10 min) [3]. In small groups, with large group discussion, participants will design a workshop on a topic of their choice using a workshop design worksheet, with emphasis on aligning educational activities with learning objectives (50 minutes). The importance of team selection, pre-planning checklists, teaching aids, room set-up, facilitator positioning, budget and post-session evaluation, and methods of enhancing interactivity (e.g. visual agenda [3], role-play, peer coaching, muddiest points, video review, reversed Q &A) will be highlighted (20 minutes). Handouts and worksheet will serve as a blueprint for participants’ own workshops. The final “closing” 5 minutes will be used to summarize and answer questions.

**Intended audience:** Educators, clinicians and simulationists who use or wish to use workshops as an educational modality. Intermediate level.

**Relevance to the conference:** Workshops are the most frequently used education modality for faculty development [6] and comprise a large percentage of presentations at simulation conferences. Most simulation educators have little or no formal experience designing, developing and conducting workshops. In this workshop, participants will experience a “learner-centered” approach that will be modeled to highlight the importance of placing the focus on the learners. [6] The workshop will present methods by which educators can enhance simulation-specific workshops (e.g. visual agenda [3], role play, peer coaching and video review).

**References:**


WS 17 – Developing and Delivering Patient and Family Centered Care Using Simulation
Simulation Instruction design and curriculum development
Submission ID: IPSS2016-1171

Maria Carmen G. Diaz1,*, Jennifer Arnold2,*
1Nemours Institute for Clinical Excellence, Nemours/Alfred I duPont Hospital for Children, Wilmington, DE, 2Texas Children's Hospital, Houston, United States

Learning objectives:
• Participants will identify key concepts that must be considered when developing simulations for patients and caregivers.
• Participants will design a scenario for patient education to meet specific caregiver needs based on scripted cases (seizures, diabetes, anaphylaxis, tracheostomies, CPR).
• Participants will identify specific education gaps that simulation could address in their patient care populations.

Method of delivery: Case discussion, small groups, role play

Intended audience: Educators, intermediate level

Relevance to this conference: Simulation for patient-and family-centered care provides opportunities for patients/families to integrate cognitive knowledge and technical skills needed to effectively manage acute medical conditions outside tertiary care centers. This also provides a venue for discovering family and patient strengths and opportunities. The purpose of this course is to provide an immersive experience for participants interested in designing and delivering simulation-based patient/family centered education.

Workshop timeline:
Welcome/ Background (10 minutes)
- Faculty/acknowledgements
- Session Objectives
- Review of special considerations/tools for implementing patient/family centered care
Scenario design: Small group learning activity (20 minutes)
- Interview faculty member to expose needs
- Develop script for scenario design & debriefing
Large group discussion (20 minutes): Faculty facilitate larger discussion focused on small grp sim curricula
Simulation Scenario Implementation: One small group (chosen at random) implements simulation scenario with help of faculty member role playing as a patient/caregiver target learner (20 minutes)
- Interview faculty member role playing patient/caregiver to expose education needs
- Implement sim scenario using role-play
- Implement facilitated debriefing
Large group discussion (20 minutes)
- Feedback
- Faculty success/challenges
Summary

References:


**WS 18 – When a Child Is in Impending Respiratory Failure and Equipment Is Scarce, What's Next?**

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

Submit ID: IPSS2016-1191

Donna Moro-Sutherland1,*, Nicole Shilkofski2, Tobias Everett3, Ronald D. Gottesman4, David Piechota5, Ashish Shah6, David Mills5, Isabel T Gross6, Rebekah Burns7, Manu Madhok8

1Dept of Pediatrics, Division of Emergency Medicine, Baylor College of Medicine, Houston, 2Department of Anesthesiology/ Critical Care Medicine, The Johns Hopkins University School of Medicine, Baltimore, Maryland, United States, 3The Hospital for Sick Children, Toronto, 4Montreal Children's Hospital/ MUHC Montreal, Canada, 5Children's Hospital and Clinics of Minnesota, Minneapolis, 6Morsani College of Medicine, Pediatrics, Tampa, Florida, 7Seattle Children's, Seattle, Washington, United States

**Goal:** To acquire the necessary airway skill set needed when managing children in impending respiratory failure in a limited resource setting.

**Learning objective:** To acquire the skill set to teach alternative airway adjuncts utilizing local materials to help with airway management in a resource poor environment.

**Method of delivery:** Live demonstration and hands-on-practice

**Intended audience:** Workshop is appropriate for any level and will benefit any healthcare individual utilizing low-cost simulation in a limited resource setting.

**Relevance to the conference:** The reason this workshop is appealing to our colleagues is that there is no venue outside of IPSS who is making an effort to bring simulation to countries which are not yet industrialized. By introducing an airway skills workshop, our intention is to acquire feedback and recommendations to add these skills to an open platform so that additional colleagues have a means to promote adjunct airway skills training in limited resource settings.

**Workshop timeline:**
- Introduction (10 minutes): Faculty and Participant introductions
- Objectives (5 minutes): Hands on experience to help support an infant and/or child in impending respiratory failure without the availability of an endotracheal tube.
- Interactive session (60 minutes): Case based scenario with hands on instruction and construction of a “poor man’s LMA”, high flow nasal cannula and bubble CPAP.
- Summary with question and answer (15 minutes): Feedback from participates on utility of skills and voluntary survey, which will be filled out by participates before leaving the session.

**RT 01-1 – Can We Stick to Time?: Simulation to Assess Paediatric Convulsive Status Epilepticus Management**

*Crisis Resource Management/Human factors and Teamwork*

Submit ID: IPSS2016-1013

Fharhad Motaleb1,*, Christopher Vas1, James Blythe1, Karen Perring2, Steve Hancock2

1Paediatrics, Health Education Yorkshire and Humber, 2Paediatrics, Yorkshire Paediatric Critical Care Network, Sheffield, United Kingdom

**Background:** Convulsive status epilepticus (CSE) is the most common childhood medical neurological emergency, and is associated with significant morbidity and mortality. (1)
In 2013 a retrospective one-year audit of patients admitted to a tertiary paediatric ICU from Yorkshire/Humber hospitals for CSE following rapid sequence induction (RSI) demonstrated that of 23 patients:
- 9 (40%) had delay in receiving benzodiazepines, Phenytoin and RSI respectively
- 5 (21%) had received excessive/inadequate benzodiazepines

These are recognised reasons for inappropriate management of CSE. Yet to date no study has looked into the specific reasons as to why this occurs.

Given that paediatric CSE management usually involves multiple team members of different disciplines (including Paediatrics, A&E and Anaesthetic staff) the potential for failure of non-technical skills may be a reason for inappropriate management.

**Research question:** We hypothesise that human factors, plus deficiencies in medical knowledge and staff training are likely responsible for inappropriate management of paediatric CSE.

**Proposed approach to addressing the question:** We propose that simulation can be used as a means to prove this hypothesis at a prospective level. Thus we intend to perform real time A&E in-situ simulation of paediatric CSE requiring RSI across hospitals in the Yorkshire/Humber. By direct observation of the simulation with appropriate feedback we intend to identify/analyse:
- Adherence to the local hospital pathway of the emergency management of CSE (based on NICE CG137 guidance) (3)
- Human factors
- Latent risks/patient safety concerns

To date we have completed in-situ simulations in four A&E departments including two at tertiary children’s hospitals.

**Difficulties encountered:**
- Identifying key stakeholders to be part of the project
- Lack of enthusiasm from hospitals in the region
- Constant promotion of the project across the region
- Departmental fear of benchmarking performance against other departments in the region
- Identifying local points on contact in each hospital
- Logistics of setting up in-situ A&E simulations in busy departments
- Organising participants from three different specialties to take part in the simulation
- Dealing with potentially prolonged simulation and complex debriefs
- Accurately observing and identifying reasons for delay during simulation
- Presenting findings appropriately to create strategies for regional improvement

**Questions for discussion:**
- Should we be video recording the simulations for more accurate data collection? If so how can this be logistically done in a busy A&E department?
- Can simulation be used in this manner to assess real life practice?
- Will human factors training for clinicians make a difference to real life practice?
- Can this simulation assessment model be used to assess the management of other paediatric emergencies (e.g status asthmaticus)?

**References:**
RT 01-2 – Mind the Gap: Team Training in Healthcare
Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1129

Mary T. Patterson¹, Lillian Su²,*, Ellen Deutsch³, ⁴
¹Medical Education, Children’s National Medical Center, Washington DC, ²Critical Care, Children’s National Medical Center, Washington, DC, ³Surgery, Children’s Hospital of Philadelphia, Philadelphia, ⁴ECRI, Philadelphia, PA, United States

Background: Multiple studies highlight deficiencies of clinicians in providing appropriate care during actual and simulated resuscitations (1-5). Team performance is not solely based on member knowledge or skill; failure to translate knowledge into effective team activity is a major obstacle to achieving superior patient outcomes (3). This problem is especially acute for ad hoc teams faced with a non-routine event. In response, team training (TmTr) is often mandated in high-risk settings with acute care teams. Healthcare organizations invest substantial resources in TmTr in their efforts to improve safety and become high reliability organizations. Yet this investment is frequently not aligned with our best understanding of adaptive team capacity and performance. TmTr in healthcare is often different than TmTr as practiced in other high-risk domains and has not consistently resulted in improvements in clinical outcomes (6, 7).

Goals: We will highlight the differences and address the gaps in healthcare TmTr as well as illustrating practices that have been successful in improving team performance (8-12). To date, most TmTr has not focused on the complex behaviors that are necessary to develop adaptive capacity in the face of uncertainty and unexpected events (13). Concurrently, other high risk industries have started to shift their attention to “training for surprise”(14, 15). The ability to rapidly identify team members’ skill sets and create task expectations enables team members to identify and adapt when the situation is exceeding expectations (16). We will provide evidence for critical elements of TmTr and make recommendations based on research and practical experience. Complex behaviors, action team leadership and building adaptive capacity contribute to enhance team performance (17, 18).

Approach: Panel discussion

Difficulty encountered: Gaps in frontline training: In healthcare, TmTr is often limited to a short interval (a few hours) in a single episode(7, 19). These constraints, and perhaps a desire for simplification, mean that TmTr in healthcare is often reduced to a few behaviors. The complex behaviors required for team adaptation, though studied in a variety of domains, have not widely penetrated healthcare. This panel will highlight the necessary components and intensity of TmTr recognized in other domains. We propose that by highlighting critical differences in the ways TmTr is conducted in healthcare and other domains, we can provide guidance in the ways that TmTr in healthcare can be made more effective in improving team performance and clinical outcomes.

Questions for discussion:
• How do we make the case for a more robust and comprehensive approach to TmTr in healthcare?
• Is training to improve adaptive capacity for “surprise” appropriate in healthcare?
• Can we make an economic case for a more robust approach to TmTr in healthcare?

References:


RT 01-3 – Recognising and Assessing Medical Problems within Paediatric Mental Health
Interprofessional Education (IPE)
Submission ID: IPSS2016-1135

Tracy Latham1, Zead Said2, Shatha Shibib3, Mary Evans3, Richard Glover3, Val Kellett4,*
1Health Education England working across Yorkshire and the Humber, Leeds, 2Health Education Yorkshire and the Humber, Sheffield Health and Social Care, 3CAMHS, Becton Centre SCHNHS FT, 4Education and Skills, Sheffield Childrens Hospital NHS FT, Sheffield, United Kingdom

Background: The physical health agenda is something that has been recently brought to the forefront in adult and childrens/adolescent mental health services to promote holistic care and patient safety. Mental health nurses can have very little training in physical health care. Drs will have medical training but are now working in an environment where it is not the onus of care. The signs and symptoms of a physical health problem are often masked by psychiatric symptoms which within a mental health context will frequently be fixated on.
A simulation course for adult mental health had been developed in 2011 *RAMPPS and has been successfully running since, but there was no provision for Paediatric mental health either regionally or nationally. There was a great need for both locally and nationally as more *CAMHS services are being provided to meet the demand of a rise of life threatening psychiatric problems in paediatrics (RCPCH 2010). Should a medical problem arise within our *CAMHS service, a child will transferred by ambulance to the main children's hospital site which is several miles away, how early the problem is initially identified, assessed and managed has a massive impact on the outcome for that young person.

The Simulations have been developed for the tier 4 *CAMHS service we operate where there is a potential for children/adolescents to significantly deteriorate physically due to eating disorders, self harm, drug toxicity and restraint or a co-existing physical condition (RCPsyc 2012, RCPCH 2014). Often the onset of these symptoms is very rapid and also the manifestations are different from adults.

We drew on elements of *RAMPPS, notably pre course elearning encompassing ABCDE assessment and SBAR and the evaluation tools to assess learning/engagement pre/post course.

The difficulties we have encountered:
- The co-ordination of cross speciality/site involvement in the development of the course
- Actors v Mannikins, ethical aspect in pediatrics
- Faculty Development

We have decided to run a half day pilot initially (2 Sims) then progress to full day (5 Sims) in 2016 we will run full days, adding in the pre course elearning as currently as far as we know there is no other simulation course of this kind nationally we would want to share ideas within an international forum

References:
1. RCPCH 2010 - Children and Young People's Mental Health Statement - collaborative statement to the Government to recognise the need to ensure that every child and young person receives high quality, timely and appropriate care from the outset
2. RCPsyc 2012 - Royal College of Psychiatry - Junior MARSIPAN (Management of Really Sick Patients with Anorexia Nervosa) report
3. RCPCH 2014 - Royal College of Paediatrics and Child Health - RCPCH's consultation response to the Health Select Committee Inquiry into child and adolescent mental health services

RT 01.4 - The NuNeoSIM Study - 'The importance of Feedback in Modelling Multiprofessional Simulation'
Interprofessional Education (IPE)
Submission ID: IPSSW2016-1185

Anushma Sharma1,2,*, Alok Sharma3,4, Ranjit Gunda3,4
1Neonatal Medicine, 2MPROvE Neonatal Simulation Programme, Princess Anne Hospital, 3Neonatal Medicine, 4MPROvE Neonatal Simulation Programme, Princess Anne Hospital, University Hospitals Southampton, Southampton, United Kingdom

Background: Simulation was introduced in the NICU in Southampton as medical programme catering to neonatal trainees in December 2010. Nursing participation was adhoc and limited till 2012. A decision was made to take feedback from neonatal nurses through a structured questionnaire as part of the Nu Neo Sim Study.

Description: The initial questionnaire was administered in November 2013 after formally integrating nurses in a curriculum mapped multidisciplinary programme and running it for 11 months. Questions included whether they had participated, number of sessions attended, feelings during simulation, feedback regarding it's usefulness, and if it changed practice. We also asked if they wanted simulation sessions separate to doctors. Changes implemented after the initial survey included having multiprofessional facilitators (a doctor
and a nurse for each session) and nurse instructors designing scenarios. The survey was repeated in April 2015. Triple blinding was ensured by using an independent analyst from outside the programme.

Results: In the initial survey 82% of nurses responded versus 71% in the current survey. Both surveys included similar spread of nursing experience. Substantially more staff had attended >5 sessions (21% vs 7%) and multidisciplinary sessions with doctors (62.5% vs 45.4%) in the latter survey. In addition, more nurses (62.3% vs 55.2%) found multidisciplinary simulation with doctors useful in 2015. With regards to feelings in 2013 39.6% said they found multidisciplinary simulation made them anxious and 29.3% said that they found it daunting. In 2015 47.6% commented on feeling anxiety and 32.3% found it daunting. An interesting observation was that 25% of respondents said they would like to have simulation separate to the doctors in 2015 as compared to 12.5% in 2013. In 2015, 68% of nurses said they found simulation had changed their practice and 82% felt it increased their confidence in dealing with the sick newborn.

Discussion: Both surveys showed that nurses found multidisciplinary sim useful. 85% comments in free text were positive including excellent, exciting, enjoyable, great learning opportunity, daunting but improves practice. A significant proportion of nurses in both the surveys said that they feel anxious during simulation. This has not hampered nursing participation in simulation which has gone up but could be the reason for some nurses avoiding it. It is important because there is emerging evidence that stress encountered during a learning process helps facilitate learning.¹ 25% of nurses in 2015 wanted separate simulation sessions versus 12.5% in 2013. Interestingly an analysis of the free text comments revealed that this was for nurse specific topics alone which was not be relevant to doctors. There is recognition for a need of nurse only sessions targeting nurse specific competencies. A substantial number of nurses still avoid simulation. A structured survey of their perceptions and reasons is in progress.

References:

RT 02-1 – Off-Ward Paediatric In Situ Simulation: Are We Ready?
Patient safety and quality improvement
Submission ID: IPSSW2016-1161

Caroline Hart¹*, Andrew Thompson¹, Thomas Bourke²
¹Paediatric Medicine, Royal Belfast Hospital for Sick Children, Belfast, United Kingdom

Background: There is the potential for emergencies to occur at any time or place within an acute paediatric hospital. Therefore the team should be prepared to respond as readily for example to a prolonged seizure in the EEG department as they are on the neurology ward. Our clinical staff members receive regular resuscitation training and there are emergency trollies sited throughout hospital departments, though not all clinical areas. As a busy tertiary paediatric unit we have a number of non-ward clinical areas remote from the acute wards where inpatients are cared for and there is the potential for these patients to become sick here also.

At present we use in-situ simulation on our acute wards to train staff and identify latent safety threats. We plan to assess the management of paediatric emergencies occurring in various off-ward areas in our hospital through in-situ simulation and so identify potential patient safety issues and support effective emergency care.

Proposed approach: Our project will involve running emergency in-situ simulation scenarios in a number of off-ward clinical areas during normal working hours. Prior to carrying out any simulations in these areas we will conduct a survey exploring the experience and perceived preparedness for emergencies amongst staff there. The scenarios will be chosen based on how applicable they are to the clinical area, e.g. prolonged seizure in EEG. A high-fidelity mobile infant simulator will be taken these areas to conduct the scenario. The exact time to conduct scenarios will be determined in advance by the simulation team and it is planned that various different times are used and importantly none of the ward staff will receive advance warning. Also due to the variety of areas employed for the simulations it would be hoped that different staff members will be involved in the scenarios to incorporate a variety of experience and skills levels.
We have registered our project plan with the local Standards, Quality and Audit Department and it has been agreed with our service manager. We aim to commence active data collection from mid November 2015.

**Planned outcomes:** Our main outcome is the identification of latent safety threats in emergencies occurring in different areas within the hospital environment and the development of strategies to resolve these. In order to achieve this, scenarios will be observed by the simulation team and a record will be made of any problems. There will then be feedback gathered from participants using a questionnaire and a brief interview after the simulation. This is to enable team members to discuss their experience and identify any concerns or issues they would wish to raise. Any complications will then be addressed and flagged up via the hospital incident reporting system if indicated. It is hoped that through in situ simulation potential errors will be identified before there is any patient harm and we can therefore improve paediatric resuscitation.

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**RT 02-2 – Out of Hours Paediatric In Situ Simulation as a Quality Improvement Tool**  
*Patient safety and quality improvement*  
Submission ID: IPSSW2016-1160

Caroline Hart¹, Thomas Bourke¹, Andrew Thompson¹  
¹Paediatric Medicine, Royal Belfast Hospital for Sick Children, Belfast, United Kingdom

**Background and aim:** Many paediatric emergencies occur outside of the normal ‘9-5’ working hours and at these times there are fewer clinical staff available to respond and manage patients. With intense workloads and a small cohort of staff on duty out-of-hours the additional pressure of a medical emergency could uncover potential patient safety issues. We routinely carry out in-situ simulations at our tertiary paediatric hospital during the normal working day and through this work we have identified a number of latent safety threats. Indeed, in-situ simulation has already been established as a quality improvement method¹. Our aim is to expand upon our current work and identify potential latent safety threats in clinical areas outside the normal ‘9-5’ working hours in the paediatric hospital setting using in-situ simulation.

**Proposed approach:** Firstly the project will consist of a series of out-of-hours in-situ simulations carried out over a period of 2 months, aiming to complete between 6-10 scenarios in the given time period. The scenarios will be taken from a predetermined list of standard simulations and will be relevant to the clinical area where they are conducted. These scenarios will be carried out on the acute paediatric wards using a high-fidelity mobile infant simulator. The exact time of day to conduct each scenario will be agreed in advance by the simulation team but the on-call medical staff and ward nursing staff will not be notified of the plan. It is intended that a variety of different times and wards are to be incorporated. Due to the variety of timing of the simulations it would be hoped that different staff members be involved to increase team experience and variety of skills.

We have registered our project with the local Standards, Quality and Audit Department and it has been agreed with our service manager. We aim to commence active data collection from early November 2015.

**Planned outcomes:** The scenarios will be observed by the simulation team and a paper record will be made of any difficulties encountered. There will then be individual interviews after the simulation with the team members to discuss their experience and identify any concerns of issues they would wish to raise. Any complications will then be addressed and improvements made where necessary. If appropriate safety threats will be flagged up via the incident reporting system and reported to senior ward staff. It is hoped that with regular in situ simulation the number of potential errors will be reduced.

**References:**  

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**RT 02-3 – Know the Gaps: Immers your Experts Before Moving Into Your New Environment**  
*Patient safety and quality improvement*  
Submission ID: IPSSW2016-1252

Jesse Bender¹, Beverly Robin²
Background: In 2009, prior to opening the largest single family room (SFR) neonatal ICU (NICU) in the USA we conducted multidisciplinary in situ immersive simulations to test the integration of new and existing workflows and systems. Multiple latent safety threats (LST) were identified and corrected. These related to verbal and written communication protocols, admissions workflows, rapid response teams, family centered care, scripting, facilities, supplies, equipment, staffing and training issues. The program was highly successful and we sought to “spread the word” about the power of in situ simulation testing of new healthcare environments. We launched a study to determine how adaptable and applicable the methodology would be at other institutions transitioning to a new SFR NICU environment. Thus far, we have guided six other institutions’ simulation-based preparations for transition. Each implementation has been adapted to local care delivery, simulation environment, safety culture, and political structure. Research question: We hypothesize that implementations of in situ testing will succeed across a wide spectrum of healthcare delivery structures, levels of simulation experience, and magnitudes of culture change, resulting in a generalizable approach to integrating simulation testing into transitioning healthcare environments.

Aims:

- Share lessons learned and support local simulation teams in their preparations for in situ simulation testing;
- Quantitatively demonstrate improvement in system readiness and staff preparedness at each institution
- Assess saturation of latent safety threats over successive simulation implementations, resulting in a blueprint that can be utilized for institutions undergoing similar transitions.

Proposed approach: Outreach to candidate institutions by word of mouth, personalized discussions, and presentations at national conferences (e.g., CHA, VON, EDRA, Graven’s). Demonstrate the benefits of in situ simulation testing prior to transition to a new SFR NICU. Familiarize local stakeholders with the methodology of in situ simulation testing and requisite skill sets of the simulation team. Create scenarios (pertinent to the local environment), prepare the environment, test the simulations, test the environment and conduct facilitated debriefing. Categorize LST, refer to workflow committees for revisions, and retest iteratively. Serially survey key process readiness and staff preparedness.

Difficulty encountered:
- Identifying potential institutions for study recruitment
- Obtaining key stakeholder buy in
- Maintaining consistent methodology between institutions
- Comparison of LST between institutions
- Minimal prior simulation experience
- Underestimation of time commitment
- Institution reluctance to share sensitive information

Questions for discussion:
- Strategies for enhancing local buy-in for multicenter studies?
- At centers with undeveloped simulation programs, how to best create safe learning space?
- How generalizable is this in other intensive care settings, e.g. ED, PICU, or new hospitals?
- Alternatives or tips for incentivizing yet another survey?
- What would help institutions feel safe sharing sensitive information (nursing turnover, harm events, etc.)

RT 02-4 – Closing the Loop: Reducing Harm Through Simulation
Process improvement and organizational change
Submission ID: IPSSW2018-1094

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Background: Within health care there are active (known) and latent (potential) risks. Reporting of actual and “near-miss” incidents is one way of identify these risks that can cause harm to patients. Our monthly Quality, Education, Safer Together (QuEST) meeting is the key forum for open multi-disciplinary discussion of these incidents and risks. From this, the child health education team identify interventions to reduce harm. The simulation facilitator is embedded within the education team and thus able develop and deliver simulations as part of the harm reduction strategy. One such example is multiple incident reports relating to care of patients with tracheostomies. An appropriate scenario was developed and a series of simulations delivered. During these simulations, the emergency tracheostomy algorithm was found to be unclear when used in practice. This was adapted and information was added to all tracheostomy boxes listing the detailed equipment requirements. Task focused simulations on emergency tracheostomy changes were also delivered for those staff that required it.

Research question/ Educational goal: Our belief is that simulation can simultaneously reduce harm by:
- Providing practical education to multi-disciplinary teams
- Identifying and then rectifying processes, equipment and environmental issues causing potential harm in a specific location or the wider children’s hospital

Proposed approach to addressing the question or goal: An active simulation programme is already embedded in the children’s hospital. Risk issues that might be amenable to simulation development are identified through a range of sources including, meetings, unplanned PICU admission data and adverse incident reporting systems & root cause analysis. A tailored simulation package can then be designed that might include frequently delivered task specific simulations within a ward/staff group through to larger, high fidelity, high acuity, multi-disciplinary team simulations. All simulations are delivered in situ so that multiple layers of learning are possible relating to both the clinical situation and the environment. Any Corrective Actions/ Preventative Actions (CA/PA’s) identified are logged, solutions to remedy them planned, and the name of the person responsible for their delivery documented. These are reviewed regularly to ensure CA/PA’s are completed. This ensures a closed loop governance system through simulation.

Conundrum or difficulty encountered: Moving forward, our aim is to assess the impact of this educational approach to utilisation of simulation on reducing harm to patients. Our uncertainty is how best to rigorously assess and evidence this.

Questions for discussion:
- How have others used simulation in evidencing a reduction in harm?
- What measures would reflect the impact of simulation on reducing harm, rather than any other confounding factors?

RT 02-5 – Leadership and Followership Education Using Simulation
Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1032

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Background: Leadership and followership within teams consist of complex action processes, some of which are innate and others that must be learned. Commitment to developing and improving these individual skills is essential to elevating team performance and minimizing medical error given the high-acuity, high-stakes environment that exists in intensive care units (ICUs).

Educational goal: In order to ensure optimal team performance, individual team members need knowledge of and training in leadership, followership, effective communication, and task delegation. Changing the focus from general teamwork concepts to exploring the responsibilities, expectations and optimal behaviors of individual roles within the team (leaders and followers) will strengthen an individual’s performance within a team because one cannot display good leadership or followership behavior without supporting one’s teammate, which is the basis of teamwork.
Proposed educational approach: Use a sociocultural framework and Vygotsky’s concept of zone of proximal development for simulation curriculum design. Within a given simulation, there are participants with varying levels of experience. Junior trainees fill the peripheral roles in the simulation, leaving team leadership to more experienced participants. Both the simulation facilitator and experienced trainees aid the junior trainees to hone their skill sets with the goal of moving from the periphery of the simulation exercise as a follower to the central role of leader by the time one is a senior trainee. The progressive, structured curriculum provides a scaffolding of support for learning that is peeled back slowly over three years as the learner gains competence and autonomy in decision making. Participation in the simulation curriculum leads to knowledge production, resulting from socialization within a team, identity construction as an integral team member (first as a follower and then as a leader, as one moves through fellowship), and learning of expertise.

<table>
<thead>
<tr>
<th>Trainee Year</th>
<th>Leadership</th>
<th>Followership</th>
<th>Team Training</th>
<th>Simulation Focus</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st year</td>
<td>Apprenticeship during clinical work</td>
<td>Apprenticeship during simulation curriculum</td>
<td>Teamwork exercises</td>
<td>Management of acute medical issues</td>
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<td></td>
<td></td>
<td></td>
<td>Simulation curriculum</td>
<td>Teamwork</td>
</tr>
<tr>
<td>2nd year</td>
<td>Active role acquisition during simulation and clinical work</td>
<td>Active role acquisition during simulation and clinical work</td>
<td>Leadership and followership exercises</td>
<td>Leadership and followership</td>
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<td></td>
<td></td>
<td></td>
<td>Simulation curriculum</td>
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<tr>
<td>3rd year</td>
<td>Active participant or leadership instruction in simulation and clinical work</td>
<td>Fellowship instruction in simulation and clinical work</td>
<td>Leadership, conflict resolution, debriefing exercises</td>
<td>Leadership and team debriefing</td>
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<td></td>
<td></td>
<td></td>
<td>Simulation curriculum</td>
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Conundrum: High resource utilization requirement with sophisticated simulation design and debriefing skills required for this simulation curriculum to satisfy its objectives.

RT 02-6 – Incorporating Live Simulation and Computer Models to Improve Patient Flow with Lean Six Sigma
Patient safety and quality improvement
Submission ID: IPSSW2016-1222

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Understanding and improving patient flow is critical to providing the best patient care. Boston Children’s Hospital (BCH) has several teams that have taken on the challenge to improve patient flow using live simulation, discrete event simulation (DES) and the DMAIC methodology (Define, Measure, Analyze, Improve and Control). However, currently no standard approach exists in utilizing these tools to improve flow. BCH has a strong program using live simulation to better understand and improve systems and processes allowing participants to learn, troubleshoot and test process changes while protecting patients from unnecessary risks or inconveniences. Using live simulation enhances engagement of stakeholders by providing an emotionally-engaging experience and empowering them to become integral part of the process improvement.

BCH has also been exploring the use of DES computer modeling to create what-if scenarios to test proposed process changes. It is based on the rules and resources that govern that process, where the operation of a process is modeled as an ordered sequence of well-defined events over time. DES allows a team to test changes and virtually see the effects as the model is run in accelerated time.

Fig 1. Discrete event simulation of the Liver Transplant Clinic

In tandem with simulation, BCH has also committed to using Lean Six Sigma (LSS) techniques which include a five-step methodology called DMAIC in these efforts.

As each tool has its own set of strengths, an opportunity exists to standardize an approach to patient flow projects with the use of DMAIC methodology, live and DES simulation together to provide teams with the best chance for success in the least amount of time.

Goal: Our goal is to find the most effective blend of improvement and learning tools to enhance the patient experience, specifically maximizing efficiency in patient flow.
**Approach:** Piloting in one clinical area, a team will utilize the DMAIC methodology and simulation to evaluate the effectiveness of each. In the end, the team intends to have an instructional workbook of how to approach the measurement and improvement of patient flow by detailing best-practices and lessons learned during the pilot to be shared across the enterprise.

**Conundrums:**
- What is the best way to evaluate the effectiveness of the workbook developed?
- How can we ensure that the workbook will be flexible enough to apply to other patient care settings?

**Discussion:**
- Which simulation approach should come first – live or computer-based simulation study?
- What situations lend themselves to a live simulation experience versus computer-based simulation modeling?
- Where in the DMAIC roadmap should simulation experiences be integrated?

**Image:**

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RT 03-1 – Feasibility, Reliability, and Applications of High-Resolution Data Collection During Pediatric CPR Assessment (including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1029

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**Background:** For the last decade, research in CPR has focused on how to measure and optimize the delivery of the various components of CPR in accordance with published guidelines. The use of feedback and recording devices during CPR represent one method of accurately measuring quality. Studies in pediatric patients using such devices have shown that CPR performance is frequently inconsistent with recommended
A recent study of simulated pediatric CPR using devices showed significant incongruity between the perceived and actual quality of chest compression delivery.[2] Preliminary data on the use of videorecording to assess CPR performance has begun to emerge. Our group recently published the results of an analysis of CPR quality as measured by videorecording in a tertiary pediatric emergency department.[3] In a separate analysis, we reported on a comparison of videorecording and feedback/monitor device measurement of compression rate, depth, and release in actual patients in the ED; we demonstrated that retrospective review of videorecorded CPR was an unreliable method of assessing chest compression quality.[4]

The combination of device-based data collection and video-based data collection should provide the highest possible level of detail in assessing pediatric CPR quality. The proposed research will involve multicenter data collection on pediatric CPR performance, with an initial phase of feasibility and reliability testing through simulation.

**Methods:** The Videography In Pediatric Emergency Resuscitation (VIPER) Collaborative was founded by investigators in three tertiary pediatric EDs where videorecording is used during resuscitative care. The goal of the VIPER Collaborative is to establish a centralized data collection system to be used in all three centers to record data on pediatric resuscitation performance, with a specific focus on critical procedures, including CPR.

All children receiving CPR in the ED under videorecorded conditions will be eligible for enrollment. Data on chest compressions rate, depth, and release will be collected from a feedback/monitor device (Zoll R Series, Chelmsford, MA, USA). Data on providers, compressor segment duration, pause duration, and actions during pauses will be measured by video review. Data will be stored in a centralized, deidentified database. Simulated CPR cases will be used to assess reliability of data collection and to train reviewers. Once established, data on CPR quality will be prospectively collected and allow an assessment of the impact of training and educational interventions on CPR performance in actual pediatric patients.

**Questions for discussion:**
- What level of detail regarding providers is necessary for assessing CPR quality by provider group? What level is ideal?
- What training interventions would be most desirable to evaluate using this methodology?
- What degree of change (and in what parameters) in CPR performance would be evidence of significant improvement in CPR quality?

**References:**

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**RT 03-2 – Combined HBB/ ECEB Simulation Training Will Reduce Neonatal Morbidity and Mortality in Santiago, DR**

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

Submission ID: IPSSW2016-1228

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**Background:** About 3.7 million newborns die worldwide annually, mostly in developing countries. UN Millennium Development Goal 4 (MDG4) called for a 2/3 reduction in child mortality. Improving newborn care is an essential part of achieving this goal. Birth asphyxia, prematurity/low birth weight, and infection are major causes of neonatal mortality.¹ The DR faces persistently high neonatal mortality of 22/1000 live infants, one of the highest in Latin America.²
Helping Babies Breathe (HBB) has been shown to significantly reduce neonatal mortality when implemented in a structured, sustainable way. Essential Care for Every Baby (ECEB), a complementary program, targets newborn care during the first days of life. Focusing on keeping babies warm, identifying high risk infants, and establishing exclusive breastfeeding, it aims to address causes of neonatal mortality after initial newborn resuscitation.

**Question:** Can implementation of an HBB/ECEB simulation course with close follow up of those trained reduce neonatal morbidity and mortality in Santiago by improving early neonatal care and identification of high risk infants? Can this course be a model for improving neonatal morbidity and mortality in low resource areas?

**Methodology:** IRB approval/exemption was obtained for this project. A master trainer course (train-the-trainer model) was held for 17 representatives (“champion” MDs and RNs) from 5 hospitals feeding into the regional Children’s Hospital in the North of the country. Baseline pre-intervention data of key indicators will be collected for 2 months. Facility “champions” will then train all newborn personnel in their institution. Follow up data of these key indicators will be collected and analyzed at 2-3 month intervals. In addition, transfer data from the tertiary care center will be collected to measure the condition of newborns transferred into the regional hospital from the 5 facilities trained.

Data will be analyzed to determine a difference in outcomes as measured by key indicators (utilization of BMV, temperature at 1 hour of life, skin-to-skin care, breastfeeding, administration of vit K, vaccines and eye care, and administration of antibiotics prior to transfer to higher level facility) and neonatal mortality at each institution.

The research team will also be “coaching” the champions at site visits and via phone calls/emails in order to provide teaching support.

**Aim:** To demonstrate that the HBB/ECEB simulation programs are effective and efficient educational tools to help reduce neonatal morbidity/mortality in resource poor settings.

**Discussion:**
- Identifying appropriate “champions” who will execute trainings and their facility and continue to motivate those trained.
- Maintaining skill level of both trainers and trainees.
- Barriers: adapting materials to local cultural norms, material distribution, obtaining buy-in from hospital and government administrators, collecting accurate data, changing current practices.

**References:**
this issue have shown lack of financial resources for simulation using hi-fidelity manikins [1]. Low-fidelity simulations and standardized patients have shown significant gain in knowledge skills. Finding a cost-effective approach to helping medical students improve their communication skills would help bypass these limitations. Studies looking at cost-effectiveness analysis of comparing standardized patients and residents playing the patients in simulations with medical students preparing for an objective structured clinical exam (OSCE) have shown that OSCE scores improved equally in both situations and learner feedback in the debriefing sessions are felt to be better when working with peers [1, 2]. This method of teaching can be used to help medical students in pediatric rotations gain skills and comfort in dealing with difficult parent interactions. Pediatric residents face these parent interaction on a regular basis and can use their experience to provide a realistic encounter for the medical student in the simulation.

**Education goal:**
- To provide cost-effective patient interaction simulations for medical students training in low resource settings by using resident educators instead of standardized patients.
- Improving medical student communication skills with parents using patient interaction simulations.
- Improve resident teaching and feedback skills by working on debriefing during post-simulation feedback session [3].

**Description of educational innovation:**
- Develop pediatric resident common “difficult parent” case scenarios and pilot with residents.
- Provide case scenarios to medical student for background information regarding case.
- Simulate parent interaction having medical student be a provider and resident be “difficult parent.”
- Have 10 minute feedback session where resident can provide peer-to-peer feedback regarding case.
- Develop standardized general debrief tool in order to provide similar experiences between residents and medical student groups.
- Collect feedback from learners and obtain pre and post simulation assessment regarding confidence with dealing with difficult parents.

**Discussion and implications:** Low-fidelity simulation using standardized patient can be a better tool than a hi-fidelity manikin for certain learning objectives. This is very applicable in low resource setting and portable to developing countries. This can also be used for improving team work and observing for team leader performance.

**Significance:** Communication skills is a very important milestone for learners at every level and this educational innovation would help both residents and students.

**References:**

RT 03-4 – Development of an Interprofessional Simulation-Based In Situ Emergency Training Program

**Simulation for procedural and psychomotor skills**

**Submission ID:** IPSSW2016-1091

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Background: Traditional residency training may not provide sufficient learning opportunities to develop competence in essential clinical skills. On the other hand, literature shows that repetitive deliberate practice involving medical simulation is associated with improved learner outcomes. Simulation-based training does not only result in improved practical performance, but further has the potential to improve patient outcome. Thus, we have conceptualized a simulation-based in situ emergency training program aiming at physicians and nursing staff of a tertiary pediatric center.

Description: The goal of this project is to offer interprofessional healthcare providers the opportunity to repetitively train management of pediatric emergencies in the actual healthcare environment. The educational intervention will be implemented starting in November 2015. As a first step, we plan to deliver two training sessions per month. Training will be conducted in situ either in the emergency outpatient clinic or at a hospital ward. Each session will last for 90 minutes and include one resident/consultant and 2-3 pediatric nurses. Scenarios will feature common pediatric emergencies such as respiratory diseases, seizures, sepsis, dehydration, and trauma. Training will be conducted by two physicians using a medium-fidelity pediatric patient simulator. Structured debriefing will focus both on technical skills performance and non-technical skills such as teamwork behavior, communication, and leadership. The effect of the training program will be assessed both subjectively and objectively. Participants will be asked to answer questionnaires regarding perceived self-confidence and knowledge of practiced emergency situations immediately before and after training. All training sessions will be video recorded for objective assessment of trainees’ performance, which will be rated by a non-involved pediatrician.

Evaluation: Between November 2015 and April 2016, approximately 40 healthcare professionals will participate in the emergency training program. Results of the evaluation including participants’ self-confidence and cognitive skills related to management of pediatric emergencies as well as measures of objective performance based on video review will be presented.

Discussion: There are several challenges associated with implementation of the described program. First, a significant number of emergency scenarios from several pediatric subspecialties including laboratory and radiological tests will have to be prepared. Second, training has to be delivered during clinical routine, which may impede availability of personnel and spatial resources. Third, training will be associated with costs resulting from simulator rent, necessary medical equipment, and personnel expenditures.


OP 01-1 – Pediatric Active Shooter Education and Response in the Operating Room

Crisis Resource Management/Human factors and Teamwork

Submission ID: IPSSW2016-1042

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Context: The Active Shooter Medical Simulation (AShSim) we developed focuses on training pediatric healthcare professionals on the response to an active shooter (AS) incident in an operating room (OR). The
ASHSim is a novel, adaptable, educational modality that can be utilized for interprofessional learning in various clinical settings.

**Description:** Real AS incidents are frightening and intense, requiring an immediate response. Primary educational goal is to challenge learners (LS) to compare their anticipated response to their actual response. A balance between realism and caution is needed to not provoke a negative response from the LS. LS are provided two safe words; one to indicate a true threat and one to be excused from the simulation. For maximum benefit we prepare each AShSim to occur in the LS normal place of work. ASHSim also focus on two non-routine interactions. The interaction between shooter and LS and between police and LS. Our ASHSim includes active duty police officers who are training on AS response to a healthcare setting. This partnering of vocations allows for enhanced interprofessional educational simulation and debriefing discussion.

**Observation/ Evaluation:** A mix of 11 Anesthesia Residents and Pediatric Anesthesia Fellows participated in the ASHSim. The pre ASHSim-questionnaire identified that none had previous AS education, 82% felt this training was essential. Before the ASHSim 64% felt they would protect patients, 91% felt an ethical obligation to protect patients, and only 45% felt they could abandon a patient. From the post ASHSim questionnaire 90% experienced fear/anxiety, the ASHSim was realistic and informative, and it was essential to occur in an OR. 100% felt the ASHSim was essential for an adequate facility response with 90% feeling better prepared. 89% of the group preferred ASHSim to other educational methods and 90% recommended all staff should experience ASHSim.

**Discussion:** The development and implementation of the ASHSim was rooted in the rising rates of gun violence in the healthcare setting1,2. The challenges that medical professionals face during AS incidents have not been adequately addressed and current education is passive. The Medical Simulation Center at Loma Linda was successful in implementing ASHSim in clinics, academic offices, and classrooms. ORs create unique challenges with limited exits, confined spaces and patient's needs. To address the gaps, the ASHSim consisted of a medical case that required attention to patient needs and an AS intent on harm. Challenges of an ASHSim in an OR were overcome by scheduling after hours in a hospital with minimal patient activity. This ASHSim demonstrated partnership between the pediatric simulation community, pediatric anesthesia, OR nursing, campus security and police. The relative low fidelity the ASHSim required, and the significant implications for both health care worker and patient safety, affirm the generalizability of this project to other centers.

**References:**

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**PO 01-2 – Use of an Innovative Tool to Improve Role Clarity during In Situ Simulations**
**Crisis Resource Management/Human factors and Teamwork**
**Submission ID: IPSSW2016-1178**

Mona Khattab1,*, Nathan Sundgren1, Leigh Ann Cates2, Kellie Kainer2, Leisa Chancey2, Jennifer Arnold1
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**Background:** The simulation center at Texas children’s hospital is expanding a Comprehensive In Situ Simulation Program (CISP) to the neonatal ICU (NICU). In an effort to identify the unit’s patient safety, educational and clinical areas for improvement, a needs assessment survey was administered to all NICU staff. Role clarity and effective communication during codes were identified as crucial areas for improvement. In addition, space and access to the patient is a limiting factor that could negatively affect the ability to effectively resuscitate a neonate. Simulation can be used as a patient safety tool to help evaluate latent safety threats in new and existing processes of care in addition to helping identify more optimal solutions to processes of care [1], [2]. We sought to utilize simulation as a tool to evaluate the most optimal provider roles and locations in addition to patient positioning during a neonatal code.
Hypothesis: Use of simulation as a patient safety tool to identify appropriate roles and positions for providers and the patient during a neonatal code will assist in development of an optimal “Roles and Responsibilities” chart and color-coded floor map that clinicians can be trained to during in situ simulations.

Methods: After a close inspection of the NICU layout and equipment, the In Situ Simulation team designed a color-coded floor code map that can be easily and optimally integrated into the existing NICU environment. We created a “Roles and Responsibilities” chart for each team member role typically involved in a code. Repeated simulation sessions were conducted with the aid of multidisciplinary NICU staff. Focused debriefings and the NASA-Task Load Index (NASA TLX) were used after each simulation to evaluate mental and physical demands, effort, and frustration with the roles and responsibilities as well as their physical placement on the floor map[3]. [4] [5] Additionally, unique to neonatology, the appropriate position of the infant during a resuscitation (head at foot of bed vs. side of bed) was evaluated.

Results: We have performed two, 2 hour simulation sessions with multidisciplinary teams. Our preliminary results of NASA TLX scores and qualitative feedback during debriefings after simulations performed thus far have identified many recommendations to the ideal position and functions of roles during a neonatal code (see chart) and that the preferred neonatal position for optimal access during a code is with the patient’s head to the side of the bed. We are in progress of evaluating these roles and positions during in-situ simulations and subsequently actual codes within our NICU. Planned outcomes for this next phase will include analysis of scores of NASA TLX by simulation participants, qualitative analysis of debriefings, and video-review analysis of teamwork during in-situ simulations. Careful attention will be made to monitor any negative response to change in workflow that the diagram may be perceived.
References:

OP 01-3 – Developing Alternative Uses for CRM

Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1022

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Background: In outline, this workshop will begin with a brief introduction to Crisis Resource Management followed by some information on the various ways in which we apply these principles in our practice. There will follow a session during which facilitators will lead a discussion of the ways in which participants currently implement CRM in their practice. Next participants will work in small groups to come up with new ideas of their own which will be shared with the group. At the end of the session each group will come away with a concrete plan for the use of CRM in their own practice along with contacts at other institutions with whom they can implement and review these plans.

The overall goals:
• Explore the variety of uses of CRM that participants and facilitators currently utilize.
• Discuss further options that may not be in general use.
• Bring delegates together to inspire multi-centre trials of new applications in the future.

Learning objectives:
- Consider creative applications of CRM through facilitated discussion and small group brainstorming.
- Create a concrete plan for utilising at least one new application of CRM which they will share with the whole group.
- Network with colleagues after the conference to continue widening the ways in which they make use of CRM.

Intended audience: Clinicians, educators and supervisors, technicians and team workers.

Relevance to conference: CRM is a method of addressing behaviours that have a proven effect on outcomes when people apply themselves to complex technical problems. They have been used as learning objectives for debriefing in a variety of professional training settings. They are of great help in avoiding crisis in the first place and where groups of people work together. There is a strong tradition of debrief in medicine, the quality has always been varied. The skills honed in simulation training are definitely transferable, including the idea that many of the clinical problems that arise have a basis in the non-technical area and so discussion of CRM is usually helpful though rarely done. Most recently we have been applying CRM to training for education supervision as a tool to help trainees achieve their goals and identify their stumbling blocks. We are keen to not only hear our delegates’ concrete ideas but also bring them together to inspire multi-centre trials of new applications in the future.
OP 01-4 – Impact of Stepstool Use and Provider Height on Quality of Chest Compressions: A Multicenter Study

Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1197

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Background: The provision of guideline-compliant cardiopulmonary resuscitation (CPR), with emphasis on appropriate chest compression (CC) depth and rate, has been shown to improve patient outcomes from cardiopulmonary arrest (CPA). Unfortunately, even trained providers struggle to perform guideline-compliant CPR during simulated and real CPA events. Provider characteristics and use of step stool may have an influence on the quality of CPR.

Research question: We hypothesize that provider height and the use of step stool are associated with the quality of chest compressions delivered in simulated pediatric cardiac arrest. We explore whether the relationship between height and stepstool and quality of CPR is attenuated by the use of visual feedback and/or Just-in-Time CPR training.

Methodology: We conducted secondary analyses of data collected from a prospective multi-center randomized controlled trial of simulated cardiac arrest. We measure the association between 1) step stool use, 2) provider height and 3) study intervention arm and CPR quality, i.e. chest compression (CC) depth and rate. We assessed for interaction between study intervention arm and provider height.

Results: One hundred twenty-four subjects (72% females) participated. Data from 1,230 30-second epochs of CPR were analyzed. The use of step stool is associated with a significant improvement in CC depth for short providers (female short: 33±7.7 mm without stepstool vs. 36±6.6 mm with stepstool, p = 0.007; male short: 30±1.8 mm without stepstool vs. 37±10.2 mm with stepstool, p < 0.001). Use of a step stool is also associated with improvement in CC depth for tall providers (female tall: 34±8.4 mm without stepstool vs. 36±7.8mm with stepstool, p = 0.001; male tall: 38±9.6 mm without stepstool vs. 41±3.6mm with stepstool, p < 0.001). There is no significant association between provider height and CC rate. After adjusting for gender and step stool use, the use of visual feedback was found to attenuate the effect of height on CC depth (p = 0.025).

Discussion/Conclusion: The use of a step stool is associated with improved CC depth in short and tall providers. Increased rescuer height is associated with improved CC depth. Visual feedback attenuates the effect of height on CC depth.

OP 01-5 - Bringing Out the Best in Every Member of the Team

Interprofessional Education (IPE)
Submission ID: IPSSW2016-1114

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Background: Increasing complexity and specialization of health care providers has led to siloed education with strong professional identities and may contribute to challenges when interprofessional teamwork is required.
Overall goal: Provide practical strategies to help all team members meet their performance potential using simulated crises and team exercises as educational models.

Learning objectives:
- Describe and discuss the impact that “cognitive maps,” which arise from siloed education, have on health outcomes in intensive care settings.
- Analyze the systemic determinants of positive collaboration within a team including equality of power, recognition of interdependence, and development of professional plurality.
- Create team exercises that focus on distributed leadership, interdependence, and shared objectives.

Method of delivery: Case discussions, small group brainstorming sessions, and video and live demonstrations will be used.

Intended audience: Simulation educators and educators interested in leadership and teamwork at the intermediate to advanced level of knowledge.

Relevance to the conference: Strong teamwork and leadership are vital to patient outcomes in acute care settings. This workshop will focus on strengthening teamwork and leadership in increasing complex, multidisciplinary work environments by focusing on interprofessional education and collaboration. Workshop participants will understand the advantage of high levels of cooperation, coordination and standardization to guarantee excellence, continuity and reliability. The format of the workshop will be interactive in both small and large group settings.

OP 02-1 – NeoSim Workshop – The Beginning of Neonatal Simulation in India: An Initiative by PediSTARS, India

Educational Outreach (including remote, rural and international simulation education)
Submission ID: IPSSW2016-1221

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Introduction: Simulation based learning has become popular over the last decade across the globe, more so in the developed countries. However it is still in the stage of acceptance in developing nations like India. PediSTARS, India, a national society formed in India in 2013 to promote simulation based training in paediatrics. After gaining some experience in conducting a few successful simulation workshops across India including training of the trainers (TOT), PediSTARS designed various simulation workshops based on the needs of varied learners in 2015. One such workshop is NeoSim Workshop – Neonatal Emergencies by Simulation. The workshop focuses on simulation based learning of skills, knowledge and attitudes required during neonatal emergencies.

Description: The one-day workshop is comprised of three sessions. The first session includes interactive lectures and a team game. It was aimed to discuss the learning methodology by simulation, human factors and crisis resource management. The second session consists of workstations to discuss about transport of a sick neonate, approach to a newborn with critical congenital heart disease, structured hand over in critical situations and human factors during procedural skills. Third session consists of simulation scenarios of common neonatal emergencies.

Observation: We have conducted two workshops so far in India with the help of the local partners. The National Neonatology Forum of India (NNF) supported both the workshops. The regional medical councils awarded the CME credits for the workshop. Mixture of high fidelity and low fidelity mannequins i.e Sim Baby, Sim new-B and Newborn Anne were used with the support of Laerdal. The delegates include neonatologists, paediatricians, neonatal and paediatric trainees and nurses. A Whatsup group of the delegates for each workshop was formed and discussion was generated about simulation based learning and crisis resource.
management. It helped the faculty to understand the learners’ expectations and learning needs. Delegates were also prepared for the workshop, as it was a first simulation experience to majority of them. However, debriefing with ‘advocacy with enquiry’ technique was a challenge to the faculty to promote reflective learning, as the learners are more used to learning by directive feedback. Nurses and doctors were able to learn well as a team. The delegates were very enthusiastic and actively participated throughout the program. Workshop was very successful in fulfilling participants’ expectations. They felt that simulation training was useful to learn systematic approach to emergencies and CRM principles.

**Conclusion:** Neonatal simulation workshop was well received in India. PediSTARS received requests to conduct such workshops in different parts of India. PediSTARS is hoping to train more neonatologists, paediatricians and nurses to spread the simulation based learning in India.

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**OP 02-2 – Remote Monitoring on Retrieval: Engaging a Simulated Critically Ill Child to Evaluate a Novel System**

**Innovation/ Future Direction and Outreach Simulation**

Submission ID: IPSSW2016-1052

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**Context:** Retrieval of critically ill/ injured children is a complex process. The stabilising team is often based in a remote hospital and composed of adult ICU/ED practitioners and general paediatricians. In these situations, in the UK, advice and support is provided by PICU retrieval team on the telephone. Imaging, ECGs and other clinical information is transmitted by email or inter-hospital image linking systems. Telemedicine is well established in the military and pre-hospital environment but not yet routinely used by retrieval teams.

**Description:** We ran a scenario using a child simulated patient admitted to a district hospital following an RTA. The child was managed by the local trauma team. A Tempus Pro remote monitoring system provided by RTD was used during the simulation. On arrival, the patient was attached to the monitor and information from the resuscitation and subsequent transfer to PICU transmitted to the regional PICU consultant. This included continuous vital sign monitoring as well as ECGs, CXR, ultrasound, photos of injuries and laryngoscopy.

**Observation/ Evaluation:** The monitor provided excellent real-time physiological data from the bedside as well as access to video of team dynamics and patient management/ interventions. The quality of the ultrasound images provided was felt by the local radiology consultant to of an appropriate resolution to make an assessment of the patient’s injuries. Instant access to CXR and injury photographs allowed the PICU consultant to highlight key interventions required. On arrival in PICU, patient stabilisation and transport data was instantly downloaded from the device to a local printer as well as emailed to the receiving consultant. Access to the data was dependent on good mobile data connection which was not available at all points in the referring hospital or along the retrieval route. The camera on the RMD is currently on the back on the monitor which meant that in order to view the patient, the monitoring screen needed to be turned away from those at the head of the bed. When accessory modules such as ultrasound or video laryngoscopy were switched on, monitoring was minimised at the bottom of the screen in a numerical format rather than waveforms. There was an absence of auditory clues to changes in physiology during this time apart from when alarm limits were reached.

**Discussion:** Identification of connectivity problems will allow appropriate upgrading of hospital Wi-Fi systems to provide continuous access during the stabilisation. Witnessing the simulation has allowed the company to understand the intricacies of the retrieval process and help facilitate targeted development of the monitor to function fully in this environment. Feedback of information gained for the simulation to the R&D team of the parent company will allow them to prioritise monitor developments – such as audible pulse oximetry and split screen technology to allow full utilization of this device in the retrieval environment.
OP 02-3 – A Cascaded In Situ Community Network Simulation Program: Lessons Learned
Innovation/ Future Direction and Outreach Simulation
Submission ID: IPSSW2016-1109

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Background: The realities of healthcare reform are driving a trend toward consolidation of community hospitals into large healthcare systems and networks with the goals of cost reduction and quality improvement. However, cultural, behavioral, and clinical practice between large academic centers and their affiliates often remain unstandardized and, at worst, divergent. Harmonization related to targeted standard practices and remediation of latent safety threats stands to improve both patient outcomes and team function among a hospital network. We hypothesized that a cascading simulation-based program could be used to harmonize care provided within the Boston Children’s Hospital network community hospitals with a goal to develop a system of sustainability.

Phase I of the Boston Children’s SIMNetwork In-Situ Program comprised program development through literature review, development of a CIPP Model Checklist, outreach to key leadership for support, a multidisciplinary needs assessment of community-based clinicians, and physician boot camps to garner physician support. Phase II included the development of course content and program roll-out to 10 community hospital partners for a total of 50 courses reaching over 350 clinicians across three pediatric service lines: newborn medicine/neonatology, inpatient pediatrics, and pediatric emergency medicine care. Phase III, currently in progress, looks to incorporate lessons learned as we continue to increase the scale and quality of the program.

We have received many inquires on the process by which we have implemented these courses. This presentation will describe a stepwise approach to developing a successful simulation program distributed throughout a regional healthcare network with focus on:
- Lessons learned across the physician, nursing, and administrative continuum
- Developing a value proposition that appeals to both administrative and clinical leadership including cultural differences related to garnering support
- Sustainability (Figure 1)
- Cost/budget and financial structure
- Large scale simulation facilitator training
- Challenges - including debriefing specifics and project management

Image:
References:

OP 02-3 – Mobile In-Situ Simulation Connecting Academic Centers and Community Hospitals - Bridging Gaps In Care
Innovation/ Future Direction and Outreach Simulation
Submission ID: IPSSW2016-1037

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Background: ImPACTS, a collaborative of pediatric simulation experts from 8 institutions, focuses on the development, execution & sustainment of community based mobile, in situ pediatric emergency simulation programs to engage community partners in improving pediatric acute care.

Goals:
• Develop a plan for stakeholder identification & establishing buy-in for creating a sustainable community program
• Develop a needs assessment for your community to establish tailored goals/objectives for a feasible curriculum
• Develop a strategic plan with careful focus on logistics

ImPACTS connects children’s hospitals with community partners through simulation training/education. Community hospital healthcare providers (CHHPs) often lack ongoing exposure to & experience with critical events compared with continuous training available at academic medical centers (AMCs). AMCs may have enhanced education/training through their access to subspecialty expertise & simulation specialists/equipment. CHHPs may not have such resources & are handicapped when practicing critical events & team training. Mobile outreach simulation is a novel way to bring these critical simulation experiences to CHHPs, allowing simulation specialists & multi-professional subspecialty educators to bridge gaps in care by engaging community sites, in their own clinical setting, with a goal of sharing expertise using simulation techniques & technology. This collaboration adds layers of expert guidance (troubleshoots systems issues, identifies safety concerns).

Our group iteratively developed 4 pediatric acute care cases (seizure/stridor/sepsis/cardiac arrest). We enrolled community & pediatric emergency sites to evaluate care provided to pediatric patients across a spectrum of emergency departments. Sessions involved a scripted debrief of key points & analysis of the environment & safety of care delivered. After each session a “report out” was delivered & discussed with a site “champion.”

The session has 4 parts. The introduction (0-15 minutes) will be a slide overview of ImPACTS, serving as a foundation for program modeling.
Part II will be 2 rotating, small group tables lead by faculty (15-45 & 45-75 minutes). Table I will focus on stakeholder identification, crucial for program success. Worksheets to troubleshoot key departments, administration, institutional leaders in the academic and community sites will be available for planning engagement Table II will evaluate methods of needs assessment, discuss KERNS model of curriculum development, & program evolution/refinement. We will share ImPACTS curriculum: parent, facilitator & debriefing scripts for discussion. This table will also touch on important “day of” session logistics: equipment, set up, session flow, etc.
Participants will regroup for expert panel/wrap up (75-90 minutes), use the time to ask questions & discuss larger global issues. Opportunities for individual time with faculty to address participant’s specific program needs will be offered.
OP 02-4 – Simulating Large Infectious Disease Exposure and Checking Competency of PPE Protocol: A Pilot Study

**Innovation/ Future Direction and Outreach Simulation**

Submission ID: IPSSW2016-1115

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**Background:** Health care workers (HCW) contracted Ebola Virus Disease (EVD) within the United States despite the knowledge of patient’s EVD disease status and following standard recommended Personal Protective Equipment (PPE) to defend against transmission. Standardizing PPE protocol is complex and the CDC has updated its PPE protocol with added detail emphasizing the importance of training, practice, competence, and observation of HCW, especially in correct donning and doffing of PPE.

**Objective:** To determine the effectiveness of standard PPE doffing procedures in preventing transmission to health care workers by using GlitterBug® to simulate pathogen exposure.

**Design/ Methods:** 12 Pediatric Emergency Medicine physicians, fully trained in PPE procedures, consented to participate in our study during required refresher training. Each subject was checked for fluorescent residues using a UV light prior to starting the standardized CDC protocol of donning and doffing. Each participant donned Level 2 PPE, consisting of impermeable coveralls, two pairs of gloves, PAPR hood with face shield, boot covers, and impermeable apron. A coach walked each person through the donning exercise and ensured each step was completed successfully. Subjects then applied a standardized amount of Brevis GlitterBug® Potion to their gloves, apron, PAPR hood, and boot covers to simulate a large exposure. Coaches then walked the participants through the doffing procedure per protocol. An independent observer noted each step as “Completed Correctly” or “Completed with Error”. After fully doffed, the observer checked again for residual GlitterBug® Potion on each subject and recorded findings.

**Results:** One of our 12 participants had residual GlitterBug® Potion found on the right hand following doffing. The coach noted no errors during the doffing procedure. Upon interview with the subject, the likely contamination was during the glove removal. During this refresher training, both gloves were of the same...
length, causing them to roll up. The standard protocol calls for a longer inner glove. Given the absence of such studies, a sample size calculation was not possible.

**Conclusions:** Our study suggests the standard donning and doffing protocol is effective, but when deviated from, there is a potential for contamination. A full-scale study is necessary to determine the failure rate of providers and PPE in protecting HCWs from the spread of infectious disease.

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**OP 02-5 – Live Streaming of Simulations Can Be a Valuable and Safe Teaching Strategy**  
*Innovation/ Future Direction and Outreach Simulation*  
Submission ID: IPSSW2016-1244

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**Context:** Our Trust has embraced Simulation for many years as a key component of integrated learning for multi disciplinary teams across the hospital. We have an ongoing simulation fellowship, nurse and simulation technicians. Although the team is well used across departments they are limited in their ability to access large numbers of staff due to the nature of focused simulation scenarios and the small numbers of learners directly involved. The Paediatric Sim team proposed using a telemedicine video transmitter to allow live simulations to be viewed remotely as part of their planned programme of teaching to increase simulation learning opportunities for additional staff.

**Description:** Using existing telemedicine transmitter and receiver equipment and the hospitals’ Ethernet ports, twice monthly point of care simulations are viewed by paediatric trainees facilitated by senior staff. The simulations are conducted at point of care locations across the hospital, wherever paediatric and neonatal problems may arise. No recordings are made and participant consent is gained beforehand. All faculty members have received masterclass training in running and debriefing the scenarios.

**Observation/ Evaluation:** All simulations are assessed using individual anonymous feedback forms from both participants and observers. Written responses are collated by the hospital sim team and compiled into a regular report. Numbers of simulation participants are recorded and the paediatric team’s participant responses have been compared to those not using live transmission techniques.

**Discussion:** Simulation learner numbers are significantly higher within Paediatrics compared to other departments in the hospital. In 1198 simulations over a 12 months period, average participant numbers in paediatrics per session were more than doubled using this technology compared to other departments. Written feedback has not suggested an increase in anxiety or reduced sim value for participants and paediatric simulations are buoyant with volunteers from across disciplines agreeing to be involved in simulation point of care training. We have found observers gain significant learning from watching the actions of others in addition to the valued learning which occurs for participants themselves. Within the paediatric teaching programme simulation is regarded as a most beneficial aspect. We suggest that this technology is widely available and could be utilised by sim teams across other hospitals to enhance and increase simulation exposure for many learners.

**References:**
1. Grant, D. BASIM Bristol Advanced Simulation Instructor Masterclass course. Bristol Medical Simulation Centre, Bristol, UK

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**OP 03-1 – Systemic Reduction in Medication Administration Events through Novel Simulation Based Training**  
*Patient safety and quality improvement*  
Submission ID: IPSSW2016-1054

Kiran B. Hebbar, Lorisa Williams, Lisa Davis, Jessica Pina, Halli Jones, Trayce Newton, James E. Bost, Gary Frank
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Background: Medication events (ME) in healthcare are common, with some reporting prevalence of 19% of all reported hospital errors. 30% are administration errors and children are at higher risk due to weight-based dosing. While our rate of serious ME is low, medication “administration” events (MAE) continued to represent nearly 70% of all MEs.

Objectives: To decrease serious ME by 10% through the use of medication administration simulation (MAS) training for frontline staff in our inpatient units and emergency departments by November 2014.

Methods: Data was collected from April, 2013 and November, 2014. Groups of four nurses participated in a 2 hour MAS workshop in our simulation lab. Workshops consisted of three scenarios with distinct objectives around which the “debrief” focused. Some of the objectives included better understanding and more consistent use of:
1) 5 Rights
2) MedZone (a distraction-free zone)
3) High Alert independent double check
Scenarios were designed from real events and varied depending on the unit of the hospital being trained. Debriefings immediately followed each MAS and lasted 20-30 minutes. Debriefings utilized “advocacy inquiry” technique to gain better understanding of ME. Nurses completed a survey following MAS and a simulation coordinator collected data during the MAS. To estimate the financial impact we used standardized definitions of adverse ME based on diagnostic codes.

Results: 579 general care, 655 critical care, and 200 emergency department nurses participated in the MAS. The rate of serious ME decreased from 2.5 events/month during the 12-month pre-intervention period (4/2012 - 3/2013) to 1.4 events per month during the 20-month intervention rollout (rate ratio 1.78 [95% Confidence interval 1.03–3.1, P-value =0.029 by exact Poisson test]), and to 0.86 events per month during the 7-month post-intervention period (rate ratio 2.9 relative to pre-intervention period [95%CI 1.2–8.5, P-value=0.014 ]), conferring a 63% decrease in serious ME from the baseline period. There was a significant increase in the adherence to the adverse drug event bundle, from 51% in January 2014 to 84% in June 2015 (P-value < 0.001 by Mann-Kendall trend test, tau = 0.673). Analysis of our data indicates that serious MEs increases the charges per child by $11,000 to $17,000 due to the MAE events with a corresponding increase of $6,000 to $9,000 in actual costs. Children with MAE median length of stay (LOS) was 2 days longer. Trends post simulation shows an annual decrease of 15 MAEs with an estimated total cost reduction to be $90,000 to $130,000 per year.

Conclusion: Simulation based training was associated with a significant reduction in ME and should be considered as an important component of a robust medication safety program for organizations attempting to achieve high reliability in medication administration.

References:
OP 03-2 – Analysis of Parent Views on Multi-disciplinary In-situ Simulation in Paediatric Emergencies Training
Patient safety and quality improvement
Submission ID: IPSSW2016-1132
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Context: As a tertiary paediatric unit we facilitate unannounced multi-disciplinary high fidelity in-situ simulation. Following one scenario team feedback raised the question of how mock emergencies may impact the parents and children on the ward. A previous small PICU study revealed that overall parents felt simulations should occur in this environment but reported mildly increased anxiety1. In order to enhance our simulation programme we decided to evaluate parental attitudes to mock emergencies happening on the ward during their child’s admission and establish ways to help support them during our in-situ simulations.

Description: A simple questionnaire was designed asking parents to rate how strongly they agreed to statements about medical and nursing staff receiving training in managing emergencies. They were also asked how they and their child would be affected if this practice was carried out on the ward. There was space for comments and on collection of the forms any parents’ questions were answered. The questionnaires were distributed by a nurse and doctor involved in simulation training who explained the concept of in-situ simulation to parents prior to taking the survey. All forms were completed on a single afternoon and 21 parents from seven wards participated.

Observation/ Evaluation: All the parents approached were keen to engage in the process, providing many valuable comments. We noted that only a third of parents whose children had one admission thought in-situ simulated emergencies would be distressing. One felt ‘it would be stressful, but also necessary’. This is opposed to the more mixed views where children had over ten inpatient stays. All parents of children with a single admission, and two thirds of those with ten or more admissions, agreed that practicing for emergencies on the ward should be done even if it caused disruption. 95% of parents felt more confident in the team knowing they received regular in-situ emergencies practice.

Discussion: This survey provides valuable insight for those planning to establish an in-situ simulation programme. The overall impression is that parents are keen for medical and nursing staff to receive regular ward-based training in paediatric emergencies; ‘further training will only benefit my child’. This was even if there could be disruption and some distress caused. A key issue raised by parents was the need to communicate with them and one parent stated that ‘to be aware they could happen at any time would be enough for me not to become distressed’. Some parent suggestions were to produce an information leaflet to be provided on admission to prepare them for the possibility of in-situ simulations and to ‘have a quiet word in surrounding relatives ear’ to prepare parents and reduce distress at the time of simulation. We are now incorporating these strategies into our training programme, are collecting further data and are prospectively surveying parental opinion after simulations.

References:

OP 03-3 – Pediatric Staff ACLS Training Increases Competence in Caring for Adult Chest Pain in a Pediatric ED
Patient safety and quality improvement
Submission ID: IPSSW2016-1036
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Context: Pediatric Residents and staff in children’s hospitals have little experience and low comfort in treating adults. However, Emergency Department (ED) staff must stabilize adults in extremis before they can be transferred to an adult facility. Very few pediatric patients come to children’s hospitals alone. They bring adult relatives who have medical issues themselves and are often under extreme duress. In our ED in 2014,
262 patients over the age of 21 were seen; 68 of those had cardiac related complaints making chest pain the most common adult presentation to the pediatric ED. Advanced Cardiac Life Support (ACLS) is not required of our ED department staff or pediatric residents leaving a large knowledge gap in adult care. Of the 2014 adult CP patients eligible for morphine or nitrates in the ED only 1/3 of those received these medicines.

**Description:** Within an existing mock code curriculum using simulation for pediatric residents, an adult chest pain case was inserted. This case involved a time dependent element, an acute ST segment Elevation Myocardial Infarction (STEMI) that deteriorates into Ventricular Tachycardia (VT). The exercise was expanded to involve ED nurses and pharmacists for an Interprofessional Education Experience (IPE). Residents and staff were evaluated on their performance in adherence to ACLS protocols via checklist. Resident knowledge base as well as confidence in treating adult patients was evaluated pre and post simulation. The case was evaluated and taught by Pediatric Emergency Medicine staff who were ACLS certified. The team goal of competence was recognition of a STEMI and its time dependent nature, and proper stabilization, treatment, and transfer of the patient per ACLS protocols. Critical key elements in the ACLS protocol including STEMI recognition, timely CPR and the administration of Morphine, Oxygen, Nitrates, and Aspirin (MONA) were analyzed as a subset. The sessions took place in the ED over a six month time frame.

**Evaluation:** 75% of residents invited attended the mock code sessions. All sessions were successfully IPE experiences. The residents demonstrated a 34% increase in confidence in treating adult patients over the six months. Residents demonstrated at 41% ACLS knowledge increase from pre to post scenarios. Team competence measured by adherence to ACLS checklists increased from 60% at the beginning of the training to 83% at 6 months; an increase of 23%. Adherence to the critical key element subset increased to 100% by the end of training.

**Discussion:** Elements that enhanced performance included distribution and use of cognitive aides during the simulation as well as didactic teaching sessions for the residents and staff. Limitations for this educational intervention included the cancellation of several sessions due to winter weather and a staff death. Next steps involve repeat simulations in 3 & 6 months to look at competence retention and analysis of 2015 CP patients for adherence to ACLS protocols.

**References:**
2. EA Hunt, S Patel, K Vera, et all. Survey of Pediatric Residents with Resuscitation Training and Attendance at Actual Cardiopulmonary Arrests. Pediatric Critical Care Medicine, Jan 2009, Volume 10 (10), pg 96-105.

**OP 03-4 – Does Targeted Multiprofessional Simulation Help to MPROve Neonatal Outcomes?**

**Patient safety and quality improvement**
Submission ID: IPSSW2016-1049

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**Background:** Drivers for introducing multiprofessional simulation in education include changes in junior doctor's hours1, endorsement by the NPSA2, CMO3, and need to reduce medical error4. The use of simulation across different specialties allows for acquisition of skills and team-work training in a realistic safe clinical environment. The question is whether multi professional simulation training can be demonstrated as an evidence based cost-effective education intervention to improve clinical outcomes.

**Research question:** Can multiprofessional simulation involving key quality parameters result in improved clinical outcomes?
**Methodology:** An intervention study assessing the potential impact of multiprofessional simulation on certain quality parameters has been performed over a 4 year period. The quality indicators chosen were areas of high risk related to preterm birth and aftercare (Figure 1). The MPROvE programme is a Multiprofessional curriculum mapped modular programme (neonatal nurses, doctors and nurse practitioners) categorised into neonatal airway, access, respiratory and preterm care, surgical, and cardiac care modules. Areas of high risk (preterm golden hour management, accidental extubation and vascular access) have been incorporated into the programme to evaluate if deliberate multiprofessional practice can positively impact key quality indicators in these areas. These areas are covered at the beginning of each training cycle through simulated multiprofessional workshops. Key quality indicators monitored over the period of the study include temperature soon after resuscitation, and the incidence of umbilical extravasations.

**Results:** A total of 5 cycles (45 training sessions) have been delivered over 4 years. The incidence of hypothermia from 2010 to 2014 in neonates under 32 weeks has significantly improved annually (14.2%; 4.3%; 3.2%; 0.9% p=0.0001). The incidence of UVC (umbilical venous catheter) extravasation from 2012-2014 has been reduced significantly (4.5%;2.2%;0% p<0.05) during the same period. Serious complications related to UVC extravasation (Death, Ascites, and Intracranial haemorrhage) have been reduced from 3.1% to 0% (p=0.03). We have done cost analysis keeping these improvements in context to see if the educational interventional is cost-effective over a sustained period.

**Conclusions:** This programme demonstrates that deliberate multiprofessional simulation targeted to key areas can be associated with improved outcomes. Along with improving patient outcomes, we present cost-effectiveness of the programme to maintain such a model. It serves as an example for provision of multiprofessional curriculum mapped educational intervention which is reproducible, sustainable and improves quality of care.

**References:**
Context: There is a paucity of information related to a newly licensed nurse’s experiences with death and dying in the PICU. Nurse educators concur that there is a dearth of curricular content on death and dying in undergraduate nursing programs when caring for an adult or child (Delaney, 2004; Puia, Lewis & Beck, 2013). Newly licensed nurses, therefore, have had neither the education nor the clinical expertise to deal with the stress associated with the death and dying of a child. They undergo a wide range of emotions including fear, sadness, helplessness, isolation, and uselessness (Beck, 1997). A 29 bed Pediatric Intensive Care Unit housed within a free standing, quaternary Children’s hospital in a major northeastern American city, has, on average, one pediatric death per week. The standard length of orientation for a newly licensed nurse within this institution is 6 months. Didactic instruction to care for the dying child occurs during the final 1-2 months of orientation, if available. Many newly licensed nurses encounter limited to no experience with a pediatric death during orientation. Realizing that a death cannot be “planned” during a clinical orientation, an innovative simulation curriculum has been piloted among the novice nursing staff. This program provides a high fidelity clinical experience for the new nurse to reflect on and contribute to the future delivery of high quality end-of-life care for the dying child and family. This pilot is setting the stage for interdisciplinary team training involving patients at the end-of-life in order to better prepare clinicians to care for the dying child while also honoring and supporting the family.

Description: A simulation pilot was offered for newly licensed nurses who completed orientation but had less than 3 years of PICU experience. The ICU bed space was supplemented with family photos, favorite stuffed animals and was supported with professional actors who played the role of grieving parents.

Observation/ Evaluation: Standard institutional simulation evaluation forms revealed high levels of satisfaction. This project draws an awareness to the vulnerability of novice nurses. Prior to this simulation, several participants stated that they were afraid of death and that they did not know what to do or say when a child dies. Observations made by clinical and educational experts uncovered the need for more high quality end-of-life teaching for the newly licensed nurse upon entry into practice.

Discussion: Overall, the simulation pilot was a success and adequately addressed the need for newly licensed nurses to have an opportunity to practice communication skills and end-of-life care. Upper-level management has agreed to provide financial support for this pilot program to occur bi-annually. Future improvements to the curriculum include the addition of novice health care professionals outside the discipline of nursing such as medicine, child life, social work and chaplaincy.

References:

OP 03-6 – Team Sims: Implementing Interprofessional In Situ Simulations in the Neonatal Intensive Care Unit
Patient safety and quality Improvement
Submission ID: IPSSW2016-1220

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Context: Despite our active NICU simulation courses for all NICU staff, we were lacking full immersive multidisciplinary simulations geared toward teams working together daily. Also, our robust initiatives in quality improvement and patient safety needed to be integrated and tested in simulation sessions. To remedy these vulnerabilities in our program, we developed the Team Sims course.
Description: The Team Sims are scheduled at the same time each week in an unused patient space with one of the NICU teams, that consist of varying combinations of trainees, attending neonatologists and other health professionals. We also run simulations with the night shift utilizing the on-call medical team, night nursing and respiratory therapy staff. The simulation scenarios are written after discussion with patient safety, education and quality improvement leaders to address recent safety issues, new pieces of equipment or new procedures being introduced. The facilitators include a nurse and attending who co-debrief. We are using a new hospital-wide code debriefing form to lead these debriefings to familiarize and encourage staff to use the form after actual patient events. After each simulation topic is completed a summary email of the most frequent and pertinent debriefing points are shared with all NICU staff.

Observation/ Evaluation: We have a run a total of 21 simulations since starting the course in February 2015. There have been 139 participants, including 45 nurses, 20 respiratory therapists, 34 front line clinicians, 11 residents, 11 fellows and 15 attending neonatologists. We have had cancellations due to acuity of the unit or unavailability of simulation staff. Evaluations were obtained from all participants. The evaluations responses were on a Likert scale of 1-5 with strongly disagree and strongly agree corresponding to 1 and 5 respectively. For the statements “I would like to participate in this type of learning experience again” and “I plan to incorporate what I learned into my practice” the means were 4.87 and 4.9 respectively.

Discussion: We have successfully introduced a new simulation course of in situ simulations in a busy quaternary care NICU. Participants have identified the importance of simulations for enhancing teamwork and filling knowledge gaps. Part of the success is attributable to being able to be “signed-off” on required education on new equipment and procedures. Despite some last minute cancellations, we realize that forcing participants to come if they have other stresses in the unit would diminish the acceptance of the Team Sims. In the future, we would like to eventually empower team self-debriefing with the aid of the code debrief form. Moreover, we will start unannounced in situ sims as one of our next steps now that we have buy-in and acceptance of our Team Sim course.

OP 04-1 – Simulation-Based Testing to Assess for Validity Evidence of Checklist for Neonatal Intubation
Assessment (Including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1106

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Introduction: Novel educational techniques are needed to improve performance in neonatal endotracheal intubation (NETI). Development of a procedural skills checklist, global skills assessment (GSA), and Entrustable Professional Activities (EPA) assessment with validity evidence will be critical for future simulation-based education.

Methods: A convenience sample of 23 providers at an academic level IV NICU each completed one simulated NETI attempt. Performance was recorded with a video camera and a videolaryngoscope. Four blinded expert raters used a skills checklist, GSA, and EPA assessment to evaluate psychomotor performance. Airway visualization was assessed using standard scales. Evidence for five sources of validity was assessed (Cook et al, 2006).

Results: Content validity: Only one validated checklist was identified for NETI (Bismilla, et al. 2010) upon review of the literature. A modified Delphi process was completed, with Cronbach’s alpha of 0.862.

Response process: Demonstrated through rater training during a webinar, and calibration while rating 3 standardized videos. Cronbach’s alpha ranged from 0.8-0.92 (dichotomous) and from 0.76-0.90 (trichotomous). Intraclass Correlation Coefficient (ICC) ranged from 0.79-0.91 (dichotomous), and from 0.76-0.89 (trichotomous). Cohen’s Kappa (κ) between raters and “reference ratings” varied between the 3 videos (dichotomous 0.26-0.63; trichotomous 0.25-0.49).

Internal structure: Assessment of inter-rater reliability (IRR) between ratings of participant’s performance using checklists, GSA, and EPA, and grade of airway visualization, during a single simulated NETI
When utilized by the 4 trained raters to evaluate the participants’ skills on a single neonatal intubation attempt, the itemized checklists had an overall Cronbach’s alpha of 0.868 and 0.840 (dichotomous and trichotomous). Statistically significant findings were noted for IRR metrics on both skills checklists (P< 0.001), with Fleiss kappa values of 0.642 and 0.576, respectively. IRR for C-L ratings was 0.778. ICC of 0.912 was calculated for POGO scores.

**Relations to other variables:** Summative scores on the checklists, GSA, and EPA were significantly different among providers in different roles, and amongst those varying NETI experience (P< 0.05). Positive correlations were noted between checklist scores, between GSA and EPA, and between C-L score and checklist/ GSA (all >0.90).

**Consequences:** EPA ratings were correlated with the corresponding scores on the itemized procedural checklist, and summative checklist scores were presented as numeric correlates to the EPA ratings.

**Conclusion:** Simulation-based testing can provide good-to-excellent evidence for the five sources of validity on a procedural skills checklist, GSA and EPA assessment for NETI. Further testing is necessary to determine how scores translate into success upon clinical NETI attempts.

**References:**

**OP 04-2 – Assessment of an Ideal Weight for Age Based Dosing Education for EMS using Simulated Encounter**

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

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**Background:** During pediatric EMS calls, the patient’s weight is unknown and difficult to estimate expeditiously. This could lead to challenges in calculating an appropriate weight-based dose as well as longer time to administration (TTA) of the medication. Weight-based dosing is the most accurate method to determine accurate dosing, but calculations can be timely.

**Learning objective:** To assess an ideal weight for age dosing education tool on the accuracy and ease of dosage calculation as well as TTA for medications during simulation. This study focuses on deliberate practice in simulation exercise after educational intervention on the use of the weight for age based dosing tool.

**Design/ Methods:** 35 EMS providers consented to participate in our study. All subjects underwent a refresher course on PALS Pharmacology and took a written pre-test. In their current practice to estimate weight, they utilize length based weight tape (Broselow tape) and calculate dosing as illustrated on it. Subjects were block randomized into pre and post-assessment groups. The pre-assessment group first went through a short simulation scenario of a 5 year old in status epilepticus. Subjects announced any medications, doses and route of administration, and delivered the medications to a mannequin. An assessor recorded the information announced by the subject and the TTA for each medication. The post-assessment group first underwent training on ideal weight for age dosing tool for drug dosages. The groups switched and the post-assessment group went through an identical simulation while the pre-assessment group received the new training. Doses were assessed by the PI, who was blinded to the group of each subject. Pre-test scores were compared by Mann Whitney U test, years of experience and TTA were compared by t-test, and correct doses were compared by chi-squared test.
**Results:** 18 providers were in the pre-assessment group and 17 were in the post-assessment group. Years of experience was greater in the pre group (18.5 years vs. 12.1 years, p=0.09) though this difference was not statistically significant. The average TTA compared between pre and post-assessment decreased by 69.4 seconds (p=0.001) for benzodiazepine administration, decreased by 53.9 seconds (p=0.002) for dextrose administration and decreased by 28.0 seconds (p=0.048) for epinephrine administration. Dose accuracy was higher in the post group for benzodiazepenes (88.2% vs. 72.2%, p=0.15) and dextrose (61.1% vs. 70.6%, p=0.03). Accuracy of epinephrine was 100% in both groups, though the Broselow tape gives dosage without calculation.

**Conclusions:** During simulation exercise, using a weight for age dosing tool to estimate ideal weight significantly reduced TTA for all three resuscitation medication types and improved the dose accuracy for dextrose.

**References:**

**OP 04-3 – Simulation as a Tool for Patient Safety: Identifying Latent Threats to Communication and Teamwork**

**Patient safety and quality improvement**
Submission ID: IPSSW2016-1120

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**Background and objective:** Effective communication and teamwork are essential for the delivery of high quality, safe patient care and failures in communication and teamwork are an extremely common cause of healthcare errors.1 Infectious diseases, such as Ebola Virus Disease (EVD), dictate the need for level 3 personal protective equipment (PPE); however, the impact of such precautions on communication and teamwork remains understudied. Simulation has been recognized as an essential tool for patient safety that can be used to assess clinical processes before real pediatric patients are exposed to them, to identify potential latent safety threats to patients and health care professionals.2 This quality improvement initiative aimed to use simulation to identify issues related to the use of level 3 PPE with regard to communication and teamwork and potential solutions to mitigate them.

**Methodology:** Simulation scenarios were run during a 4-hour interprofessional training class designed to help ensure competency in EVD-related emergency preparedness. Scenarios aimed to provide training in proper donning and doffing of level 3 PPE and an opportunity to experience collaborative performance of routine clinical care while wearing PPE in an isolated environment. Simulations were followed by debrief sessions that were audio-recorded and subject to qualitative content analysis by 2 investigators to identify
latent threats to communication and teamwork. The Anaesthetists’ Non-Technical Skills (ANTS) framework that encompasses task management, team working, situational awareness and decision making was utilized to categorize issues with regard to teamwork.

**Results:** Eighty-two nurses and 16 respiratory therapists participated in 22 EVD simulations. The time taken to debrief varied from 10:07 to 34:51 minutes (mean = 21:46 ± 5:14). Communication was discussed during all 22 debriefs, with a specific miscommunication noted in 2 simulations. Common issues raised included difficulty in hearing other team members (n = 22), the buddy (n = 6) and the pediatric patient (n = 16), and difficulty with non-verbal communication (n = 2). Thirty-eight potential strategies to enhance communication were identified. Additionally, all debriefs discussed teamwork, with specific compromises related to teamwork noted in 12 simulations. Issues contributing to ineffective teamwork included deficient planning and preparation (n = 10), compromised recognizing and understanding, and poor coordination of activities amongst team members (n = 11). Twenty mitigating strategies were identified.

**Discussion/ Conclusion:** Simulation, as a tool for quality improvement, was a useful means of identifying and characterizing issues related to communication and teamwork. From the healthcare providers’ perspective, level 3 PPE significantly impacts communication and teamwork.

**References:**

**OP 04-4 – Paediatric Rapid Evaluation & ReSuscitation of the Unwell Simulated Patient (pRESUS) for Students**

**Patient safety and quality improvement**
Submission ID: IPSSW2016-1180

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**Context:** High-fidelity simulation is a growing area of under-graduate medical education1. However, despite children accounting for 40% of patients seen in primary care2 and 22% of ED attendances3, undergraduate simulation programmes usually focus on adult patients. The pRESUS course was developed to address this issue and aims to improve patient safety by ensuring students develop a robust system for assessing acutely unwell children throughout medical school and on day 1 as an F1.

**Description:** The pRESUS course was designed by and is delivered by paediatric trainees. The near-peer method was chosen as this has been found to be a valuable source of education for both teachers and learners4. A 3 stage ‘SET, SIM, TEACH’ approach was developed (See image). This is delivered over 2 sessions during the medical students’ 4 week placement in child health. It revises basic life support, ensures students recognise when and how to call for help and covers acute management of emergency paediatric presentations. Scenarios are curriculum mapped and can be run in-situ or in a designated sim-suite. Each session includes a comprehensive debrief and integrated teaching including signposting to relevant resources.

**Observation and evaluation:** Over 60 students have been taught on the course so far across 2 hospitals. The feedback has been extremely positive and pre and post-simulation questionnaires demonstrate confidence in assessing and treating the acutely unwell child has improved by 38.2% (p<0.01). Students have found in
situ scenarios particularly helpful as it allows them to better understand the ward environment and how to access emergency resources. Consultant colleagues have also commented that student performance in assessing acutely unwell children during their formal assessments has improved, although gaining quantitative information regarding this is challenging.

**Discussion:** Following the positive impact of the pRESUS programme in the pilot hospitals, pRESUS is expanding across the Wessex region. This has been made possible by the help of the Wessex STRIPES group (Specialist Trainees with an Interest in Paediatric Education and Simulation). A handbook has been produced allowing the course to be fully reproducible. This includes practical tips on organisation and management of courses as well as presentation, feedback and simulation resources. A website is under development to act as a parallel learning tool for students. Crucially, the course is now being offered to medical and nursing students together, to foster inter-disciplinary relationships and team working at an early stage of career development and to increase fidelity in simulation scenarios. The ultimate aim is to integrate pRESUS into the medical and nursing student curriculums. Discussions are being held with relevant University parties to explore this further.

**Image:**

**References:**
7. pRESUS website. Available at: http://www.pRESUS.weebly.com

**OP 04-5 – Improving Patient Safety by ‘Targetted’ Simulation: Replicating PICU Model into a Children’s Hospital**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1246

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**Context:** Improving patient safety and reducing risk is important in paediatrics. Simulation education has traditionally focused on syllabus curricula. There is a need to bridge the gap between the two streams - lessons learnt from adverse incidents and their impartation to staff in a targeted format during simulation training. We presented as an oral abstract at IPSS the success of our PICU-model that changed our safety culture. We have implemented this model into the rest of our Children's Hospital.

**Description:** 360 bedded Children’s Trust in the UK and a 31-bedded tertiary PICU. PICU model - All adverse incidents are collated (online IR1 with specific forms for incidents involving medications, accidental extubations, buzzer pulls and extravasations) and analysed by the Safety Group and trends monitored. The Simulation Team delivers in-situ simulation training for the multidisciplinary staff weekly using high-fidelity manikins. Each training scenario and debrief lasts 1 hour. The ‘Simulation Group’ (efferent) and the ‘Risk Group’ (afferent) regularly discuss the priorities depending on the adverse incidents and the lessons learnt. It then implements the action points during ‘targeted scenario training’. The trend of ‘incident severity’ has declined since 2007 and the ‘reporting culture’ has increased contributing to patient safety. The success of the PICU-model has been replicated to other clinical areas. We conduct unannounced ‘live codes’ twice a month using high-fidelity sim manikins utilising real-life events that have occurred. The scenarios would vary between different clinical areas. It would range from a previous well child collapsing with anaphylaxis to a post-operative child developing a cardiac tamponade.

**Observation/ Evaluation:** As the sim scenarios are conducted ‘live’, they test the ‘operational readiness’ of a department and that of the hospital resuscitation team in a truly interdisciplinary manner. In addition to the human factors and non-technical skills, several organisational factors have been revealed. They have ranged from disconnected defibrillator paddles to delay in scrambling the ECMO team. Debriefs are conducted using the advocacy-inquiry technique. This has promoted learning within departments as ‘team training’ but also helped to dissipate the action points for the future. The different departments who have expressed gratitude to this training have reported subsequent examples of excellence in clinical practice. The Safety Group and the Simulation Group of the hospital work symbiotically. Parents who witness this training have responded very favourably using the hospital ‘feedback app’ on their phones.

**Discussion:** ‘Targeted’ simulation training is an important training tool to enhance the safety culture of a children’s hospital. The Safety and Simulation Groups should develop a symbiotic relationship for this to succeed. The success of one department can be replicated in other clinical areas using customised training.

**References:**

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**Context:** A large proportion of young people with mental health needs present to general hospitals. Recent UK government reports have highlighted the importance of joined up care in these cases, whilst there appears a general lack of confidence in paediatric staff when managing them. We developed an interprofessional simulation (IPS) training course with the aims of improving joint working between paediatric and CAMHS staff and increasing participants’ confidence in managing young people with mental health needs.

**Description:** A one day course was developed and piloted on 10 occasions. 99 participants attended in all. Participants included: paediatric, GP VTS, emergency medicine and psychiatry trainees, paediatric nurses
and healthcare assistants and CAMHS professionals. Scenarios were designed according to clinicians’ difficult past experiences with this patient group.

**Evaluation:** Data was collected from course evaluation forms, and pre- and post-course questionnaires exploring participants’ confidence in the assessment and management of such young people, and their attitudes towards their roles and responsibilities in their care. Focus groups were conducted to gather further qualitative data.

Quantitative data demonstrated a statistically significant increase in participants’ confidence scores from pre ($M=59.78$, $SD=15.37$) to post course ($M=76.81$, $SD=11.27$), $t(54)=-9.46$, $p<.0005$ (n=62). Additionally, participants’ attitudes score improved, from pre ($M=27.65$, $SD=3.68$) to post course ($M=30.26$, $SD=3.33$), $t(53)=5.33$, $p<.0005$ (n=62). The eta squared statistic indicated large effect sizes,.62 and .35 respectively.

Thematic analysis of the qualitative data (n=99) generated several themes. In addition to those relating to knowledge, confidence, attitudes and clinical skills, participants particularly appeared to have enhanced their capabilities in collaborative working. Specifically, this comprised of: the intention to involve colleagues earlier, to seek advice more, to better hand over information and to discuss cases more. Participants also reported a better awareness of teams’ roles and responsibilities and improved appreciation of different professionals’ perspectives.

**Discussion:** Our findings demonstrate that it is possible to employ IPS to promote collaborative working at the mental-physical interface for the care of young people with both mental and physical health needs. Additionally, participants went away with improved knowledge, confidence and attitudes for working with this demographic. Our hope is that the courses will have a positive impact on patient care and experience for those presenting to general hospitals with mental health needs.

**References:**

**OP 05-1 – Effective Use Of Simulation For Procedural Teaching In Medical Education**

**Simulation for procedural and psychomotor skills**
Submission ID: IPSSW2016-1075

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**Overall goal:** This session will discuss two important motor learning theories such as; Ericsson’s theory of expertise that stresses the importance of engagement in deliberate practice, with feedback for acquisition and maintenance of expertise and the Challenge point framework concludes that for optimal learning and retention to occur, the performer’s expertise and task complexity (psychological or physical) should match and learners benefit from real life or simulation experiences that appropriately challenged them. This session then presents and discusses a model of simulation curricula for technical skills based on the above theories so that simulation promotes achievement of expertise and transfer of skills from simulation to practice and therefore promote patients safety.

During this session participants are engaged in interactive activities in large and small group and individually to apply this model at designing a technical skill curriculum of their interest.

**Target audience:** Beginner and intermediate

**Learning objectives:**
- Identify the main principles of Ericsson’s theory of expertise
- Discuss the main principles of Challenge point framework
- Apply principles of Motor learning theories to design of a simulation curriculum for technical skills
Method of delivery and timeline:
Organization and method of presentation: mini-lectures, demonstration of a simulation curricula, individual assignment, small group assignment and large group discussion.

Introduction: 25 min
- Mini – lecture summarizing the evidence for effective simulation curricula.
- Large group discussion encouraging participants to share their experience and reflect on the evidence.

Ericsson’s theory of expertise and Challenge point framework: 45 min
- Mini – lecture explaining Ericsson’s theory of expertise and the Challenge point framework.
- Several examples of curricula that apply the principles of both theories are presented.
- Small group exercise where participants work on creating their own curricula by applying the principles.

Summary: 20 min
- Mini lecture summarizing feasibility, cost and organizational structure needed to have effective simulation curricula.
- Large group discussion on barriers and facilitators of building the curricula in their own setting.

Intended audience: Educators in charge of building or maintaining simulation curricula

Relevance to the conference: We discuss very important theories of motor learning and learning in general and promote building curricula that are well founded on theories.

References:

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**OP 05-2 – SONAMS: Simulations Of Neonatal Airway Management Skills**

*Simulation for procedural and psychomotor skills*

Submission ID: IPSSW2016-1144

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**Background:** Neonatal Airway management is a vital skill for trainees working in all levels of Neonatal units. Neonatal Life Support (NLS) courses address basic airway management techniques and do not teach intubation techniques or management of situations involving “cannot intubate cannot ventilate (CICV) scenarios. Level 3 units in district general hospital settings have its own challenges, as there are no paediatric anaesthetist or ENT expertise on site. ST1/ST2 trainees will have their first exposure to Neonates and will need more facilitative approach to help them learn airway skills like intubation. Registrar trainees allocated to such units are also more junior grades (ST4/ST5) and they would have unlikely came across difficult airway management scenarios during their training to date but are expected to manage airway challenges presented to them during out of hours awaiting senior help as consultants are not onsite.

**Aim:** To help trainees learn intubation and become familiar with availability and use of different pieces of kit to learn manage difficult airway situations in newborn.

**Method:** To address above challenges both opportunistic and formal simulation sessions are developed to target teaching of Neonatal airway skills to ST1/ST2 and ST4/ST5 trainees. We have secured CMAC video laryngoscope that is more commonly used at the time of intubation opportunity (simulation or real patient). Supervising consultant is able to visualise airway anatomy on separate screen in real time whilst trainee visualises under direct vision with use of CMAC video laryngoscope. With prompting and guidance, consultant is then able to help trainee intubate correctly while at the same time teach another trainee/ANNP about the anatomy of airways on the separate screen and also capture the video of the procedure for wider training. Thus opportunity can be used to teach multiple trainees. There has also been separate teaching simulation sessions developed for senior colleagues as well as registrar trainees to help learn use of
Laryngeal Mask airways (LMAs), Seldinger technique of Intubation over a neonatal Bougie and use of CMAC video laryngoscope.

**Results:** There has been extremely positive experience and feedback from trainees who have underwent these learning opportunities. Consultant colleagues have started to use video laryngoscope more often in their practice of teaching. This method of teaching if made available in more units will help in improving patient outcomes and trainee's confidence.

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**OP 005-3 – Impact of Personal Protective Equipment on Pediatric Procedures: A Pilot Study**

*Simulation for procedural and psychomotor skills*

Submission ID: IPSSW2016-1064

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**Background:** High level personal protective equipment (PPE) is designed to ensure provider safety in the prehospital and hospital setting when caring for patients with known or possible exposure to hazardous, biochemical, or highly contagious airborne infectious agents. Since the Ebola viral disease epidemic of 2014, there has been increased recognition of the need for widespread training in PPE use and preparedness. Very little is known about the impact of PPE on the performance of basic resuscitative procedures in children, either by impaired dexterity or increased tendency for fatigue.

**Objectives:** We sought to measure the success of multiple basic resuscitative procedures on simulated pediatric patients by trained providers wearing multiple levels of PPE. This pilot study was conducted to assist in planning a larger multicenter controlled trial designed to measure the impact of PPE use on common procedures.

**Methods:** Physicians, nurses, and paramedics performed several basic procedures (chest compressions, BVM ventilation, tracheal intubation, LMA insertion, IV placement, IO placement) while wearing one of two types of PPE (Level B or Ebola). Procedures were done on simulated pediatric patients of different ages (infant, child, adolescent/adult). For chest compressions, subjective fatigue was reported following 2 minutes of uninterrupted compressions. For the remaining procedures, time to completion was recorded by an observer. Univariate comparison between level B and Ebola groups was done by nonparametric analysis (Wilcoxon ranksum).

**Results:** Eight providers participated in the pilot (5 physicians, 2 nurses, 1 paramedic). 53 procedures were performed in level B PPE; 37 in Ebola PPE. The median time to success was shorter in Ebola B PPE than level B PPE for all three respiratory procedures (BVM: 7 ± 3 sec vs. 4 ± 1 sec, p < 0.001; intubation: 89 ± 37 sec vs. 44 ± 17 sec, p = 0.01; LMA: 35 ± 7 sec vs. 17 ± 4 sec, p = 0.004) and both vascular access procedures (IV: 178 ± 104 sec vs. 70 ± 33 sec, p = 0.02; IO: 74 ± 53 sec vs. 36 ± 12 sec, p = 0.04). Self-reported fatigue on a 10-point scale following 2 minutes of uninterrupted chest compressions was not significantly different between both groups (Level B: median 5, IQR 2-6; Ebola: median 7, IQR 5-8; p=0.22).

**Conclusions:** While most procedures were successfully performed in PPE, higher level PPE (Level B) resulted in significantly longer time to completion for respiratory and vascular access procedures. Subjective fatigue did not differ significantly over 2 minutes of chest compressions between the two PPE levels. The Impact of Personal Protective Equipment on Pediatric Procedures (IPPEPP) study will be a controlled trial conducted at three US sites comparing procedural performance on simulated pediatric patients by experienced providers with and without PPE. These data will influence recommendations and guidelines for resuscitation in these special circumstances.
OP 05-4 – 'The OPEN Approach' - Task-Trainers, Simulation and Standardised Videos for Procedural Skills Training

Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1096

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Context: There are 168 competencies that need to be achieved by neonatal trainees and approximately 100 for neonatal nurses. The Francis report endorses multiprofessional simulation for critical care teams1. The integration of simulation in already busy education calendars is expensive, time consuming, and cannot be used to deliver all competencies. A Key issue is how to deliver education through simulation to individuals who train separately, have different learning needs but work together to enable consistent learning outcomes. Does curriculum integration help?

Description: Neonatal Nurse and Medical educators have integrated existing national curricula2,3 to produce a bank of 25 scenarios covering the neonatal airway, access, respiratory system, cardiovascular system, neonatal neurology and surgery. This is delivered as a themed session every 4th Tuesday over a 6-month period for year 1-3 medical trainees and 9 months for neonatal nurses. The focus is on low frequency and/or high risk events in neonatal care. 3 cycles of the programme have been delivered.

Observation: Simulation was predominantly a medical programme in the department from December 2010 to April 2012. Nursing participation started in April 2012 and uptake was poor. Curriculum integration was introduced in January 2013. Nursing participation has increased significantly over the period of implementation. 97 feedback forms evaluating simulation from April 2012 to December 2012 revealed 97% of participants agreed the sessions were relevant to their training and 99% agreed it was important to their clinical practice. 96% agreed that post scenario multidisciplinary feedback was useful and 100% agreed the sessions were of a high educational quality. Interestingly fewer nurses (58%) strongly agreed with the sessions being relevant to their clinical practice as compared to doctors (92%). A key theme identified by them was lack of nursing facilitators.

Discussion: Curriculum integration has been key to multidisciplinary neonatal training in our set up. The delivery of mapped simulation scenarios has been very beneficial, because there are time constraints for which we have multiprofessional teams together and we have to facilitate learning for doctors and nurses. We have been able to prioritise delivery of low frequency high risk events related to systems with a focus on human factors, behaviour, communication and team working and relevant to the multiprofessional team. Curriculum integration has also helped to formalise the nursing participation in what was a predominantly medical simulation programme with a significant increase in multidisciplinary sessions and participation over the past 2 years. It has helped avoid duplication of topics already being delivered, those which are better delivered through didactic education and those less relevant to the multiprofessional audience. Nursing facilitators are being trained to debrief. Feedback post curriculum integration is being analysed.

References:
2. Royal College of Paediatric and Child Health - RCPCH. Curriculum for Paediatric Training Neonatal Medicine Level 1, 2 and 3 Training (Sept 2010). RCPCH Website
3. British Association of Perinatal Medicine-BAPM Matching knowledge and skills for Qualified In Speciality (QIS) Neonatal nurses: A core syllabus for clinical competency April 2012
Context: Safeguarding is an essential aspect of all paediatricians’ work. It requires many skills including sensitive communication with family/carers; report writing and court appearances. Trainees need to gain knowledge of the multi-agency systems for assessing and managing cases of actual or suspected child abuse. However these cases are often devolved to the senior doctor (consultant), limiting trainee’s exposure.

Description: We created a simulated educational intervention for senior paediatric trainees to address these training needs.

Session 1 (1/2 day): A 10-month-old (moulaged manikin) was brought to the ED with a swelling on his head. X-ray identified a fracture. The trainees took a history from the parents (actors from our simulated patient programme), examined the child and documented their findings. They then explained to the parents the next steps including investigations and multi-agency discussions. Following scenario de-brief (including safeguarding education), a simulated multi-agency strategy meeting was convened, with trainees representing the medical team. Finally, all trainees wrote a safeguarding report on the case.

Session 2 (1/2 day): A moot family court scenario. A colleague (an experienced lawyer as well as consultant) and our local named doctor for child protection played the roles of advocates for the local authority and child respectively. Simulation faculty played the clerk to the court and usher. Two trainees were witnesses and gave evidence on the stand. Others were allocated roles such as members of the bench, advocates for the parents, and advisers to the advocates. They were given a period of time to ‘prepare’ for court. The witnesses were brought to the stand, sworn in and faced questioning and then cross-examination from all the advocates. At the end, the advocates summarised their cases.

Following the simulation we debriefed report writing, court preparation and taking the stand.

Evaluation: Trainees completed pre and post simulation questionnaires on their understanding of processes and confidence in preparing for and appearing in court for such cases. Statistically analysis showed significantly improved (p <0.001) self-rated confidence post simulation in all domains assessed.

Discussion: This novel simulation provided an opportunity for trainees to gain experience and confidence in managing safeguarding cases and appearing in court. A search of the literature found little evidence of such tools being utilized elsewhere and we propose this is an excellent way to immerse trainees in high stakes situations prior to them ‘doing it for real’.

A considerable amount of preparation was required for the initial development but this can now be more easily run in future and a template of the training session could easily be provided to other centres.

We have plans to further enhance the fidelity of the court scenario by engaging our local university law students as advocates, which will benefit both groups of learners.
Learning objectives:
- Describe learning principles based on contemporary educational neuroscience
- Identify implicit learning models within simulation sessions and how conceptual models can be utilized by instructors to achieve educational objectives
- Design curriculum incorporating conceptual models to improve efficacy in achieving learning objectives

Method of delivery:
- Priming video to illustrate a “good” simulation and debriefing session followed by a reflective exercise discussing how we measure success
- Interactive didactic: introduce and discuss 4 learning models: Kolb’s learning cycle; Conscious-Competence model; Self-determination theory; and, Walker-Peyton’s four-step coaching method for teaching a manual procedural skill.
- Large Group: abstract conceptualization to reflect on simulation sessions they have experienced (or the video) based on the proposed conceptual models
- Active experimentation through a small group exercise planning a simulation curriculum utilizing a worksheet. They will identify 1 conceptual model and 1 learning principle to enhance learning. Large group discussion will evaluate how conceptual models were incorporated
- Large Group summary of take home points discussed during the workshop, and contact information for participants who would like help in implementing these educational models in their curriculum design.

Intended Audience: Educators and simulation program administrators

Relevance to the conference: Explicitly utilizing education models can have long term benefits to the development of educators, simulation centers, and scholarly activity.

Timeline:
- Concrete Experience: A priming video illustrating a simulation session (2 minutes)
- Introductions, Disclosures, Goals of workshop (8 minutes)
- Reflective Observation: Group reflection on priming video: how to measure success, and how to make “good” programs and curriculum better (10 minutes)
- Interactive Didactic: Present and discuss Kolb’s learning cycle, Conscious-Competence model, Self-determination theory, and Walker-Peyton’s four-step coaching method for teaching a manual procedural skill (20 minutes)
- Paired Exercise: Compare and contrast past simulation sessions/video discussing how learning models/principles where implicitly used (15 minutes)
- Small Group Exercise: Plan a simulation session where educators will use new conceptual models and learning principles (15 minutes)
- Large Group Discussion: Feedback from Small Group Session (10 minutes)
- Conclusion, questions and evaluations (10 minutes)

References:

OP 06-2 – Simulation Training of a Specialized Team of Clinicians to Care for Children with Serious Infections
Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1184
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Context: The threat of emerging infectious diseases demands hospitals be prepared to care for children infected with serious communicable disease. Training a specialty team of clinicians to respond safely to these patients is challenging. These disease have low prevalence and rare occurrence, but carry high risk to caregivers if not properly prepared. This requires high-level training in crisis resource management, emphasizing team decision-making and communication under stress. Here we describe the development of a unique simulation program to train a “Special Response Team” (SRT) at Texas Children’s Hospital in Houston Texas.

Description: Prior to initiation of the training program, a group of 12 individuals underwent a 2-day, intensive class designed to teach principles of biocontainment and infection control, and create trained simulation instructors for this course. This included instruction on creating scenarios and evaluation tools. Learners were introduced to simulation equipment and manikin operation, created tools to measure team skill competency in future SRT simulation courses, and learned the skill of debriefing. These instructors then taught series of 2-day simulation courses aimed at physicians and nurses from varied backgrounds to prepare them to work in a pediatric biocontainment unit. individuals (n=30) participated in a 2 day high-fidelity simulation course focused on training learners to properly don and doff personal protective equipment (PPE), and perform clinical tasks in PPE. Team members attended several hours of workshops designed to cross-train all team members to perform necessary patient care, even for the most critical of patients, under unique and high-stress situations, such as caring for a critically ill child with Ebola. These skills focused on airway management and pediatric resuscitation, as well as daily clinical skills including intravenous and central line placements, laboratory processes, and handling biohazardous trash.

Evaluation: SRT members (n = 30) were trained in a pilot course. 100% of team members completed course objectives and competencies. Immediately following each simulation course, team members evaluated course objectives using a Likert scale, and feedback was very positive. 27/30 trainees completed evaluations, which addressed: appropriateness of simulation in teaching the material, completion of course objectives, applicability to clinical practice, procedural skills, clinical knowledge, and improving communication skills. All areas received an average of 5/5, the highest possible rating.

Discussion: This simulation course was designed to address the unique need of clinicians from varying backgrounds to work as a team to provide safe and effective care for highly infectious pediatric patients. This course allowed team members to clearly define roles and priorities, refine procedural skills, and learn to communicate in this high-stress environment under safe circumstances.

OP 06-3 – 12-Month Simulation-Based Learning Curriculum Combining RCDP and Debriefing with Good Judgment

Simulation Instruction design and curriculum development
Submission ID: IPSSW2016-1021

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Context: Simulation-based learning, based on 2013 data, is used at approximately half of pediatric emergency medicine training programs in the United States and Canada¹. Additionally, there is a lack of longitudinal curriculums published targeting this learner group². Lastly, there are no published longitudinal curriculums that look at combining debriefing and instruction strategies in an effort to identify best practice. This curriculum aims to combine debriefing with good judgment³ and rapid cycle deliberate practice⁴ to evaluate progress made by pediatric emergency medicine fellows during their three-year training period.

Description: This is a 12-month simulation-based learning curriculum that combines debriefing with good judgment and rapid cycle deliberate practice. The curriculum was developed using a 6-step approach and
focuses heavily on the needs assessment and curriculum evaluation and assessment steps. The 12-month length was chosen based on an 18-month pilot curriculum that showed an approximate 66% attendance rate as well as the needs assessment. With the observed attendance rate, the curriculum was shortened to 12 months to allow greater likelihood of participation during the three-year training period. The curriculum meets once a month for 2-4 hours and includes both traditional simulation days as well as procedural skill days. Each simulation day has two scenarios. One utilizes debriefing with good judgment and focuses on crisis resource management, internal frames and teamwork of the fellows. The other scenario, although related to the first scenario, utilizes rapid cycle deliberate practice and focuses more on skills, muscle and mental memory, and data driven best practice.

**Observation/ Evaluation:** Formal observation and evaluation is constant and ongoing. Numerous methods of assessment and evaluation are used to provide a maximum amount of data. Pre and post curriculum needs assessments are given to learners. Debriefings are evaluated using the debriefing assessment for simulation in healthcare. Numerous checklists and anchored rating scales are being used to track and monitor learner progress. Additionally, a brief on-line evaluation form is sent to all learners after each session inquiring about overall experience and whether or not objectives were met.

**Discussion:** To date, the curriculum is approximately half-way through its first full cycle. There is limited yet growing data collected. Currently, qualitative data from the learners is the most prevalent and is supportive of the curriculum. Further collection and assessment is needed regarding effectiveness of instruction and curriculum as a whole. If successful, this will be the first curriculum to date that combines the two debriefing strategies of debriefing with good judgment and rapid cycle deliberate practice and may be a step towards identifying and establishing best practice for instructional strategies in healthcare simulation.

**References:**


**OP 06-4 – Rapid Cycle Deliberate Practice Compared with Standard Debriefing for Simulation Education**

**Simulation instruction design and curriculum development**

Submission ID: IPSSW2016-1060

Jenni Sokol1,2,3,*, Tess Vawser4, Kate Hodgson1, Stacey Gilbert5
Context: The Royal Women’s Hospital (RWH) is a perinatal center with 7000 deliveries yearly. Given the high turnover and junior status of many medical, nursing, and midwifery staff, on-going training is required to ensure proficient care of neonates. Inter-professional simulation-based education (SBE) forms an integral part of the education program, aiming to enhance technical and human factor skills, and improve neonatal and obstetric outcomes. We sought to explore participant perceptions of two methods of SBE: Continuous simulation (CS) with debriefing following the scenario\(^1\), and ‘Rapid cycle deliberate practice’\(^2\) (RCDP), with the aim of exploring perceptions of these two simulation methods, and to enhance the RWH neonatal SBE program.

Description: This 12 month mixed method study occurred over two 5-month periods. Ethics Board approval was sought. Any medical, nursing or midwifery staff attending SBE could participate. Sessions included both RCDP and CS and simulation content increased in complexity over time. Evaluations were completed at each session and 3 months after each time period. Participant demographic data were reported with descriptive statistics. Evaluations included Likert responses with free text to enable quantitative and qualitative descriptive exploration\(^3\) of participant perceptions of simulation styles and learning outcomes.

Evaluation: 150 (6-17/session) staff attended 14 sessions. Of 65 staff enrolled (4 professions-student to consultant level), 34 attended >1 session. RCDP was utilized in 10 simulations and 13 in the CS style. RCDP was difficult to deliver for the neonatal-obstetric simulations so midwives and obstetric doctors were omitted from comparison of the two styles. Nursing, obstetric, and midwifery staff had less exposure to simulation overall, with less exposure to both styles of SBE. 95% of session evaluations were returned. Of those exposed to both simulation styles, 72% returned the 3 month questionnaires. The session evaluations highlighted both clinical content and human factor learning outcomes equally. Continuous simulations were preferred over RCDP if staff were more senior and as new staff gained experience. Less experienced doctors and nurses preferred RCDP, due to the ability to re-focus, practice, de-stress, and be guided by the facilitator. Of the questionnaires returned at 3 months, human factors were recalled significantly compared to scenario content. Participants preferred the CS style due to perceived improved realism. The few experiencing less ‘buy-in’ noted after accepting a lack of realism, they preferred RCDP for the structured learning.

Discussion: This study has provided valuable insight and guidance in which to modify our SBE program. The overwhelming recollection and desire to incorporate human factors into their clinical practice is encouraging and is a step closer to Kirkpatrick’s fourth level of evaluation-proof of the effectiveness of our SBE program is the next challenge.

References:
**Context:** Pediatric residents care for a wide spectrum of children with acute and chronic disease processes. They are often the first communicators with families yet have no formal training in communicating difficult information. Many residents feel unprepared to face these challenges in practice. In 2000, the AAP made recommendations that all pediatricians, including residents and fellows become knowledgeable and comfortable with providing palliative care (1). At our institution, we felt that residents would benefit from practicing these critical conversations in a safe, directly observed environment. We then created a simulation to address gaps in communication using a multidisciplinary team. We hypothesize that residents would value this experience as part of their simulation curriculum and would feel more comfortable delivering such information after having gone through the simulation.

**Description:** A scenario was developed regarding the drowning death of a child using a high fidelity simulator and a standardized actor as the patient’s mother. Small groups of pediatric residents participated in the scenario, which was run weekly over a 12-week period to capture the entire program. An attending physician facilitator directed participants through the medical resuscitation, while a second facilitator directed the residents through three conversations with the patient’s mother. These conversations or “Time Outs” were planned at three discrete time points:

1. Parent’s initial arrival to the ED
2. At a near-futility point in the resuscitation
3. Once the patient has died.

Objectives were created which included using plain and simple language, empathy and professionalism. Members from Pediatric Palliative Care, Hospital ministry, child life and simulation staff was present to help facilitate the debriefing session. A pre-test survey and post-test survey were given to the residents to measure their comfort with pediatric palliative care.

**Observation/ Evaluation:** The pre and post survey questionnaires were evaluated. We found that first year residents expressed the most discomfort with speaking with parents and families regarding issues of death and dying. When surveyed, 40% of first year residents had never experienced the loss of a patient, whereas 100% of second and third year residents had experienced patient death. On the pre-test survey, 88% of residents reported that they were not comfortable, or only somewhat comfortable with issues related to patient death and dying. Following the simulation, 92% of residents reported feeling more comfortable. 100% of residents felt that death and dying education should be included in resident training.

**Discussion:** Residents value simulation as a way to practice critical conversations and residency training programs should adapt simulation as a valuable asset for resident education.

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**OP 06-6 – The Importance of Curriculum Integration in Simulation Programmes for Multiprofessional Teams**  
*Simulation Instruction design and curriculum development*

**Submission ID:** IPSSW2016-1096

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**Context:** There are 168 competencies that need to be achieved by neonatal trainees and approximately 100 for neonatal nurses. The Francis report endorses multiprofessional simulation for critical care teams¹. The integration of simulation in already busy education calendars is expensive, time consuming, and cannot be used to deliver all competencies. A Key issue is how to deliver education through simulation to individuals who train separately, have different learning needs but work together to enable consistent learning outcomes. Does curriculum integration help?

**Description:** Neonatal Nurse and Medical educators have integrated existing national curricula²,³ to produce a bank of 25 scenarios covering the neonatal airway, access, respiratory system, cardiovascular system, neonatal neurology and surgery. This is delivered as a themed session every 4th Tuesday over a 6-month period for year 1-3 medical trainees and 9 months for neonatal nurses. The focus is on low frequency and or high risk events in neonatal care.⁴ 3 cycles of the programme have been delivered.
**Observation:** Simulation was predominantly a medical programme in the department from December 2010 to April 2012. Nursing participation started in April 2012 and uptake was poor. Curriculum integration was introduced in January 2013. Nursing participation has increased significantly over the period of implementation. 97 feedback forms evaluating simulation from April 2012 to December 2012 revealed 97% of participants agreed the sessions were relevant to their training and 99% agreed it was important to their clinical practice. 96% agreed that post scenario multidisciplinary feedback was useful and 100% agreed the sessions were of a high educational quality. Interestingly fewer nurses (58%) strongly agreed with the sessions being relevant to their clinical practice as compared to doctors (92%). A key theme identified by them was lack of nursing facilitators.

**Discussion:** Curriculum integration has been key to multidisciplinary neonatal training in our set up. The delivery of mapped simulation scenarios has been very beneficial, because there are time constraints for which we have multiprofessional teams together and we have to facilitate learning for doctors and nurses. We have been able to prioritise delivery of low frequency high risk events related to systems with a focus on human factors, behaviour, communication and team working and relevant to the multiprofessional team. Curriculum integration has also helped to formalise the nursing participation in what was a predominantly medical simulation programme with a significant increase in multidisciplinary sessions and participation over the past 2 years. It has helped avoid duplication of topics already being delivered, those which are better delivered through didactic education and those less relevant to the multiprofessional audience. Nursing facilitators are being trained to debrief. Feedback post curriculum integration is being analysed.

**References:**
2. Royal College of Paediatric and Child Health - RCPCH. Curriculum for Paediatric Training Neonatal Medicine Level 1, 2 and 3 Training (Sept 2010). RCPCH Website
3. British Association of Perinatal Medicine-BAPM Matching knowledge and skills for Qualified In Speciality (QIS) Neonatal nurses: A core syllabus for clinical competency April 2012

**OP 07-1 – Serious Gaming for Neonatal Resuscitation**

**Serious games and virtual environments (e.g. second life)**
Submission ID: IPSSW2016-1201

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Neonatal resuscitation skills learnt and practiced at training sessions can be rapidly lost if not used frequently. This is particularly true for practitioners who work in the community or smaller units where they may not be involved in neonatal resuscitation on a regular basis, but need to maintain these crucial skills. Death and serious morbidity can result if babies are born in a poor condition and do not receive adequate resuscitation. Around 10-16 % of babies require active resuscitation at birth and all practitioners who may be present at a delivery are required to have neonatal resuscitation skills. Training is generally completed in 4 year cycles but evidence indicates that the skills rehearsed at such training rapidly deteriorate for some at 6 months.

There is now a growing recognition of the potential benefits of ‘serious gaming’ therefore this seemed an appropriate mechanism to support and engage busy professionals in providing skills maintenance. In response to this problem the entrant worked closely over 18 months with a digital company to develop an engaging realistic serious game that enables a practitioner to test themselves in a range of neonatal resuscitation scenarios. The game mimics the skills required without the use of expensive equipment, feedback and instruction are provided and the game can be played anywhere anytime by the user. The game was tested by a range of students and professionals during its development and adhere to the ILCOR guidelines. This innovative neonatal resuscitation ‘game’ supports skill maintenance and is not designed to
teach skills, but reinforce skills previously taught on training courses, however good scores do not demonstrate clinical competence.

The user is faced with a baby requiring resuscitation, in a variety of settings and is asked to select the appropriate actions. The user ‘drags and drops’ the appropriate equipment towards the animated baby – e.g. a towel to dry the baby, the right sized mask. The user is timed, receives points for performing the correct actions e.g. demonstrating the length, frequency of inflation, ventilation breaths, CPR, suction etc.

The game is available as a downloadable mobile application on tablets, smart phones, or PC. The app has been downloaded by users in five countries feedback has been extremely positive. A robust evaluation of the impact of the game on skill maintenance is about to commence in early 2016.

This app is suitable for all practitioners involved in caring for newborn babies, it can be used by anyone with access to a mobile phone device this is particularly useful in remote and rural areas and also in resource poor countries where mobile phone technology is now widely used. This game currently is for neonatal resuscitation but a similar game could be developed or added for older babies and children. This app may help practitioners maintain skill, resulting in more neonate receiving the highest possible quality care.

Image:

References:
4. The International Liaison Committee on Resuscitation (ILCOR) consensus on science with treatment recommendations for pediatric and neonatal patients: neonatal resuscitation
9. Mosley C & Shaw B, 2013, 'A Longitudinal cohort study to investigate the retention of knowledge and skills following attendance on the newborn life support course', Arch Dis Child, 98, 582-586

OP 07-2 – Serious Play: Feedback to Improve a Disaster Triage Video Game

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Objective: Video games are increasingly being used as an educational strategy for EMS. Usability and enjoyment are criteria for successful video games. This paper describes the beta-testing of an EMS disaster triage web-based video game we developed. It is important to evaluate usability prior to deployment to a large number of learners; if a game is difficult to play, it is not appropriate to measure its efficacy as an educational intervention. We aimed to elicit learners’ feedback to evaluate users’ experience and guide the iterative development of the game.

Methods: This prospective mixed methods study enrolled paramedics, emergency medical technicians (EMTs), EMS students, and undergraduate students. Participants played three levels of the game with multiple-casualty incidents (12 patients per level using the START/JumpSTART triage algorithm) and received automated electronic feedback after each level. After playing, participants completed a survey assessing gameplay realism, accessibility and engagement. One research assistant observed players, independently rated their interaction with the game, and documented technical difficulties. Five-point Likert scales anchored at Strongly Disagree and Strongly Agree were used for survey questions.

Results: There were 22 players (6 paramedics, 4 EMTs, 7 EMS students, and 5 undergraduate students). Players’ qualitative responses included suggestions about electronic feedback and comments on gameplay realism, accessibility and engagement. Frequent suggestions were adding a practice level and improving concordance of player actions with visual gameplay. Across the three levels, 82% of players disagreed or strongly disagreed with the statement that the game levels were hard to navigate. Players agreed or strongly agreed (89%) that game levels were realistic and engaging. Regarding electronic feedback, 70% of players agreed or strongly agreed that it was accurate; they agreed or strongly agreed (81%) that it was clear; and they agreed or strongly agreed (81%) that it was helpful.

Conclusion: Eliciting learners’ feedback revealed several ways to improve our game, including adding a game tutorial and amending graphic design. These items were immediately addressed and the game was updated prior to implementation.

OP 07-3 – Development of an Innovative High Fidelity Paediatric ECMO Simulator

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Extracorporeal membrane oxygenation (ECMO) is an advanced modality of treatment offering cardiac and/or respiratory support in critically ill patients. Following the design of a new high fidelity simulation centre with specifically designed subfloor conduits, an opportunity arose to remotely manipulate flows and dynamics of an ECMO circuit without detracting equipment and personnel. Current research indicates that the application of appropriate cues at the right time improve the realism within simulation. The advancement of a novel ECMO simulator that applies an appropriately high level of realism in enhancing clinical authenticity will be described.

The ECMO circuit was adapted to allow for the continuous circulation of simulated blood by attaching the venous and arterial access lines to a reservoir that was hidden within the torso of a low fidelity manikin. The reservoir volume could be remotely adjusted via a separate line fed through the subfloor conduit to simulate hypovolaemia. Intravenous lines were connected to the reservoir bag, ensuring that volume changes made by participants also produced realistic haemodynamic changes with the console, displaying realistic ECMO parameters. Concealed by the subfloor conduits, intraluminal balloons were positioned within the circuit, allowing for the simulation of arterial and venous line resistance and obstruction from the control room. This also allowed for the simulation of massive venous air entrainment. Furthermore, to create a realistic ventilatory response, a balloon was secured to the end of an endotracheal tube placed through the mouth of the manikin, allowing for both genuine mechanical and manual respiratory feedback. Further authenticity was achieved between the manikin and ECMO circuit operators to vary physiological parameters simultaneously with ECMO observations.

Throughout the simulation, it was observed that participants were given the exact cues that they need for responding to changes in the ECMO machine, as well as manikin observation. Further cues were participant driven whereby improvements in the patient condition were evident when the correct therapy was applied. The development of an innovative high fidelity ECMO simulator with remote manipulation and independent response to participant’s actions is a new and innovative development in both ECMO training and simulation. The adaptation of the manikin to allow for realistic ventilation and ECMO parameters in response to participant actions offers a greater impact in realism. Furthermore, the use of remote inflation of intraluminal balloons positioned inside the circuit via a subfloor conduit allows for circuit physiology to be influenced according to specific disease patterns and allows for greater application of knowledge with practice. This novel system is a cost effective and efficient use of equipment, offering a high degree of realism in duplicating real life situations which has yet to be described in the literature.

References:

OP 07-4 – Using Lean Six Sigma and Live Simulation to Improve Patient Flow in a Liver Transplant Clinic

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

**Submission ID:** IPSSW2016-1217

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**Background:** Boston Children’s Hospital (BCH), a Harvard Medical Teaching Hospital serving children from around the world for more than 140 years, is well regarded for its use of live simulation and Lean Six Sigma to improve clinical efficiencies, patient safety, and quality. Previous work at our institution has shown these methodologies can be used together to improve efficacy of the quality improvement process by combining tools such as live simulation, process mapping, and failure modes effects analysis. This work looked at the effectiveness of adding live simulation to this toolkit to address patient wait times in a multidisciplinary liver transplant clinic. Patients in the Liver Transplant Clinic must see a large number of providers in succession, including a hepatologist, surgeon, nurse coordinator, social worker, nutritionist, and pharmacist. Cumulative effects of long wait times across frequent pre- and post-transplant appointments may have broader implications, including decreased school performance and parental employment.
opportunities. Our objective was to decrease the overall length of appointments, improve patient satisfaction and decrease the cumulative time away from school and work by adding live simulation to the Lean Six Sigma tools to improve patient wait times.

**Purpose:** The goal of the work was to determine the effectiveness of combining Lean Six Sigma methodologies and live simulation to decrease patient waiting time and increase the patient’s value added time.

**Methods:** A team of Lean Six Sigma experts, simulation specialists, and clinical experts adhering to standard Lean Six Sigma DMAIC methodologies (figure 1) took a unique approach to addressing a complex problem of decreasing patient waiting time in a multidisciplinary clinic. Standard Lean Six Sigma tools included value steam mapping (Figure 2), visual management system, standard work and balancing work loads. A four-hour live simulation exercise with the entire multidisciplinary team facilitated by a simulation specialist was carried out within the designated clinic space using live patient volunteers. Three rounds (1 baseline and 2 testing solutions) were completed during the four hour session, with team debriefs after each round. Changes to clinic workflow were made based on the results of the simulation sessions.

**Results:** Patient waiting times decreased by 40% and value add percentage (time with clinician/overall time in clinic) increased from 50% to 70% (Figure 3).

**Discussion:** Combining Lean Six Sigma and Live Simulation appears to be an effective tool for improving patient flow through a multidisciplinary clinic, decreasing patient waiting time and increasing value-added time. Added benefits not foreseen prior to initiating the exercise were an increased level of provider engagement and cultural changes surrounding changes in clinician behaviors and practice.

**References:**

**OP 07-5 – Innovating a Paediatric Robotic Motion Arm for Neurological Sensory Feedback Response**

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

Submission ID: IPSSW2016-1236

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Simulators are designed with specific features that allow for learning which can transfer to actual patient care. However, learning from a simulator is limited as it can often fail to emulate the realism and relationship found within the context of clinical practice. In particular, it is difficult to replicate realistic limb movements in a paediatric simulator due to the limitation of space, location of other aspects to patient assessment such as cannulation and pulses, as well as cost. The presence of the right cues for learning in the simulation environment allow for appropriate realism and authenticity. It is the placement of such features that determines the transfer of learning in simulation to the context of a real-life situation. Therefore, the rationale for the development of a mechanical arm was to allow for an authentic replication of motor limb flexion and extension responses during neurological assessment in an unconscious patient.

Engineering fidelity was an important concept in the development of design which included a process of consultation, manufacturing, testing, evaluation and re-testing. It was essential that the development of appropriate fidelity was replicated as it would aim to translate the authenticity of neurological assessment by reflecting the right cues at the right time in delivering an appropriate level of realism and therefore, influencing meaningful psychological fidelity. A right arm from the Laerdal® 'MC Kid Trauma’ moulage kit was utilised which enables the limb to be easily transferrable between low and high fidelity paediatric manikins. The arm was modified to insert a linear actuator with a customised metal elbow pivot joint inside the arm cavity. This allowed for the lifting force and pivot required to enable realistic limb movement. Critical to the design of the simulator was that it required elements to accurately simulate the specific behaviours of motor response and associated limb movement during neurological assessment. Therefore, utilising push button and joystick controls, movements can be generated as required and controlled to accommodate changing scenarios, including motor response associated with fluctuating levels of consciousness. The range of motion achieved includes varying degrees of flexion, extension and rotation from the elbow.

Novel engineering solutions that create a more realistic clinical response, increase the potential for participants to interpret and treat the manikin according to features and cues found in the simulated learning environment, without detracting factors such as voice over descriptions, or reliance on alternative cues such as physiological parameters. The Kids Simulation Australia paediatric robotic motion arm is able to deliver appropriate realism essential for accurate assessment of the unconscious child and has the potential to improve transfer of learning to real life paediatric neurological emergencies.

References:

OP 041 – STEP - Experience of first inter-professional workshop by PediSTARS India
Interprofessional Education (IPE)
Submission ID: IPSSW2016-1234

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Background: PediSTARS India is a national society formed in India in 2013 to promote simulation based training in medical profession. After gaining experience in conducting a few successful simulation workshops across India including TOT, PediSTARS designed various simulation workshops based on the needs of varied learners in 2015. One such workshop is STEP (Simulation Training in Emergency Pediatrics) which focuses on simulation based learning for pediatric doctors and nurses involved in emergency care. The main aim was to foster a team-based approach and promoting inter-professional education via simulation.

Description: The one day workshop comprised of a brief talk with video that focused on describing simulation based education, simple game to emphasise team approach for handling emergencies, rapid session of recap of algorithmic approach to common pediatric emergencies (added with success to address the knowledge gap in some learners). A mock scenario by faculty demonstrated the practicalities of learning by simulation depicting the flow of scenario and most importantly debriefing and reflective learning. Eight scenarios focusing on different aspects of managing pediatric emergencies were designed to bridge learning of knowledge, skills and attitudes.

Observations/ Results: 6 workshops have been conducted so far in 4 cities of South India of which 2 were part of the national/state conferences. Faculty included mainly representatives of PediSTARS India and
trainers trained through PediSTARS India/IPSS led Training of Trainers workshop held in 2014. All the workshops were heavily subscribed and fostered good inter-professional education. The challenges of handling the learning needs of variedly able knowledge and experience of learners appeared to be well addressed in the workshop. Nurses and doctors were able to learn well as a team through the workshop. Debriefing appeared a challenge to the faculty to promote reflective learning as the preference locally of the learners appeared to favor lecture based information sharing. There was a significant shift in trend of learners preferring to adopt simulation at bed side after STEP workshop.

Conclusions: STEP workshop appears to find popularity locally in India in setting a bench-mark for simulation based learning and promote inter-professional learning. Debriefing appears to be a challenge to favour reflective learning and will need to be adapted to local needs of learners. The introduction of quick recap session addressed the knowledge gap of learners.

OP 08-1 – Cultural Prototypes and Differences in Simulation Debriefing
Debriefing and teaching methodologies
Submission ID: IPSSW2016-1205

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The workshop aims to raise awareness and create a discussion around cultural influences on debriefing in different parts of the world. It is intended for physicians, nurses or educators of any level involved in debriefing. The workshop will consist of 3 short presentations outlining the “stereotypical” behavior of participants from varying countries (Lebanon, Switzerland, Qatar and USA) in typical learning situations (e.g. communication, hierarchy, speaking up...). Participants will then be divided into small groups to brainstorm and discuss how cultural elements could affect the simulation-learning environment. Each faculty member will guide the groups through key elements to enable participants to trial innovative approaches to debriefing with learners with different cultural backgrounds.

At the end of the workshop, participants will:
- Use a frame of reference to understand and describe differences in cultures (distinguishing cultural borders from national borders)
- Become aware of cultural influences on communication and debriefing, in part by interacting with workshop participants with disparate cultural backgrounds
- Learn to adapt their words and actions during simulation based-courses to the different cultures of their audience

As an introduction, 5 faculty members, one Lebanese, one Swiss, one Australian (working in Qatar) and two Americans, will illustrate few cultural stereotypes of the respective societies they are describing and provide some background information regarding the cultural context in which they practice simulation training. (10 minutes)

Next the participants will be asked to make a 30-second statement describing their own cultural background and the cultural context in which they are exposed to during simulation. (5 minutes)

The participants will be be divided into groups of different cultural clusters. Faculty will present 4 short outlines of “stereotypical” behavior (when involved in a substantial error during the simulation) from varying countries (Lebanon, Switzerland, Qatar and USA).

Table discussions should focus on analyzing the differences in the reactions in relation to culture and participants will be asked to comparatively discuss and present to the group the “stereotypical” reactions they would expect in their own cultural setting when a simulation team member is involved in a substantial error during a similar scenario. (45 minutes)

Participants will then be shown a video (or an enactment by faculty members) of a simulation scenario where a senior physician fails to recognize a pediatric patient’s condition. Participants will then be asked to debrief a junior physician or nurse who failed to speak up in the cultural context in which they practice simulation “at home”. They will be offered 2 guiding questions:
- How do you react to what you observed and heard during the presentations?
- What would be your immediate reaction to what you heard and observed? (20 min)
Concluding remarks and discussion (10 minutes).

**OP 08-2 – How to Develop an In-Situ Children's Emergency Department Simulation Programme from Scratch!**
*Programme development/ Administration and Programme Management*
Submission ID: IPSSW2016-1212

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This work will enable those working in emergency and acute care settings (i.e not just limited to emergency departments) to develop the confidence to introduce or enhance their own in-situ simulation programme.

**Learning objectives:**
- Develop the key initial enablers and barriers to introducing in-situ simulation in a simulation niave environment. This will involve a small piece of active work in wish the learners will work individually or in groups to draw up their own driver diagrams to take back to their workplaces.
- Be aware of the equipment and technology needed to introduce a comprehensive (and curriculum relevant) programme. This will cover various situations from resource poor to resource rich departments. Where possible there will be practical or video demonstrations.
- Understand the ‘grey’ area of implementation in respect of maximising senior involvement, utilising social media and developing multi-professional working.

**Method of delivery:** Mixed methodologies with a team experienced in educational presentations. The format will be based around the 3 learning objectives but didactive lecutres will be limited and participants will be encouraged to share their own learning. Videos will be utilised, along with a short ‘how-to’ social media section.

**Intended audience:** No previous experience of simulation is necessary but this workshop would still be relevant to experienced simulators interested in the specific challenges that Emergency and Urgent care settings have in respect of in-situ simulation. Both clinical (of any professional background) and non-clinical staff would be welcome.

**Relevance to the conference:** We feel this workshop will promote in-situ simulation, a developing and essential part of any long term simulation programme, as well as providing a shared learning environment for anyone to be able to network and develop new ideas from others.

**OP 08-3 – Human Centered Design for Simulation Practitioners**
*Programme development/ Administration and Programme Management*
Submission ID: IPSSW2016-1235

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**Overall goal:** This workshop will explore human centered design and how simulation practitioners can utilize the philosophy and the process for program innovation. Human centered design is a creative, collaborative approach to problem solving beginning with a deep understanding of the needs of those we are serving and culminating with solutions viewed through three lenses: desirability, feasibility and viability. The process has three non-linear phases: Inspiration, Ideation, and Implementation. During the workshop, participants will experience these three phases and practice the approach using an example. We will end the workshop with a discussion on how the process can be utilized at home institutions.

**Learning objectives:** After this workshop, participants will be able to:
Describe the human centered design process
Apply design thinking using an example
Identify ways to utilize this process to their simulation work at their home institution

Method of delivery: Mixture of didactic, large group discussion and small group sessions.

Intended audience: Anyone who designs simulations.

Relevance to the conference: In keeping with the theme of IPSSW 2016 – Innovation, Engineering, and Exploration, this workshop will offer simulation practitioners the tools to apply design thinking at their home institutions in order to produce innovative curricula, engineer solutions, and explore interventions.

Workshop timeline:
Introduction and Background on Human Centered Design: 10 minutes
Large Group Interactive Session #1 – Demonstration of Inspiration: 10 minutes
Small Group Interactive Session #1 – Ideation: 50 minutes
  - Creation of Insight Statements – 12 minutes. Participants will review themes and rephrase into 3 short insight statements that will guide solution generation.
  - How We Might Statements – 12 minutes. Insight statements will be rephrased into questions in an effort to identify opportunities to design possible interventions.
  - Brainstorm – 12 minutes. The groups will brainstorm and generate as many innovative ideas as possible.
  - Bundle Ideas – 12 minutes. Innovative ideas identified during the brainstorm will be clustered and consolidated into possible solutions.
Large Group Discussion - Discuss how this process can be applied at home institutions: 12 minutes
Final summary and questions: 10 minutes

References:

OP 08.4 – In Situ Simulation – The Public's Perspective
Programme development/ Administration and Programme Management
Submission ID: IPSSW2016-1255

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Aim to canvas opinion from the public on their perceptions of in situ simulation.

Learning objectives: What is the public’s perception of in-situ simulation? Do they find it reassuring that teams undertake training in this manner, or are they overwhelmed by the intense scenarios that unfold? Simulation is recognised as a valuable training tool in healthcare, and as it evolves there are a growing number of multi-disciplinary team exercises (1). The use of in-situ simulation has allowed teams to undertake training in their workplace, increasing opportunities to improve team resource management skills. In-situ exercises also allow for latent risks to be identified (2, 3). Additionally, in-situ simulation allows clinical teams to display that training is taken seriously. The public are aware there is an educational exercise in progress, and can often see the simulation unfolding, witnessing first-hand the commitment given to the exercise. A common reason given by healthcare professionals for non-participation with in-situ simulation exercises is that they are ‘too busy’, and ‘they have patients to see’. There are increasing numbers of in situ simulation exercises in healthcare environments, but as yet the opinions of the service users themselves have not been sought. A study is currently underway at Hull Royal Infirmary in the East of England focussing on parents, carers and other visitors to paediatric wards whilst in-situ simulation exercises are undertaken. The project is canvassing opinion from the public on team simulation training and their thoughts on the training occurring in-situ, questioning whether the location is appropriate or whether it is daunting. Of particular importance in
paediatrics. The study also aims to assess any perceived impact it has on patient care. A questionnaire is distributed prior to a session; the exercise takes place then responses collected.

Summary of work undertaken: This is a work in progress. The project is based on in situ simulation exercises in a variety of paediatric or neonatal clinical environments at Hull Royal Infirmary. Thus far feedback has been overwhelmingly positive, with responders feeling reassured by the training and pleased that it is taking place. Perhaps most importantly, no patient care compromise concerns have been voiced. Impact on practice

This project aims to demonstrate that service users believe that in situ simulation training is a valuable learning tool, and they are reassured that teams take training and patient safety seriously. It will show that the location of training does not cause concern for the public, and will also illustrate that in-situ exercises do not result in patient care compromise. When these things are brought together they can be used to encourage engagement in ward based simulation exercises to all healthcare professionals, which will promote participation and effective learning.

References:

OP 08-5 – Designing Effective Healthcare Systems: Simulation for a State-Wide Paediatric Resuscitation Form

Process improvement and organizational change

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Delivering reliable and consistent high quality care across a variety of healthcare services requires the creation of a system that positions safety as the ultimate priority1. This involves a process of testing, training, retraining, evaluating, modifying, and reassessing practices. In any Emergency Department (ED), effective paediatric resuscitation requires a team that works efficiently whilst being supported by existing processes and resources. The scribe is often the point of communication in resuscitation and essential to the recording of patient treatment. Therefore, the process of scribing requires efficiency within the design. Incorporating simulation into the design of a Paediatric Resuscitation Form is described. The aim being to enable healthcare teams to deliver highly reliable care in a consistent fashion across more than 200 Australian hospitals.

The construction of scenarios following patient admission through to disposition was designed in an attempt to probe for weaknesses in form design and highlight areas for improvement to promote useability. Three paediatric medical resuscitation scenarios were chosen to incorporate all areas of the proposed form. Scenarios were delivered in real time, thereby; creating a more realistic reconstruction of what would transpire to best inform the process of form design. Teams chosen to test the form consisted of a typical ED team from both a base hospital with a mixed paediatric and adult ED and a team consistent within a tertiary referral paediatric ED. Teams consisted of junior and senior medical, nursing and allied health staff. Following each scenario, an opportunity for discussion and feedback on the use of the form was provided using an informal style of debriefing. This created an objective and non-threatening environment, producing an open forum to share concerns and suggest solutions in a supportive setting.
Subsequent findings of such an exploratory simulation have resulted in changes to final form design, including the addition of columns to allow for the correct documentation and identification of participants and use of initials on verbal orders. The addition of the ‘read back, check and given’ columns of drug prescribing was seen as the most important new development of the scribe form as it allowed for clear, closed-loop communication within the team. Alteration in the layout of the form was further recommended to allow for a clear and sequential progression through the scribing process, in accordance with patient management.

The use of simulation in designing healthcare systems is limited. This approach emphasises that simulation is an effective method for the development of a well-designed healthcare form to be used effectively in the healthcare system it was created for. The final form design was found to be useable, promoting efficient work practices by use in a realistic simulated healthcare environment.

References:

OP 08-6 – Reporting Guidelines for Health Care Simulation Research: Extensions to CONSORT/ STROBE Statements

Process improvement and organizational change
Submission ID: IPSSW2016-1110

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Introduction: Simulation-based research is rapidly expanding but the quality of reporting needs improvement. For a reader to critically assess a study, the elements of the study need to be clearly reported. Our objective was to develop reporting guidelines for simulation-based research by creating extensions to the CONSORT (Consolidated Standards of Reporting Trials) and STROBE (Strengthening the Reporting of Observational Studies in Epidemiology) Statements.

Methods: An iterative multi-step consensus-building process was used based on the recommended steps for developing reporting guidelines. The consensus process involved: (1) Developing a steering committee; (2) Defining the scope of the reporting guidelines; (3) Identifying a consensus panel; (4) Generating a list of items for discussion via online pre-meeting survey; (5) Conducting a consensus meeting; and (6) Drafting reporting guidelines with an explanation and elaboration document.

Results: Eleven extensions were recommended for CONSORT: item 1 (title/abstract), item 2 (background), item 5 (interventions), item 6 (outcomes), item 11 (blinding), item 12 (statistical methods), item 15 (baseline data), item 17 (outcomes/estimation), item 20 (limitations), item 21 (generalizability), and item 25 (funding). Ten extensions were drafted for STROBE: item 1 (title/abstract), item 2 (background/rationale), item 7 (variables), item 8 (data sources/measurement), item 12 (statistical methods), item 14 (descriptive data), item 16 (main results), item 19 (limitations), item 21 (generalizability), and item 22 (funding). An elaboration document was created to provide examples and explanation for each extension.

Conclusions: We have developed extensions for the CONSORT and STROBE Statements that can help to improve the quality of reporting for simulation-based research.
*For the INSPIRE Network Reporting Guideline Working Group
OP 09-1 – Comparison of Two Teaching Methods of Umbilical Venous Catheterization, Via Simulation
Multimedia, e-learning and computer-based instruction
Submission ID: IPSSW2016-1124

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Objective: The objective was to compare two teaching methods, both simulating the installation of a UVC in case of emergency: in one, the demonstration was done by an instructor (standard method), in the other, the demonstration was made using a pedagogical film.

Equipment and methods: The exploratory study took place in a controlled setting: it was random and monocentric, and included 22 midwives students divided into two groups according to their learning method: “standard” or “film”. The teaching method was evaluated by filming the students while they were performing the technique on a mannequin, ten days after their instruction. Two physicians observed their performance and evaluated the students using a dimensional grid of ten points. The two physicians were independent of each other and were not previously informed as to the training (standard or film) that the students had received. The study hypothesized that the “film” method of instruction was not inferior to the “standard” method. The procedure was regarded as “learned” when the student achieved an average grade (among the two instructors) of ≥ 7.5 points out of 10.

Results: Of the 22 participants, ten received the “standard” instruction and twelve were taught by using the film. The average grade among the students who received the “standard” instruction was 7.8 ± 1.1 and that of the students who were trained using the film, 8.4 ± 0.7 (p=0.272). All of the students who were trained by use of the film learned the procedure, as compared to only 80% of the students who were trained according to the “standard” method.

Conclusion: Our study demonstrates the interest in using the “film” method of training for the insertion of an UVC in emergency situations.

References:

OP 09-2 – Save the Baby: Developing an Online Simulation Model to Practice Neonatal Resuscitation
Multimedia, e-learning and computer-based instruction
Submission ID: IPSSW2016-1083

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Background: The American Academy of Pediatrics (AAP) Neonatal Resuscitation Program (NRP) curriculum offers learners an evidence-based approach to resuscitation. The current requirements for obtaining an NRP card are obtaining a passing score on a multiple-choice test and subsequent simulation participation. Course participation is recommended every two years. Current issues with this approach are lack of learner preparedness to transition to the simulation component leading to increased time needed in the simulation environment. In addition, deterioration of NRP skills has been shown to occur as early as 3 months after a first NRP course.

Educational purpose: The NRP has worked with an educational technology partner to develop physiological models of term and preterm infants to allow learners to perform the steps in the NRP algorithm on virtual patients in real-time: NRP eSim. The purpose of this virtual learning environment is to reinforce the cognitive components of NRP particularly helping learners “put it all together” with the added elements of patient assessment and time pressure. Following each case, learners receive a comprehensive and time-stamped debriefing that provides an assessment of performance, reinforces what was done well, provides guidance for improvement. The debriefing section will also link directly to the NRP algorithm and directs students to the relevant sections of course materials for clarity.

Evaluation/ Approach to research: Extensive validation testing continues to insure the final NRP eSims, which will be available in Spring 2016, match NRP resuscitation recommendations and meet the NRP learning objectives. Research studies are being designed to determine the impact of NRP eSim on learning, skill retention over time, and clinical performance.

Goals: It is hoped that the eSims will excite learners, extend and crystalize learning, and, ultimately, improve preparedness and performance in hands-on team simulations and actual clinical practice.

Discussion: The NRP eSims will be a mandatory course component and can be accessed an indefinite number of times within a learner’s renewal period. The long-term goal is for eSims to serve as the basis for an episodic approach to future NRP education, and help to reduce knowledge and skill decay. NRP eSims are a collaboration between the AAP and Laerdal Medical.

OP 09-3 – NRP Prompt: A Randomized Controlled Trial of a Mobile App for Neonatal Resuscitation Training
Multimedia, e-learning and computer-based instruction
Submission ID: IPSSW2016-1199

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**Background:** It has been well recognized that there is poor adherence to the Neonatal Resuscitation Program (NRP) algorithm by all levels of providers in both simulated and clinical settings (1-4). While audio-visual prompting improves adherence in adult cardiopulmonary resuscitation (5-11), visual prompting alone has been ineffective in improving NRP compliance (12). For this study, an iOS mobile application, NRP Prompt, was designed to provide audio-visual prompts based on user responses at decision points in the NRP algorithm.

**Research question:** Does NRP Prompt improve the adherence of novice NRP providers to the NRP algorithm compared to visual-only prompting in simulated neonatal resuscitation?

**Methodology:** This was a randomized-controlled trial of first year residents in Family Medicine and Obstetrics/Gynecology at the University of Toronto, Canada attending NRP training. NRP Prompt in addition to standard visual aids during two neonatal resuscitation simulations, where each resident took turns as team leader. Resident pairs used either NRP Prompt or standard visual aids only during two low-fidelity neonatal resuscitation simulations. The same pair was then evaluated in a third simulated scenario that was video recorded, where neither group used NRP Prompt or standard visual aids.

**Outcome measures:** The primary outcome was the comparison of median checklist score in the NRP Prompt group versus control. Two independent NRP providers evaluated the video recorded performance of each pair using a validated NRP checklist (13). Secondary outcomes were comparison of time to positive pressure ventilation (PPV), time to commencement of chest compressions and time to intubation.

**Statistical analysis:** Inter-observer variability was determined using a two-way mixed-effects intra-class correlation coefficient (ICC). Median NRP scores and time to interventions were compared between intervention and control groups using the Wilcoxon ranked-sum test.

**Results:** 39 residents participated in the study. 8 pairs participated in the intervention group and 7 pairs (and one group of three) in the control group. The ICC was 0.69, indicating good agreement between raters, and so the average of scores were used. Median NRP scores were not significantly different in intervention 21 (interquartile range (IQR): 1.5) vs. control 21 (IQR: 1.5), p = 0.89. Median time (in seconds) did not differ for time to PPV (intervention 60.5 (IQR: 19.5) vs. control 48 (IQR: 13.5) p=0.12), chest compressions (202.5 (IQR: 54) vs. 216 (IQR 71) p=0.69), and intubation (234 (IQR: 145) vs. 264 (IQR: 94.5) p=0.25).

**Discussion/ Conclusions:** Training using NRP Prompt did not improve performance in simulated neonatal resuscitation. Potential reasons include: voice prompts being distracting and smaller than hypothesized effect size. Future development of prompting apps should have options for different degrees of prompting tailored to user preferences.
Introduction: Environmental factors may introduce safety risks for patients and providers. Simulation has been used to test existing healthcare facilities to identify latent safety threats, equipment issues, and orientation gaps. However, remediation post-construction is often costly leading to suboptimal “workarounds.” Boston Children’s Hospital is in the early phases of constructing 2 new clinical towers. To optimize form-function and ensure creation of safe, efficient, and patient-centered spaces, simulation is being used at multiple process points from pre-design through occupation. Phase I of this project used simulation to optimize fundamental features of building design, such as room size and door position, to be used in detailed architectural design drawings.
Methods: Architects and key clinician stakeholders from 11 separate clinical spaces (inpatient, ambulatory, ICUs, ORs, etc.) worked together to identify key design testing priorities related to elements of room design that dictate overall space planning for the building (room size) or would impact adjacent spaces (door positioning, bathroom size and positioning). Life-sized room reproductions were constructed from cardboard, where highly realistic simulation scenarios among native teams addressed design questions. Front line clinicians participated in simulations to evaluate elements of the room related to testing objectives. A dynamic debriefing format was used, in which the design team moved cardboard walls to reconfigure rooms based on initial simulation findings, allowing teams to immediately re-test the updated designs.

Results: 167 clinicians and design team members participated in simulation and debriefing in 11 clinical areas. These exercises identified that initial room size was inadequate in 4/11 areas. Rooms were immediately enlarged and re-tested to determine optimal size. Other major design elements that changed based on these exercises included the size and position of patient bathrooms within inpatient rooms, position of operating room doors, and elimination of separate patient and provider entries into ambulatory clinic rooms. Teams also identified areas for further evaluation, including the need for computer modeling of clinic patient and provider flow.

Discussion: On our urban healthcare campus space for new construction is tightly constrained, leading to tension between total possible number versus individual size of patient rooms. Highly relevant simulation allowed us to identify optimal size and configurations of rooms for safe care across 11 clinical areas. Identification of these priorities early in process, particularly before architectural drawings are complete, stands to provide significant time as well as cost saving and avoidance opportunities. Additional simulation-based testing throughout the design process will address patient and staff safety related to details of room design and readiness for building occupation.

OP 09-5 – Simulation Based Training to Inform Safe and Effective Work Practices for a Paediatric Ebola Centre Process improvement and organizational change
Submission ID: IPSSW2016-1139

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Following the 2014 outbreak, the risk of highly infectious (HI) viral haemorrhagic fever (VHF) spreading outside African borders became a genuine threat. As the nominated state-wide paediatric centre for New South Wales, the Children’s Hospital at Westmead (CHW) began to design and operationalise personal protective equipment (PPE), and safe processes of care for management of HI children. Given the HI nature of the disease, the unsuitability of some adult guidelines, and the lack of experience in caring for children with VHF, it was imperative to ensure staff and patients would be safe during their time in hospital. Many of the proposed processes of care were unpractised and untested due to inexperience with VHF. It was aimed to utilise simulation based training to test and inform the use of new equipment and novel care process, identify latent errors and enable appropriate risk management within the organization.

A group of recognised experts in infectious diseases and emergency and intensive care produced a detailed guideline for the management of children with VHF. Elements of the guideline were then developed into specific standard work practice (SWP) documents. Simulated events were then designed and undertaken with the dual purpose of training CHW staff and field-testing to informing the SWP documents. Specific SWP documents for VHF tested included the communication cascade upon identification of suspected cases, safe transfer of suspected patients to the HI diseases unit, safe use of PPE including the detailed sequence for donning and doffing, initial patient evaluation and treatment procedures, and safe transfer of biological specimens. Key aims common to all simulated events included the identification of enhanced processes of care for the maintenance of patient and staff safety, minimization and containment of contamination risk, and modification of practices and equipment necessary for the delivery of high quality clinical care. In addition to traditional video recording, first-person video utilising Go-Pro® technology captured the patient perspective during the simulated events.

Over 90 health care staff from nursing, medical, executive, domestic services and communications participated in three simulated events designed to train staff and inform further development of 9 SWP documents. Simulated scenarios demonstrated effective teamwork, communication and spill containment procedures and informed all SWP documents being tested. Serious barriers to safe and effective patient
transfers were identified and major alterations in guidelines initiated. Innovative use of first person video capture provided valuable insights and allowed modification of SWP documents to better meet the specific needs of the child. Interdisciplinary, hospital-wide simulation based training was successfully used to train staff in novel equipment and modified care processes and helped to inform safe, high quality patient care for children with suspected VHF.

OP 09-6 – Objective Assessment of Patient Safety Risks and Mitigating Strategies using StudioCode Heat Maps

*Process Improvement and organizational change*

Submission ID: IPSSW2016-1249

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Health environments are complex, varied and lack a standard design. Multiple caregivers of variable experience are involved in numerous and overlapping tasks. Any changes to familiar healthcare processes, equipment and environments have the potential to impact adversely on patient safety, including infection control.

The Children’s Hospital at Westmead is a pilot paediatric location for the introduction of Electronic Medication Management (eMM). Together with the project management team, simulated training opportunities were created to optimize the process of medication administration and maintenance of appropriate hand hygiene, whilst using the new system and associated equipment during medication administration.

eMM sees the introduction of a portable computer into the caregiver workflow, creating a new zone of infection risk as the non-sterile device moves in and out of patient zones. This creates a new dynamic interaction between caregiver, equipment and patient.

Hand Hygiene has long been identified as an area of risk requiring mandatory training and promotion campaigns to mitigate the risk of Health Care Associated Infections. In 2010 NSW health established an awareness program in alignment with the World Health Organization guidelines called “Five Moments for Hand Hygiene”

Numerous video recordings were made documenting the process of medication administration using the eMM in diverse simulated and real healthcare settings. Videos were categorized on the basis of environment, equipment and co-location of hand hygiene devices, then analysed using a code window developed in StudioCode to identify healthcare movements related to entry and exit from the patient zone.

By utilizing a heat map designed in StudioCode, we were able to describe the effect of introduction of the eMM on 2 crucial moments of hand hygiene: Before entering the patient zone, and on exiting the patient zone.

Heat map diagrams were able to assess how the effect of presence and location of hand hygiene products within reach of caregivers in the entry and exit zones altered the uptake of hand hygiene opportunities and compliance with hand hygiene policy, whilst utilizing the new equipment and processes.

Mapping offers the opportunity to better understand summated behaviours of multiple individuals in changed clinical environments.

By documenting the presence and location of equipment that may stimulate appropriate hand hygiene behaviours, we plan to utilize this technology to better understand and evaluate the impact of introduction of the eMM on hand hygiene and patient safety, particularly infection control.

References:  
1. NSW Health Hand Hygiene policy

PO 01-1 – Improving Competency-Based Assessment Rubrics for Team-Based Simulations Using Learner Participation

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

Submission ID: IPSSW2016-1071
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**Context:** Simulation has long been recognized as a powerful teaching tool for communication, teamwork skills, and clinical skills. However, there are challenges in developing high quality assessment tools. Many existing rubrics for assessing clinical skills do not take into account the importance of communication in a simulation scenario. Additionally, rubrics often focus on a single learner, but do not adequately take into account the teamwork aspect of simulation.

We created a series of assessment tools using the the observations of peers and reflections of learners (1) to compare with trained pediatric simulation experts to determine the best overall tool for assessing groups of learners and the individuals within those groups.(2) This information was then used to give meaningful formative feedback to the learners.

**Description:** This set of three complementary assessment tools builds on the strength of a previously implemented rotational model of simulation.(3) In this model used in one program’s two year pediatric focused curriculum, learners are assessed three times. First, learners are assessed by a group of their peers watching the scenario live on a video feed. Second, learners are assessed by a trained simulation expert observing their actions live. Third, learners complete a self assessment tool, reflecting on their own performance.

The tools are complementary in that the questions asked of the peers, learners, and expert grader are either the same or directly address the same learning objective. Each question is tied to a competency, allowing for comparison to other questions addressing the same competency. The linking to competencies and use of three different tools developed to assess the same simulation provide evidence to validate the tools. These updated tools can then be used to establish the efficacy of the model.

**Observation/ Evaluation:** Data collected from 12 days of simulations, conducted over the course of a year, provides three different perspectives the same event. By comparing the results, (of these three tools that were designed to complement each other), evidence is gained regarding the validity of individual questions, as well as informing the process for refining these tools for future use. These assessments are an important part of simulation instruction. Future evaluation will include focus group interviews to help improve the three tools, and to determine which aspects learners find most useful for enhancing their learning through these pediatric simulations.

**References:**

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**PO 01-2 – Performance of Resident Teams during Simulated Pediatric Resuscitation Scenarios**

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

**Submission ID:** IPSSW2016-1118

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**Background:** In simulated pediatric resuscitations, resident physicians do not meet performance standards set by the American Heart Association (Hunt 2009). How differences in resident training (specialty, previous resuscitation training, etc.) affect performance in team-based resuscitation is unclear. Comparisons of pediatric versus emergency medicine resident performance in high-fidelity pediatric resuscitation simulations have not been previously reported.
**Objective:** To compare the performance of teams led by pediatric or emergency medicine residents in terms of team performance, team leader performance, and time to critical interventions (chest compressions, epinephrine, and defibrillation). Secondary objectives included comparing teams led by either a junior (PGY-2) or senior resident (PGY-3 and PGY-4), and examining the effect of length of time since last Pediatric Advanced Life Support (PALS) training on performance.

**Methods:** Pediatric and emergency medicine residents on a pediatric emergency rotation at a tertiary-care children's hospital participated in simulation-based resuscitation education. Teams of 3-6 residents were assigned to one day of simulation training during their rotation. Residents volunteered to be team leaders. The test simulation was done prior to any education and involved resuscitation of a child in cardiac arrest with ventricular fibrillation. Blinded video reviewers recorded time from entry into the room to first compression, defibrillation, and epinephrine dose. Video reviewers also scored team performance using the validated Simulation Team Assessment Tool (STAT) (Reid 2012) and team leader performance using a resident team leader evaluation tool for simulated resuscitations (RTLE) (Grant 2012). Student’s t-test was used to compare times and scores between groups.

**Results:** Time to first compression averaged 40.3 s and 36.8 s for teams led by pediatric residents (n=13) and emergency medicine (n=16) respectively (p = 0.23). Mean time to first shock was 250 s for pediatric residents and 261 s for emergency medicine (p = 0.86). Time to first epinephrine was also similar at 308 s and 307 s (p=0.57). Training year and time since last PALS certification did not affect critical intervention times. Similarly, there was no difference in STAT or RTLE scores between teams led by pediatric or emergency medicine residents, junior or senior residents, or residents with PALS training more or less than 1 year ago.

**Discussion:** There was no significant difference in simulated pediatric resuscitation performance between teams led by pediatric vs. emergency medicine residents at a single tertiary care children’s hospital. As in previous studies, there was no significant difference between teams led by more senior residents and those with more recent PALS training (Bhanji 2015).

**References:**

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**PO 01-3 – Evaluating Organizational Cultural Readiness to Advance Simulation-based Learning Assessment (Including use and validation of measurement and assessment tools)**

**Submission ID:** IPSSW2016-1127

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**Context:** The use of simulation in pediatric healthcare education and clinical practice has grown dramatically over the past several years, however, there continues to be widespread reports of organizations that have acquired simulator equipment only to have it remain unused. There are many theories about why this happens but overall, a failure to ensure organizational readiness is often the root cause.
Inadequate communication about expectations and plans, as well as disagreement about how simulation-based education (SBE) fits into the mission, vision, and values of the organization lead to this problem. The presenters conducted a literature review to determine how best to help organizations evaluate cultural readiness in hopes of improving utilization of the teaching strategy to help foster successful outcomes for students and clinicians.

Description: The Organizational Culture and Readiness for System-wide Integration of Evidence-based Practice Survey® (Fineout-Overholt & Melnyk, 2014) and the TeamSTEPPS Readiness Assessment (AHRQ, 2015) were adapted to create a tool to examine readiness to integrate SBE. The Simulation Culture Organizational Readiness Survey (SCORS) was evaluated for content validity by an expert panel of simulationists. The SCORS has four subscales: 1) Defining need for change (8 items); 2) Readiness for culture change (9 items); 3) Time, personnel, and resource readiness (4 items); and 4) Sustainable education development to embed culture (2 items). Scoring guidelines provide a method to interpret overall and individual item scores. A guidebook provides information to help the participant best respond to each item.

Observation/Evaluation: Colleagues are encouraged to collaborate with leadership to complete the SCORS, to improve overall communication and work toward better understanding of the organization’s readiness for change. Review of key documents and thoughtful discussion will help position the organization to develop strategic plans toward SBE integration. The overall survey score provides a measure of readiness, while individual item scores lend focus to opportunities for improvement.

Discussion: An organization, and its culture, must be supportive of change, with the understanding that integration of SBE requires significant and sustained communication, planning, and commitment. The SCORS can be used by organizations, in conjunction with change management principles (Kotter, 2015) and consideration of critical success factors (Garcia & Guisado, 2013; Issenberg, 2005), to enhance likelihood of successful simulation program development. This presentation is designed to help the audience understand why it is vital to address organizational culture, readiness for change, and ability to support change prior to integrating SBE.

References:
The decision-making skills of trainees vary and there is no clear method of teaching or measuring these skills\textsuperscript{3,4,5}. To date, there are no studies investigating the development of clinical prioritization and it is unknown if prioritization skills of trainees improve with clinical experience\textsuperscript{6,7,8}.

**Research question:** The primary research question of this study is whether prioritization skills differ in neonatology fellowship trainees compared to academic attending neonologists. The secondary research question is whether prioritization skills of neonatology trainees differ when tested in a time-unlimited setting versus a time-limited setting. We hypothesize that the prioritization skills of neonatology trainees will not be at the same level of the “expert” attending neonatologists and that these skills with improve with clinical experience.

**Methodology:** Six 8-item surveys of common NICU scenarios were developed. Twenty academic neonatologists (experts) determined the prioritization order of the scenarios via a Delphi method. Two surveys were sent to neonatology trainees nationally. Surveys were divided into priority tertiles based on “expert” rank. The rankings of the 1st-tertile scenarios were summed. Scores ranged from 6 (expert) to 21. Mean scores analyzed by 2-sided t-test and ANOVA assessed differences in prioritization between fellows and the “experts.”

A multi-patient simulation was created to simulate a NICU experience. Fellows were instructed to assess the patients in the order of perceived importance. The simulation was followed by completion of a survey of prioritization rankings. Fellows received a 1st-tertile score in the simulation and in a post-simulation survey. Mean scores were analyzed by a 2-sided t-test followed by ANOVA.

**Results:** In a time-unlimited environment, there was a significant difference in 1st tertile scores among all years of training compared to experts (p<0.05). There was no difference between fellowship years and no evidence of improvement in scores with increased experience. In a time-limited environment, there was a significant difference in scores among some years of training compared to the experts.

**Discussion/ Conclusions:** Prioritization skills of neonatology fellows do not reach an “expert” level in a time-unlimited or time-limited environment. These findings may be due to clinical knowledge, clinical decision-making or prioritization experience of fellows. The gap in prioritization skills suggests that neonatology fellowship education should include dedicated teaching of prioritization and clinical decision-making skills and multi-patient simulation is one modality for this type of education.

**References:**


PO 01-5 – Validating a Neonatal Emergency Team (NET) Assessment Tool
Assessment (including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1034

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The importance of inter-professional teams working together1 has been discussed extensively, yet it is still recognised that there is a lack of basic education and development of effective team working skills. These human factors are known to be responsible for the majority of healthcare errors and patient harm events. Such effective multi-professional team working is particularly important in high stress emergency events where critical decisions are made.

To assess team behaviours in an objective valid manner with high degree of rater-rater reliability, a suitable multi-professional contextualised assessment tool is required. Such tools have been developed for both multi-professional and uni-speciality teams: Anaesthetic Non-Technical Skills (ANTs)2, Objective Skills-based Clinical Assessment tool for Resuscitation (OSCAR)3, Observational Teamwork Assessment for Surgery (OTAS)4 and NOn-TEChnical skills (NOTECHs)5.

OSCAR was developed for use in the simulated adult cardiac arrest, consisting of anaesthetists, physicians and nurses. These professional groups are recognised as subgroups, one of the unique strengths of OSCAR, with differing roles, expectations and skills. The tool is further enhanced by using exemplars of critically important behaviours for each sub-team: communication, co-operation, co-ordination, leadership, monitoring and decision making.

The aim of our project is to develop a tool similar to OSCAR for the multi-professional team responding to neonatal emergencies – paediatrician, neonatal nurse and midwife. Stage one of our project involved three Delphi expert groups to determine the critical tasks required for the effective response of these subgroups in a neonatal emergency.

The next stage of our project is to assess its internal consistency, rater-rater and test-retest reliability, using simulated videoed neonatal emergency team events. Twelve simulated neonatal emergency simulations will be recorded, collected from an advanced neonatal education course where candidates respond to specified scenarios. The courses, run in dedicated simulation centres, will contain candidates from the three professional groups who will be expected to respond as they would in clinical practice. The scenarios are either set in a delivery or neonatal unit. These videos will be retrospectively blind rated by senior staff who have a high degree of knowledge around human factors, and will use the critical tasks highlighted by the Delphi group when rating the performance of the participants. The raters will be required to sign a confidentiality agreement.

Once the tool is validated, it will:
- Be a robust objective assessment tool for debriefing simulated sessions
- Be a resource to develop objective assessment skills in more junior faculty
- Allow higher levels of evaluation of education initiatives
- Allow further research on optimum learning methods and practices
- Provide a tool to allow feedback and team development in actual emergencies

References:

PO 01-6 – Videography In Pediatric Emergency Resuscitation: Simulation to Assess Feasibility and Reliability Assessment (Including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1077

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Background: Evaluating pediatric emergency department (ED) resuscitative care is challenging. Single site studies have limited power and generalizability, while chart review and self-report have limited reliability. We developed the Videography In Pediatric Emergency Resuscitation (VIPER) Collaborative to address these limitations through a multicenter, video-based registry of pediatric ED resuscitations.

Research question: As a first step, we sought to conduct feasibility and reliability testing of the data collection process.

Methods: We conducted a prospective, observational study of video-recorded, simulated pediatric resuscitations in one pediatric ED. IRB approval was obtained prior to commencement. All three participating sites have video review quality improvement programs; resuscitation rooms have digital cameras/microphones. Videos, including patient monitor, are available for review using a proprietary software program (BLine). Simulated resuscitations were scripted cases involving cardiopulmonary compromise or arrest, using Laerdal SimBaby and SimMan. Pediatric residents were the care providers for the simulations, as part of their ongoing medical education. The study database/form were developed through an iterative process, using review of simulated medical emergencies (not included in current study) and group discussion. Three investigators (BK, KO, AD) independently collected all data from four categories: monitor placement / vital signs, primary survey, basic interventions, and tracheal intubation. For data collection feasibility, we calculated the frequency of missing/indeterminate data. For reliability between investigators, we used calculated Cohen’s kappa for dichotomous data and intra-class correlation coefficients for continuous, time-based data (two-way random effects model, with 95% CI).

Results: Five simulated pediatric resuscitations were reviewed. Data was indeterminate for 26 of 534 (5%) total data fields (178 per resuscitation x 3 reviewers). For recorded data, the overall Cohen’s kappa was 0.83 for dichotomous elements. Overall kappa for the four data categories was: 0.93 for monitor/vitals, 0.48 for primary survey, 0.84 for basic interventions, and 0.96 for tracheal intubation. For time-based data elements, overall intra-class correlation coefficient was 0.99 (95% CI 0.98-0.99).

Conclusions: Collection of detailed data from videos of resuscitation events was feasible. Except for the primary survey, the reliability of data collection was excellent for both dichotomous and continuous data. Next steps include refining the primary survey data elements through retraining and adding data elements for cardiopulmonary resuscitation and teamwork/communication. Our long-term goal is to validate the database for actual patients, creating opportunities to conduct robust research on rare pediatric resuscitation events and evaluate needed interventions to improve care and outcomes for this vulnerable population.
PO 01.7 – Measuring Teamwork during Simulated Pediatric Resuscitations: An Assessment of Existing Tools
Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1206
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Background: In a pediatric emergency department (PED), medical resuscitation teams are ad hoc and interdisciplinary, and deploy for potentially critically ill children. Effective resuscitation team performance is determined by both technical and nontechnical skills. Nontechnical skills focus on key principles of crisis resource management (CRM): leadership, followership, teamwork, communication, human, and material resource utilization, and situational awareness.

Purpose: To evaluate the psychometrics of four published CRM assessment tools during simulated pediatric resuscitations in order to select an optimal tool for use in real patients in a pediatric resuscitation collaborative.

Methods: Prospective, observational study of video-recorded, simulated pediatric resuscitations performed by pediatric residents participating in an IRB-approved educational intervention. Four validated tools were used to evaluate team performance: (1) TEAM (Team Emergency Assessment Measure); (2) NOTECHS (Nontechnical skills scale for trauma); (3) BAT (Behavioral Assessment Tool); and (4) CATS (Communication and Teamwork Skills). Nine reviewers each independently viewed a sample of 4 of 8 resuscitation sessions before (pre) and after (post) a debriefing intervention. Post scenarios were expected to receive higher scores. The CRM tools and order of use were randomized and distributed among reviewers. Univariate comparison of means was conducted to evaluate variation among raters within tools and included type of case (e.g., cardiac arrest, respiratory failure), order in which the tool was used, individual items being measured, and case timing related to debriefing (pre vs post). Exploratory generalizability analysis was conducted to evaluate the relationships between rater, scenario, and item.

Results: In simulated scenarios all tools allowed for reasonably valid evaluation of team performance, however, CATS had the least variability in scoring, making it less likely to allow for finely graded performance evaluation. The pre-post differences were significant for all forms (p < .02 or less), showing higher scores for the post-debriefing scenarios. Exploratory generalizability analyses with a Rater x Scenario x Item design showed the majority of observed variance attributable to the scenario as planned except for CATS. The proportion of variance for scenario ranged from 56% for BAT to 14% for CATS. The CATS form produced the least clear results with a substantial proportion of the variance related to items (15%), the Rater x Item interaction (16%) and the Scenario by Rater interaction (11%). Overall the BAT form showed the least impact of rater variance either alone or in interactions.

Conclusions: All four tools showed evidence of construct validity in discriminating pre- and post-debriefing performance and minimal variance ascribable to Rater compared to Scenario. Future analyses will examine variability when tools are applied actual patient resuscitations.

References:


PO 02-1 – Evaluation of Short-Term Retention with Simulation after Paediatric Advanced Life Support Assessment (including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1219

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Introduction: Effective management of emergency critical situations in pre-hospital setting by healthcare providers working in 112 Ambulance Service as first responders has a vital importance, since it is directly associated with mortality and morbidity rates’ of these patients. From these situations pediatric resuscitation events are relatively rare (1). Paediatric Advanced Life Support (PALS) training is one of the mandatory module training for 112 Ambulance personnel prepared by Ministry Health of Turkey.

Objectives: This study aims to evaluate knowledge and resuscitation skills retention of emergency medical technicians (EMTs) 4 months following of PALS course. Also the factors can have an effect on retention aimed to be evaluated.

Methodology: The PALS course included lecture, skill training, practice with task trainers and scenario based practical training. After 4 months all participants were evaluated with two cardiac arrest simulation scenarios for assessing short term retention of PALS training. Resuscitation skills were assessed with a check list made according to the 2010 PALS algorithm. Participants knowledge was evaluated with multiple choice questionnaire (MCQ) before PALS training (MCQ1), at the end of PALS training (MCQ2) and during retention evaluation (MCQ2). A survey was conducted consisted of practising years as an EMT, frequency of their arrest patients for a month and thoughts about simulation as a teaching and assessment tool.

Results: Sixty EMTs working as a crew member in 112 Ambulance Service participated in this study. Fifty eight % of the participants performed all steps of the resuscitation algorithm correctly. Others were failed to apply effective cardiac compression and/or manage the airway and/or giving the proper drugs/doses. Correct answer percentage was 16,9% MCQ1, 80,8% MCQ2 and 65,6% MCQ3. Seventy six percent of the participants with higher SE score were experienced 2-5 years (compared with experienced < 2 years) and 18% of them having 10-15 arrest patients (compared to <10 arrest patients) per month. All participants believed of the usefulness of simulation for enhancing their knowledge and skills. Participants with less years of clinical experience were more likely to be willing to participate a remedial training at least 6 months frequency.

Conclusion: The results of this study showed that; knowledge and skill retention after PALS course achieved almost in 2/3 of the participants in a satisfactory ratio. Being more experienced than 2 years and having more than 10 arrest patients in a month seem to have a positive effect on this short-term retention.

PO 02-2 – Validated Scoring of Pediatric Resuscitation Team Performance in High-Fidelity Simulations
Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1131

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Background: Medical simulation in healthcare education has seen growth in the past few decades within pediatrics. However, the use of a validated assessment tool to track the performance of pediatric residents
in high fidelity code simulations over the course of a pediatric residency has not yet been described in the literature. The Simulation Team Assessment Tool (STAT) provides a scoring scheme that may help to collect such data.

Learning objectives:
- To determine whether or not the STAT is a reliable tool for evaluation of simulations over a three-year period.
- To identify the effect of nursing presence and number of senior residents on team performance.
- To implement an intervention in the form of a scripted “ideal code” video and assess its effectiveness on team performance.

Methods: The study analyzed a total of 64 pediatric mock code videos encompassing 7 different clinical scenarios from 2010 to 2014 at a University Hospital. Each video was reviewed by 2 of 3 designated reviewers using the STAT. Reviewers were trained to ensure scoring standardization and inter-operator reliability was checked midway through the study. Scores were compiled and analyzed for change over time.

The intervention is a video demonstrating examples of poor team performance in a code scenario followed by “ideal” performance in the same scenario, utilizing principles of Crisis Resource Management. This video has been made available to pediatric simulation teams prior to their participation in a mock code.

Following inception of the interventional video, the STAT will be used again to score simulation team performance.

Results: Preliminary data shows consistency of scoring with STAT over a three-year period. No statistical significance was noted in scores of all subcategories of the STAT or the overall score though a trend towards improvement was noted over time (Graph 1).

Data showed an increase in overall average scores with nursing presence in simulations compared to those simulations without nursing presence.

The total number of senior residents in videos ranged from 0 to 5. As the number of senior residents on the team increased, improvement was noted in every scoring subsection with the exception of airway and breathing (Graph 2). Scores following inception of the interventional video are currently being collected and analysis is to be performed upon completion of data collection.

Discussion: The STAT provides a reliable method of assessing team performance in simulated pediatric codes. We hypothesize that demonstrating and contrasting poor and good team performance via videos will improve performance as scored by the STAT scheme.

Image:
References:

PO 02-3 – Critical Event Checklists Improve Medical Management/Teammwork in Paediatric Operating Room Crises

Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1163

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Background: Crises in the operating room (OR) during a paediatric case are fortunately rare as techniques and practices become safer. Data suggests that the incidence of cardiac arrests in non-cardiac patients is 2.7 in 10 0001. This rarity means that increasingly few anaesthesiologists can claim personal experience of the full range of potential OR emergencies. Furthermore, we know that the retention of advanced life support knowledge diminishes significantly within six months post-certification2. In order to address these issues, the Society for Paediatric Anaesthesia has developed cognitive aids in the form of Critical Event Checklists (CECs). Several studies have demonstrated the benefit of cognitive aids in improving adherence to guidelines, performing critical tasks in crisis situations and in Anaesthetists Non-Technical Skills3-10. However, despite the presence of cognitive aids, individuals often do not use the cognitive aids or do not use them correctly11-16. The minimal or incorrect use of cognitive aids in simulated crises can potentially be attributed to unfamiliarity and lack of education to the checklists. The goal of this study is to enhance the performance of anaesthesia trainees through cognitive aids (SPA CECs). Through the application of SPA CEC’s and orientation to these CEC’s via an e-module, our goal is to augment the performance of anaesthesia trainees such that they manage perioperative emergency situations as would someone of a higher level of experience. In order to test this, we will be using the Managing Emergencies in Paediatric Anaesthesia (MEPA) course in a simulated OR setting.

Research question(s):
- Do cognitive aids in the form of the SPA CECs enhance resident performance as demonstrated by their scores on the MEPA simulations?
- Does the mode of orientation of residents to the SPA CECs (didactic vs. e-module) increase the uptake and effectiveness for the CEC?

Proposed approach/methods:
In this work in progress, we are using a randomized, 2 x 2 factorial design, with an acknowledged probability of interaction and interest in the combination intervention as well as individual interventions. Subjects will be randomized twice. At a set point prior to their simulation experience the subjects will be randomized to receive CEC orientation A or B (e-module or didactic). Next, at the time of their simulation they will be randomized to participate in their scenario either with or without the CEC available. After randomization, participants will complete a pre-test demographic questionnaire. They will then complete four simulation scenarios from the MEPA course database. The simulations will be videotaped and rated by a Paediatric Anaesthesiologist unfamiliar with the trainee. Preliminary results will be available at time of IPSSW2016.

Difficulties/Questions for discussion:
- What type of emergencies in Paediatric Anaesthesia benefit from the use of a SPA CEC?
In what situations might the SPA CEC hinder the performance of the trainee?

References:

PO 02-4 – Variability in Teamwork Rating Between Health Care Providers in the PICU
Crisis Resource Management/Human factors and Teamwork
Submission ID: IPSSW2016-1009

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Background: Literature suggests that poor team work, and in particular poor communication, leads to increased medical errors and adverse events. Most health care professionals never receive formal training
in non technical skills such as communication and teamwork. Despite the proximity in which team members must work together, perceptions of team dynamics likely vary amongst health care professionals.

**Objective:** The purpose of this study is to evaluate variability in how multidisciplinary team members rate team performance during emergency events using a validated assessment tool. Hypothesis: We hypothesize that the perception of teamwork during emergency events varies between healthcare professions and that physicians are the most critical.

**Methods:** A validated tool was used to assess areas of team dynamics. Immediately following an emergency event within the PICU resuscitation team members including charge nurse, bedside nurse, recorder, respiratory therapist (RT), PICU fellow and PICU attending, rated the team’s performance. The assessment was based on a 10 point Likert scale with 0 being unacceptable and 10 being perfect. The tool delineated 5 conceptual categories; communication, situational awareness, decision making, and role responsibility. Each individual concept is associated with an anchoring descriptor. PICU staff was not trained in the teamwork concepts prior to using the tool.

**Results:** A total of 13 events and 41 assessments were completed by 8 RTs, 14 MDs, and 19 nurses. Initial aggregate analysis of survey data showed there was a significant difference in the overall teamwork rating between different health professionals ($P=0.045$). There was also a significant difference between the overall score (average of individual items, $P=0.046$). The mean score for the overall teamwork rating was 6.2 for MDs, 7.3 for RTs, and 7.7 for nurses. This indicates that MDs are more critical in their performance rating compared to nursing staff and RTs. RTs are more critical than nurses but less critical than MDs. Individual teamwork components with significant rating differences among the providers included: use of SBAR ($P=0.020$), resource utilization ($P=0.031$), and prioritization ($P=0.029$). The overall teamwork rating (mean 7.2) is comparable to the average of the individual components of team performance (mean 7.1). Components with the lowest performance rating (mean score<7) included: overall communication (mean 6.6), use of SBAR (mean 6.4), transparent thinking (mean 6.7), directed communication (mean 6.6), closed loop communication (mean 6.2), and role clarity (mean 6.7).

**Conclusion:** This study demonstrated that there is variability in the perceptions of teamwork between providers following real critical events in the PICU. Study results also highlight areas for improvement. Future project goals include implementation of simulation training to teach non technical teamwork skills followed by re-evaluation of team performance during real events.

**Image:**

![Table 1. Aggregate Teamwork Scores by Nurses, MDs, and RTs.](image)
References:


PO 02-5 – Promoting Professional Development Through Nursing Education and Collaboration

Crisis Resource Management/Human factors and Teamwork

Submission ID: IPSSW2016-1055

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Over the past several years there has been an increased number of nurse practitioners (NP’s) hired to support inpatient nursing care resulting in several care services moving to a 24/7 model of NP coverage. The hospital and its governing bodies delineate patient deterioration management to be under the scope of NP practice. However, educational preparation for NP’s often is limited regarding the role of NP’s in patient deterioration. Additionally, over 45% of NP’s hired had less than 5 years of experience as an NP. In March of 2015 an educational needs assessment administered to both non-ICU inpatient nurses and NPs identified the need for a collaborative educational simulation specifically around the role of event manager. Nurse educators from in patient units and central clinical education collaborated with the hospital simulation program to develop a hospital wide inpatient simulation curriculum aimed at emphasizing the role of the NP in a patient deterioration situation. Through this simulation curriculum, which highlights the importance of
the first five minutes, NP's are provided with opportunity to practice decision-making skills, clinical assessment, teamwork and communication. NPs and nurses provided feedback which included an increased understanding of the scope of practice related to the NP role in managing patient deterioration. Additionally, NP’s felt an increased comfort level with speaking up in an event or being an event manager and in managing patient deterioration by having clearer role assignment and identification. Participants also felt that the simulation experience increased their overall comfort level with communication between team members and as a result is a valued aspect of managing patient deterioration.

References:

**PO 02-6 – Development of a Mobile Simulation Teaching Aid for iOS Devices**
Submission ID: IPSSW2016-LS-06

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**Context:** Simulation is being used to teach multi professional teams in a range of environments. A bank of scenarios is being created by Wessex trainees and consultants through an active simulation collaboration (STRIPES). Moving simulation from the controlled sim suite to a range of settings including the ward and prehospital environment presents a challenge for educators who need the scenarios at their fingertips to facilitate effectively. We present a mobile solution.

**Description:** Using Xcode and Swift for iOS, we have developed a mobile app for iOS devices which will be available on the Apple App Store. The app contains a range of paediatric simulation scenarios in a user friendly interface and includes media such as videos, images and sounds. These can be used by healthcare professionals and educators to facilitate simulations in any environment. The scenarios are being developed by Wessex trainees and consultants using the standard NHS England template.

**Observation:** The app has been tested by educators in the region with an interest in paediatric simulation. We have adapted the app according to feedback to make user interface improvements.

**Discussion:** The app is complete and is currently being prepared for submission to Apple for review and will be released to the Apple App Store. It will be free to all initial users. We will continue to update this app to add and develop new content. We are keen for this app to be used in multiple environments to test its effectiveness and to allow changes from feedback to be made.

**Figure 1 - Sample screen flow of app**
PO 02-7 – Educating Our Community: Sharing a Simulation Based Health Education Programme for Young People
Submission ID: IPSSW2016-LS-29

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Background: In communities with high levels of social deprivation, there is a clear association with poorer health outcomes in children and young people [1]. Public health outreach programmes can be very effective in improving health outcomes in paediatric populations [2]. Hands Up for Heath (HUfH) is an experiential simulation outreach programme designed for young people from at risk communities. The programme has been running successfully since 2011 at the Simulation and Interactive Learning (SAIL) centre at St. Thomas’ Hospital. From prior evaluations, 97% of participants report enjoying their experience, and gaining significant knowledge of both health and social issues. It has demonstrated value in improving health related behaviours, with 69% of participants reporting changed health related decisions [3]. In 2016 with funding from Health Education South London (HESL) in line with the 2015/2016 commissioning strategy [4] HUfH was “franchised” to another local hospital; Kings College Hospital NHS Foundation trust (KCH). This study aims to determine the degree to which this programme’s successes can be replicated with dissemination to a different simulation centre, by means of evaluating the two pilot events held at KCH in March 2016.

Reproduction of an established and successful simulation programme is desirable as it conserves resources which would be required for new programme development, encourages collaboration between centres, and utilises learning from the experiences of the parent centre [5,6].

Research question: Are the benefits of a successful healthcare related simulation programme for young people replicable with dissemination of the programme between simulation centres?

Methodology: All students (n=51) who participated in the two pilot events at King’s College were invited to complete a questionnaire composed of both open-ended and closed questions the month after their experience. The content of the questionnaire is based on outcome data from a multi-modal study of the HUfH events held between 2011-2014. Kirkpatrick’s 4 level model is used as a framework for evaluation [7].

Results: (Work in progress)

Conclusion: This study demonstrates that an established community outreach programme targeted at a socially deprived paediatric population can be shared between simulation centres and continue to be delivered in such a way that is of value to participants and continues to positively influence health related behaviours and thinking. Further in-depth evaluation, using focus groups and semi-structured interviews may be of benefit to determine which factors most influenced the participant’s experiences of the day. In the current financial climate of the NHS disseminating successful programmes and collaboration between centres to share resources will continue to grow in importance - there is no need to “reinvent the wheel”.

References:
3. Thomas B., Jones A., Mau A., Reedy G., Extending Simulation to Community Education Guy’s and St. Thomas Hospital NHS Foundation Trust; SAIL Centre 2015
PO 03-1 – Workload of Team Leaders and Team Members during a Simulated Sepsis Scenario

Crisis Resource Management/Human factors and Teamwork

Submission ID: IPSSW2016-1098

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Background: Crisis resource management principles dictate appropriate distribution of workload whether mental or physical so as not to overwhelm any one team member. Workload during pediatric emergencies is not well studied. The NASA-Task Load Index (NASA-TLX) is a multi-dimensional tool designed to assess workload validated in multiple settings.1 Low workload is defined as less than 40, moderate 40-60 and >60 signify high workloads.

Research question: Our hypothesis is that workloads among both team leaders and team members are moderate to high during a simulated pediatric sepsis scenario and that team leaders would have a higher workload.

Methodology: We conducted a multicenter observational study in which subjects participated in a 12 minute pediatric sepsis scenario. The patient was a 5 year old with fever, tachycardia, poor perfusion who had significant altered mental status such that his only response was moaning. Two confederate nurses were present in the room and administered treatments the team prescribed. Immediately following this scenario all participants completed the NASA-TLX. Independent t-tests with Bonferroni corrections were used to compare 6 subscale dimensions as well as the average between team leader and team members.

Results: One hundred and twenty seven teams were recruited from 10 sites. There were 127 team leaders and 253 team members who completed the NASA-TLX. Results show statistically significantly higher task loads among team leaders than team members in all categories except performance and physical demand where team members had higher scores. Average scores were 51±11 team leader vs 44±13 team members, mean difference (95%CI) 7.24 (4.75, 9.73), p<0.001. Physical demand was the only domain where team members had higher scores (29±22 vs 18±16, mean difference (95%CI) 10.72 (6.82, 14.63), p<0.001).

<table>
<thead>
<tr>
<th>Domain</th>
<th>Team Leader Mean (SD)</th>
<th>Team Member Mean (SD)</th>
<th>Mean Difference (95%CI)</th>
<th>P - value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental</td>
<td>73.35 (16.90)</td>
<td>59.80 (20.09)</td>
<td>13.45 (9.59, 17.31)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Temporal</td>
<td>55.91 (18.25)</td>
<td>47.74 (20.45)</td>
<td>8.17 (4.10, 12.24)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Effort</td>
<td>65.91 (16.14)</td>
<td>49.78 (21.53)</td>
<td>16.12 (12.25, 20.00)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Frustration</td>
<td>49.21 (24.79)</td>
<td>34.94 (24.99)</td>
<td>14.27 (8.95, 19.59)</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

Table 1. NASA-TLX results from team leaders and team members

Discussion/ Conclusions: Team leaders and team members are under moderate workloads during a pediatric sepsis scenario with team leaders under high workloads (>60) in the mental demand and effort
PO 03-2 – A Simulation-Based Curriculum for Medical Students During the Pediatric Clerkship

Debriefing and teaching methodologies

Submission ID: IPSSW2016-1018

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Context: The pediatric clerkship places medical students in a variety of clinical settings, often supplemented with lecture-based instruction. This model provides necessary medical knowledge but may leave students lacking practical skills for managing patient care. Simulation scenarios allow students to practice patient management in a controlled environment with immediate instructor feedback. We developed a longitudinal, simulation-based curriculum integrated into a third-year pediatrics clerkship at a major academic medical center.

Description: The focus of our curriculum was management of common pediatric emergencies. Third year students participated in four one-hour sessions during the five-week pediatrics clerkship. Prior to the sessions, students were asked to review documents posted on a web-based learning management system addressing the pathophysiology, differential diagnosis, management, and evidence-based treatment guidelines for a given topic. The topics were basic pediatric resuscitation, anaphylaxis, seizure, and asthma. Learning objectives included patient assessment, evidence-based treatment, teamwork, and communication. Sessions were led by a pediatric emergency medicine fellow. A resident physician in the role of simulation “nurse” was also present to facilitate learning during the scenarios. Both low-fidelity and high-fidelity simulator manikins were used. Each case was followed by structured debriefing.

Observation/ Evaluation: Response rate, 81.5%

After participating, students were asked to complete an online, anonymous 23-question survey. All students felt they learned more from the simulations than they would have from a lecture-based format. They also felt they were better able to apply their theoretical knowledge to patient care and were more confident caring for an acutely ill pediatric patient. All respondents felt the simulations should be continued during the clerkship. The curriculum and data collection is on-going and will run through the end of the 2015-2016 academic year.

Discussion: Using limited faculty and simulation resources, we were able to implement a medical student curriculum that was perceived by learners to have distinct advantages over lecture-style teaching. Limitations of our program include lack of a 100% survey response rate as well as sustainability. It is also unclear whether student perception of learning and performance translates to improvements in patient care. Early integration of simulation-based teaching may help better prepare students for assuming clinical responsibilities after graduation. Our institution plans to continue the curriculum as part of the pediatric clerkship during the next academic year.

PO 03-3 – A Cluster-RCT of Rapid-Cycle Deliberate Practice Simulation versus Traditional Debriefing of NRP

Debriefing and teaching methodologies

Submission ID: IPSSW2016-1133

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Hypothesis: The standard curriculum for how to stabilize and resuscitate newborns in the delivery room is adherence to the Neonatal Resuscitation Program (NRP), a simulation-based team training program,
although the curriculum is standardized, the most optimal debriefing techniques for optimal learning are still understudied. It is in the debriefing process where learning occurs. The current traditional method involves running a simulated scenario immediately followed by an NRP instructor led debriefing session with or without video review. The novel method of Rapid-Cycle Deliberate Practice (RCDP) evaluates an alternative debriefing methodology. RCDP- a simulation-based train-to-mastery form of debriefing education (1,2). Our hypothesis is that RCDP is a more effective tool for debriefing than traditional during NRP training.

Methods: During each NRP session, learners will be assigned using the standard NRP multidisciplinary team recommendations into four teams prior to randomization into 2 groups receiving RCDP (intervention) and 2 groups receiving traditional (control) debriefing. All teams will receive the same 3 scenarios during NRP. RCDP utilizes interrupted, immediate feedback during the first two scenarios while traditional groups complete the entire scenarios without interruption, followed by debriefing after completion. The third scenario will be debriefed traditionally for all groups and video reviewed for comparison analysis.

Results: Full results pending, however there will be 25 groups video-reviewed: 13 RCDP and 12 Traditional groups. They will be scored using a modified Neonatal Resuscitation Performance Evaluation (NRPE) tool as well as timing of active skills including: intubation, chest compression and UVC placement (1). Results of the NRPE will compare control vs. study group’s performance in and adherence to the Neonatal Resuscitation Program.

Discussion: Given that this is a required training program for any clinician taking care of babies in the delivery room, identifying the most optimal training methodology is critical. Worldwide, skillful resuscitation of newborns in the delivery room could save over 1 million babies’ lives each year. Simulation Based Medical Education has become the standard technique for Neonatal Resuscitation Programs (3). With Rapid Cycle Deliberate Practice, the overall goal is that by having learners repeat multiple scenarios with high fidelity simulation there will be an improvement in advanced resuscitation skills (1,7). Simulation has already been proven to be a better training methodology as compared to other traditional education methods. Now this study will start to valuate innovative simulation methodology. Results of team performance from video review will be available at the time of presentation.

References:
Background: Insertion of intraosseous (IO) needles and knowledge of insertion devices is a critical skill for resident physicians1-2. However, studies demonstrate trainees quickly lose these skills when not used3-4. Studies show that simulation improves success and protocol adherence5. This study focuses on how residents retain knowledge of IO needle insertion over a 12 month period.

Research question: How are procedural skills and critical knowledge related to IO needle placement retained by residents over time?

Methodology: In this study, an instructional period was followed by a skill and knowledge assessment at 6 and 12 months. The instructional portion included a standardized IO lecture detailing anatomic considerations, indications, contraindications and potential complications. Next, placement of an IO line was demonstrated and practiced using both manual and EZ-IO methods. Following the lecture, a multiple choice question (MCQ) and skills assessment was performed, for both the manual and EZ-IO approaches. A procedural checklist based on a validated assessment tool7 was used to assign a score and insertion was noted as successful or failed. The overall success rate for each interval for the manual and EZ-IO methods and the written test was compared using paired t-test statistical analysis.

Results: To date, 27 residents (71%) have completed the initial, 6 month, and 12-month assessments. All subjects successfully inserted an IO needle at initial testing. At 6 months, 37 residents (97%) and at 12 months, 36 residents (95%) successfully inserted an IO needle. Mean scores of MCQ had a statistically significant difference between the initial and 6 month mean test score, 9.0 and 6.3 respectively (p<0.001). No statistically significant difference in MCQ was observed between 6 months and 12 months (p=0.69). The mean manual IO insertion scores were 9.7, 8.3, and 8.2 at the initial, 6 month, and 12 month intervals, respectively. A statistically significant difference was observed in manual IO insertion performance, at the initial vs. 6 month testing (p<0.001) and initial vs. 12 month testing (p<0.05). There was no observed difference in the 6 month to 12 month mean MCQ (p=1.0). The mean EZ-IO psychomotor assessments scores demonstrated statistically significant different, initial versus 6 months (9.6 and 7.7, p<0.001), 6 months versus 12 months (7.7 and 8.8, p<0.002) and initial vs 12 months (9.6 and 8.8, p<0.01).

Conclusion: This study demonstrated statistically significant differences in both cognitive knowledge and procedural skills with both the manual and EZ-IO. The greatest decline in both skills and knowledge was observed between the initial and 6 month assessment. We hypothesize the loss of skills could potentially be mitigated if a cognitive and psychomotor ‘refresher course’ were available to residents 3 months after initial teaching session, as other studies have observed minimal decay at this time period6.

References:
PO 03-5 – Rapid Cycle Deliberate Practice: A Novel Approach to Neonatal Resuscitation

Debriefing and teaching methodologies

Submission ID: IPSSW2016-1089

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Background: Studies have shown that simulation based training of neonatal resuscitation improves confidence level and observed abilities of pediatric residents. Rapid Cycle Deliberate Practice (RCDP), described by Dr. Hunt, allows the simulation facilitator to provide debriefing throughout the session acting more as a coach. Also, participants work through the simulation scenario multiple times developing “muscle memory”.

Hypothesis: Do pediatric residents have improved confidence level, observed abilities, and recall in neonatal resuscitation after receiving RCDP simulation compared to traditional simulation using the simulation-debrief cycle?

Methods: To perform a randomized control trial comparing two methods, RCDP vs. the simulation-debrief cycle, of teaching neonatal resuscitation to pediatric interns. The subjects, 50 pediatric interns at Columbia University Medical Center, will receive a teaching simulation session using either the RCDP or simulation-debrief cycle dependent on randomization. Immediately following the teaching simulation session the subjects will undergo a videotaped simulation test. The subject’s performance on the videotaped session will be scored on the Megacode ChecklistAssessment Form (MCAF) by two blinded Neonatologist. The subjects will be retested and scored again 4 months from the initial teaching to determine if RCDP improved recall.

Statistical analysis: The subjects’ cumulative scores on the MCAF and the average time to perform critical interventions will be compared between the two groups using paired t-tests. The recall MCAF scores between the two groups will be analyzed.

References:

PO 03-6 – Swindon Safeguarding Simulation
Submission ID: IPSSW2016-LS-10

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Context: Safeguarding of children is the responsibility of all healthcare professionals and ‘Level 3 Safeguarding Children’ is a national requirement for all clinical staff working with children, young people and/or their parents/carers. These healthcare professionals have a key role in identifying, assessing and reporting safeguarding concerns. They may also be part of the multi-professional strategy team deciding ongoing management.

There is evidence to suggest simulation training is an effective means of teaching child safeguarding issues¹-² and it has been suggested as a way of practicing skills that are infrequently used³. In 2015 an undergraduate safeguarding simulation programme was created⁴ and it is currently an established component of the medical student paediatric placement in Swindon. This innovative teaching model is now being extended to incorporate safeguarding simulation into the trust-wide ‘Level 3’ training programme.

Description: Undergraduate and postgraduate clinical teaching fellows have collaborated with the named nurse and consultant for safeguarding at Great Western Hospital. Safeguarding simulation sessions have been developed to be delivered as part of a trust wide programme.

Simulation scenarios include a shaken baby, a neglected teenager presenting with deliberate self-harm and a scalded toddler. Five (three hour) sessions have been scheduled, each with three scenarios for a maximum of six participants. These sessions were advertised to all trust staff requiring ‘Level 3’ refresher training, to then be recorded in their training passports.

All participants are involved in each scenario, with those not directly participating observing via a video link into a debrief room where each scenario will be discussed with a trained faculty member.

Observation/ Evaluation: Quantitative and qualitative data is being collected on this novel approach to teaching safeguarding through simulation. Attendees are asked to complete Likert scales to measure their confidence in managing safeguarding situations prior to and after the simulation session. Attendees are also asked to provide free-text answers through more open questions.

Initial feedback from participants has been positive, with all five attendees at the first session rating it as ‘good’ or ‘excellent’. Mean confidence about safeguarding in the clinical environment (scored 0-10) increased from 6.4 before to 8.2 after the simulation teaching session.

Discussion: Initial safeguarding simulation teaching sessions have been successful, received positive feedback from attendees, and helped increase confidence in managing safeguarding issues in the clinical environment. We will continue to develop this programme in light of feedback and suggestions from faculty and attendees.

References:

PO 03-7 – Simulation Based Education and its Role for On-Call Physiotherapy Training – Staff Evaluation on Early Implementation
Submission ID: IPSSW2016-LS-30

Barry Johnstone, Kathryn Sharp, Jenna Ballard, Sarah Brown, Kate MacNeil, Richard Levin

**Background:** Most physiotherapists working within the acute hospital setting have a requirement to participate in an ‘Emergency Out of Hours’ service (on-call). This service provides respiratory physiotherapy assessment and intervention to those patients whose respiratory status has deteriorated. In order to staff an on-call service the majority of physiotherapists who participate will not be working full-time within the respiratory specialism. Physiotherapists working as part of the on-call service work independently and need to be confident in their clinical reasoning and decision making skills as autonomous practitioners. Training and support should be provided to ensure all physiotherapists covering on-call have the necessary skills to be safe and effective clinicians.

Simulation Based Education (SBE) allows healthcare professionals to develop practical and decision making skills while maintaining patient safety. A growing number of healthcare professional training programmes, undergraduate and post graduate, in the UK utilise SBE. However, there is limited evidence on how this translates into clinical practice. Respiratory physiotherapy interventions have the potential to cause harm and SBE facilitates experiential learning without the need for patient contact. Participants are encouraged to reflect on a clinical situation through group debrief to enhance individual clinical reasoning skills. As part of the on-call training and education programme, RHC – Glasgow had introduced SBE.

**Research question:** The aim of the project was to evaluate the benefit of SBE to support clinical reasoning for on-call.

**Methodology:** Simulation scenarios were developed in collaboration with physiotherapists and a medical consultant with significant experience in SBE, using previous on-call experiences. Physiotherapists were invited to participate in one SBE session. To evaluate the experience the physiotherapists completed an evaluation questionnaire before and after SBE. The questionnaire was developed from a previously validated questionnaire for assessing skill development for on-call physiotherapy.

**Results:** 8 physiotherapists completed the simulation training. 4 were not respiratory physiotherapists. 6/8 (75%) agreed or strongly agreed that the simulation highlighted areas for personal development to participate in on-call. 5/8 (63%) agreed or strongly agreed that the simulation helped with their clinical reasoning. 5/8 (63%) agreed or strongly agreed that further simulation training would be useful to support their learning in relation to on-call. All physiotherapists felt confident in their ability to participate in the on-call service.

**Conclusions:** This small study showed that SBE may be a useful part of on-call training. Further development and evaluation is required to gain greater insight into this area.

**References:**

PO 04-1 – Rapid Cycle Deliberate Practice in Neonatal Resuscitation: A Team Based Training Approach
Debriefing and teaching methodologies
Submission ID: IPSSW2016-1218

Lindy Winter¹,*

112
The Neonatal Resuscitation Program (NRP) details a stepwise algorithmic approach to the resuscitation of the newborn. However, defining the best methods in teaching NRP remains unclear. A challenge in current NRP training is assessing team-training and effective team-based competence. The question is whether traditional simulation and debriefing techniques remain the best method to improve performance, teamwork, skill retention, and individual assessment of competence/confidence or whether alternative educational techniques exist.

**Description:** Deliberate Practice (DP) is repetitive performance of skills until the learner can perform correctly and independently. Constructive feedback is given and the learner asks questions about their performance thus framing effective debriefing and an advocacy/inquiry cycle shown to be effective with adult learners. Rapid Cycle Deliberate Practice (RCDP) capitalizes on core concepts of DP extending the idea into a prolonged simulation. The focus is not only individual skill acquisition, but team-based roles. The intent is to apply the concepts of automation, over learning, muscle memory, and team-based roles to complex tasks associated with newborn resuscitation. In RCDP, the team is the unit being evaluated, not the individual, thus fostering an environment where constructive real-time feedback is given and mistakes are turned into learning opportunities. The RCDP process continues until all members of the team achieve individual skill mastery, and team closed-loop communication, performance, and teamwork principles are solidified. In RCDP, progression of a scenario halts once the first error is encountered, allowing for immediate correction and learning. The scenario is then reset and learners progress as a team until the next error is encountered; the level of scenario difficulty adjusts based upon the success of the learners working as a team.

**Observation/ Evaluation:** The study took place at UAB's Women and Infant's Center Regional Neonatal ICU with high fidelity neonatal mannequins. Assessment measures were based upon individual perceptions of confidence both pre- and post-participation. Individual perceptions of confidence and teamwork were evaluated using a six-point Likert scale forming a baseline individual procedural confidence and teamwork assessment score. Fifty learners participated in RCDP and completed pre/post confidence surveys. Confidence in role, NRP algorithm knowledge, CPR/BVM skills, coordination of CPR/BVM ratios, and assessment of teamwork improved with a significance of p<0.001. Ninety-eight percent felt RCDP superior to traditional NRP training.

**Discussion:** RCDP simulation learning is uniquely suited to individual and team-based learning. Additionally, its widely applicable to algorithmic processes such as CPR, NRP, PALS, ACLS, and ATLS. Follow up work in individual skills sustainment and team-based competencies will be required before RCDP can be implemented as standard practice. References:

PO 04-2 – Use of Simulation for the Care of Sick and Injured Children in Limited Resource Country

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

Submission ID: IPSSW2016-1142

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Objective: The focus of this project will be to supply a pediatric-based simulation portal, which will take into account the limitations present in resource poor countries. The goal will be to write, validate and disseminate low-cost pediatric simulation cases that meet learners' needs, enhance performance, impact positively on patient care yet at the same time remain affordable and applicable.

Methodology:
Part 1a (completed): A panel of colleagues in the field of pediatrics, simulation and global health reviewed five pediatric simulation cases. The cases focused on the following scenarios: sepsis/septic shock, pneumonia, wheezing, gastroenteritis/diarrhea illnesses with malnutrition, and injury of a child in a limited resource setting.
Part 1b (completed): An appointed number of pediatricians and pediatric subspecialists at Mulago National Regional Hospital in Kampala, Uganda reviewed and commented on each of the cases to ensure the validity of these cases for education of medical students, residents, and house officers at their institution.
Part 1c (completed): Incorporated within each of these cases are learning objectives, pediatric simulation scenario, and procedural skill set which will be covered during each of the teaching modules.
Part 2: (Feb 2016- December 2016) Pilot testing and validation of each of the 5 pediatric scenarios at Mulago National Regional Hospital in Kampala, Uganda by principal investigator and co-investigators.
Part 3: (Jan 2017- June 2017) Additional sites in Africa will pilot test and validate each of the 5 scenarios. At each of these sites the principal investigator and an individual educating at the site will be responsible for pilot testing and validating each of the 5 scenarios. This component of the project is essential to show applicability.

Results: Anticipated: Establishment of a portal for pediatric cases, airway and procedural skills for the care of the sick or injured child in a LRS. This will begin with dissemination of the 5 pediatric scenarios for educators and learners in the global health arena.

Conclusion (anticipated) expected benefit: The burden of disease in children and the high mortality rate can only be addressed when commitment to care and education are available. Taking information and connecting individuals and organizations will help to promote this work abroad. The sharing of curriculum and the establishment of a warehouse of pediatric cases, airway and procedural skills for the care of the sick and injured child will help this educational endeavor cement itself in the teachings of pediatric emergency care in the global health arena.

References:

PO 04-3 – A Simulation-Based Pediatric Emergency Medicine Module for Emergency Medicine Trainees in Rwanda

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

Marideth Rus1,*, Heather Machen1, Rachel Moresky2, Isaie Nzyimana Nsanzimfura3, Elizabeth DeVos4, Patrick Kyamanywa5, Vincent Rusanganwa6
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Background: Emergency medicine is a developing field in many parts of the world, including sub-Saharan Africa. In Rwanda, a program to train specialists in emergency medicine began in the fall of 2013. With 41% of the population of Rwanda under the age of 14 years, pediatric patients make up a large proportion of emergency visits. Pediatric patients often have different diagnoses and needs than their adult counterparts, making knowledge of common pediatric emergencies and their management essential for emergency medicine specialists.

Research question: Will performance by trainees on a simulated pediatric resuscitation and knowledge on a written test improve following a week-long course utilizing simulation and didactic teaching?

Methods: Nine trainees in the Post-Graduate Diploma (PGD) in Emergency Medicine and Critical Care program at the School of Medicine and Pharmacy in Kigali, Rwanda completed a 1 week pediatric emergency course in May 2014. The PGD is a program developed through the University of Rwanda and Ministry of Health with partners and sidHARcTe Program Columbia University. The course consisted of 26 hours of didactics, simulations, and skill stations. Simulation was a major component of the course, with a total of 10 cases focusing on respiratory distress, shock, cardiac dysrhythmia/ arrest, and trauma. Low fidelity mannequins were utilized for scenarios, with feedback on physical exam findings such as pulses or breath sounds provided by the instructor during the simulation. The simulations were run for 15-20 minutes, followed by 10 minutes of debriefing using advocacy-inquiry debriefing. Skills stations included airway management, cardiopulmonary resuscitation, and IV/ IO placement. Didactics highlighted a variety of common pediatric medical and surgical emergencies as well as pediatric trauma. Trainees completed both written and simulation pre-tests. At the conclusion of the module, trainees completed written and simulation post-tests one day after the one week course. Pre- and post-test results were compared using the paired t-test.

Results: The mean scores for simulation and written pre-tests were 66.8% and 65%, respectively. The mean scores for simulation and written post-tests were 82.6% and 82%. The mean score for the for the simulation increased by 15.8% from the pre- to post-test while the mean score for the written test increased by 17%; this difference was statistically significant for both the simulation (p>0.001) and the written test (p =0.001).

Conclusions: After completing a 26 hour pediatric emergency medicine module incorporating simulation, skills stations, and didactics designed to highlight core topics in pediatric emergency medicine and pediatric...
resuscitation, candidates for a post-graduate diploma in emergency medicine showed a statistically significant improvement on simulated pediatric resuscitation performance and written test scores.

References:
1. Fourth Population and Housing Census, Rwanda, 2012

PO 04-4 – Neonatal Outreach Education using Simulation Training
Educational Outreach (including remote, rural and international simulation education)
Submission ID: IPSSW2016-1146

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¹Neonatology, Coastal Carolina Neonatology, ²Coastal Carolinas Health Alliance, Inc., ³New Hanover Regional Medical Center, Wilmington, United States, ⁴Respiratory Care, New Hanover Regional Medical Center, Wilmington, United States

Context: Neonatal mortality rates, those for infants less than one month of age, account for approximately 2/3 of infant mortality rates. Our region in southeastern North Carolina has some of the highest rates of infant mortality and morbidity. In 2014, neighboring counties had an infant mortality rate as high as 14.8 infant deaths per 1,000 live births compared to North Carolina’s rate of 7.1 infant deaths per 1,000 live births. The “golden hour,” or the first hour after birth, represents a crucial time in a critically ill newborn’s life. Appropriate interventions (or lack thereof) during this time can impact the neonatal outcomes such as short and long term injury, developmental delay, and even death. Attaining the best outcomes is contingent upon strong communication, teamwork, medical knowledge and clinical skills. Delivery room personnel have the opportunity to impact this transitional process, either positively or negatively. Occasionally critically ill babies are born in hospitals that are not equipped to care for these babies long term, and they need to be transported to a higher level nursery. Our goal was to provide outreach education on stabilizing these infants after initial resuscitation measures and before the transport team arrives.

Description: This was a collaboration between Coastal Carolina Neonatology, New Hanover Regional Medical Center, and Coastal Carolinas Health Alliance, an organization with a mobile simulation lab. A multidisciplinary team was created consisting of a neonatologist, a neonatal nurse practitioner, a respiratory therapist and neonatal nurses along with a simulation expert. Three pilot hospitals with level 1 nurseries were chosen based on their proximity and frequency of neonatal transports. We recreated common high risk neonatal scenarios including meconium aspiration and an extremely premature infant. The simulations and debriefing provided education about medical protocols and standards of care, and offered the opportunity to optimize teamwork and identify latent safety threats. We used evidenced based recommendations from the Neonatal Resuscitation Program, S.T.A.B.L.E Program, and TeamSTEPPS™. The scenarios were conducted in situ and used each nurseries’ own equipment.

Evaluation: To measure the impact of the training, we distributed a confidence survey before and after the sessions. A likert scale was used (1= not confident to 5= very confident) and participants felt more confident post training in maintaining temperature control (2.7 out of 5 vs. 4.7 out of 5) and appropriate oxygenation levels (3 out of 5 vs. 4.2 out of 5) in the extremely premature infant.

Discussion: Our goal was to improve the health and stabilization of the critically ill newborn prior to transport by educating staff on best practices and identifying latent safety threats in their environment. There was a demonstrated improvement in the participants’ confidence, particularly in the care of the extremely low birth weight infant.

References:

PO 04-5 – Designing an Outpatient Pediatric Emergency Simulation Curriculum
Educational Outreach (including remote, rural and international simulation education)
Submission ID: IPSSW2016-1162
Sebring M. Amanda¹,*, Diana Mitchell¹
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Context: In 2007 the Committee on Pediatric Emergency Medicine issued an American Academy of Pediatrics (AAP) policy statement titled “Preparation for Emergencies in the Offices of Pediatricians and Pediatric Primary Care Providers.” In this policy statement, the AAP emphasized the need for physicians and staff to practice pediatric emergency mock codes.

Description:
1. Create an outpatient pediatric emergency simulation curriculum.
2. Document the approach to creating an outpatient pediatric emergency simulation curriculum for replication and use in a variety of outpatient settings.
3. Evaluate the outpatient curriculum.

Method/ design: We created a modified AAP self-assessment survey of office preparedness for pediatric emergencies and distributed the survey to pediatricians through the (ICAAP) Illinois Chapter, American Academy of Pediatrics. (IRB14-0071). Needs assessment results were used to create an outpatient simulation curriculum. Outpatient general pediatric offices (2) participated in the curriculum, which included four emergency scenarios run on computerized mannequins. Office workers (physicians, nurses, medical assistants, and administrative staff) participated in each training scenario followed by a group debriefing. Participants completed a curriculum evaluation immediately after the event and will complete a survey four months after the session to assess for any changes to office practices and subjective feelings of increased confidence when dealing with outpatient emergencies.

Evaluation: Thirty-two physicians responded to the needs assessment survey. Fifty-six percent of offices saw emergencies 1-3 times a year. Respiratory emergencies were most prevalent. Sixty-eight percent of responders felt their office had no written protocol for emergencies. Regular mock codes were held in 21.9% of offices. Aspects offices felt could be improved included: education/training sessions including mock-codes, written protocol development and improved triaging. We created an outpatient curriculum that included four case scenarios identified in the needs assessment, a list of equipment needed to complete the simulation training, and debriefing guidelines. One hundred percent of participants recommended this simulation training to colleagues and 77% of staff had never participated in medical simulation. Four month follow up surveys are currently in progress. A curriculum manual will be created, which can be used as a template for other outpatient offices to implement their own training.

Discussion: General pediatricians have identified a need for improved training and development of office protocols for common outpatient emergencies. Our simulation curriculum will provide simulation training for general pediatricians. Our curriculum will allow for better stabilization and care of children presenting with life-threatening emergencies in outpatient clinics until they are transferred to centers with higher levels of care.

References:


28. Walsh, B., MD. Community Outreach Mobile Education Training: Bringing the Simulator on the Road to Educate and Train Interprofessional Community Teams.


**PO 04-6 – Paediatric Clinical Assessment Skills, Spotting the Sick Child in Any Setting**

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

Submission ID: IPSSW2016-1014

Lucy C. Arora¹*, Katie McGhee¹, Alex Brightwell²
¹Health and Social Care, University of East Anglia, ²Paediatrics, Norfolk and Norwich University Hospital, Norwich, United Kingdom

**Context:** Norfolk is a large county served by two hospitals, neither of which has a pediatric intensive care unit. Transfer to tertiary paediatric critical care service is carried out by a specialist paediatric transfer service which takes 2 hours to arrive as a minimum from the time of referral. Many of the primary care services that routinely see unwell children at first presentation are 45 minutes away from one of the two Norfolk hospitals. Expedient and accurate assessment of children at first presentation within primary care services is essential in Norfolk to reduce delay in the patient receiving hospital based treatment.

**Description:** 3 Paediatric Clinical Assessment Skills study days have been run targeted at primary care nursing staff and General Practitioners. A multi-disciplinary workforce of hospital-based paediatricians, advanced nurse practitioners and general practitioners with specialist interest in paediatrics has run all study days. Each study day is split with the morning focusing on advancing skills in rapid assessment and recognition of the sick child and the afternoon devoted to simulation based learning. Each simulation is based on a scenario that would be realistic to primary care. Learners are invited to practice their paediatric assessment skills whilst also considering the clinical management options available to them at their place of work. The SBAR communication tool is used to make a mock referral to secondary care with participants using a paediatric early warning score to quantify their concerns. Learners are then encouraged to consider the options available to them at their own place of work whilst waiting for an ambulance to arrive. Participants are given feedback relevant to each component of the simulation and discussion around any particular difficulties in managing a sick child in their place of work, or indeed challenges they have in facilitating a child being admitted to secondary care are discussed openly.

**Observation:** To date the study days have been evaluated by participant feedback through an evaluation form only. The study days evaluated positively with learners stating that they feel more confident in both their approach to assessing and managing a sick child and in making a referral to secondary care. The study days continue to run regularly with demand being high.

**Discussion:** These study days have proven an invaluable bridge between primary and secondary care simulation education. More formal evaluation is clearly needed. In-situ simulation within rural primary care services would also seem a logical next step. Whilst this program may be in its infancy it is simple in design and serves well in supplying paediatric expertise to meet the demands of an isolated county without specialist paediatric critical care services. This approach could easily be adopted internationally to any areas with similar characteristics to support the accurate and timely recognition of deteriorating children.

**PO 04-7 – Do Learners and Faculty Share the Same Perception of Simulation Fidelity?**

Submission ID: IPSSW2016-LS-31

Devika Singh¹*,², Harshad Gurnaney¹,², Taiki Kojima³, Ellen S Deutsch¹
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**Background:** Simulation has emerged as a vital tool in the education of trainees in anesthesiology, and a significant effort is often expended to make the fidelity of simulations realistic and accurate. Different realms of fidelity exist, and many aspects of fidelity are not well understood. Physical fidelity (e.g. simulation setting, simulators, and other equipment), functional fidelity (e.g. actions and interactions during the simulation) and psychological fidelity (e.g. engagement and processing demands) each contribute to the overall impression of realism during a simulation.

Because learners and teachers may have different perceptions of fidelity, we explored Fellow and Faculty evaluations of fidelity for specific simulators and for a simulation scenario during a one-day pediatric anesthesia fellows’ boot camp.

**Methods:** Fellows and Faculty completed a voluntary, anonymous survey about fidelity for two events during the boot camp: one station with advanced airway skills task trainers, and one station in which a team managed a high-technology human patient simulator with post-operative hemorrhage. Quantitative ratings (0-100% fidelity) and comments (what factors improved or detracted from fidelity) were solicited. A descriptive comparison of the ratings is provided. The study was exempted from review by the IRB.

**Results:** 28 Fellows and 14 Faculty. Quantitative airway station fidelity ratings by Fellows were higher than ratings by Faculty (Fig. 1); only the difference in ratings for simulator physical fidelity was statistically significant. Fidelity ratings of the hemorrhage scenario by Fellows were slightly lower than ratings by Faculty, without statistical significance (Fig. 2). Both groups felt that both sessions met the learning objectives.

**Discussion/ Conclusions:** Fellows and Faculty may appreciate different aspects of a simulation as contributing to, or detracting from, fidelity; in this study, overall perceptions of fidelity were similar. These perceptions of fidelity are likely to impact the effectiveness of the learning experience, and may also
influence participant engagement, affecting both learners and faculty. It is likely that the perception of fidelity is context-specific, involving a complex combination of factors which include the educational objectives, the perspectives of both learners and teachers, and attributes of the simulators, the simulation setting, and the simulation scenario. Simulation design may be improved by better understanding and management of factors which contribute to the perception of fidelity.

References:

Acknowledgement: We appreciate the participation of the Fellows and Faculty during the Anesthesia Fellows Boot Camps held at CHOP in 2014 and 2015, as well as Dr. Sonya Malekzadeh and Dr. Kelly Malloy for their contributions to the study design.

PO 05-1 – Effectiveness of Simulation-based PALS Courses for Blue Code Teams
Educational Outreach (including remote, rural and international simulation education)
Submission ID: IPSSW2016-1087
Feray Guven1, 1,*, Dilek Kitapcioglu1, Emin Aksoy1, Dilek Kitapcioglu1, Erhan Sayali2, Erhan Sayali2, Oya Sagir1
1CASE, Acibadem University, Istanbul, Turkey

Background and objectives: The aim of our study was to evaluate if simulation based PALS (Pediatric advanced life support) training is increasing skills, knowledge and teamwork among professional learners such as blue code team members and to question if this trainings are perceived as useful by this participants.

Method: 8 blue code teams (n:58) took part in our study. 71% of the participants were nurses (n:41), 29% were doctors (n:17). There were 4 anaesthesiologists, 4 cardiologists, 3 pediatricians, 2 internal medicine specialists and 1 emergency medicine specialist among the doctors participating this study.
PALS course lasted one day. The content was a 1 hour lecture on 2010 ERC algorithm and crisis resource management 1 hour practice on task trainers and 6 hours simulation (scenario+debriefing). Each blue code team consisting of 6 members and one leader took part in our simulated PALS scenario and healthcare simulation educators moderated the debriefing sessions. Afterwards, a didactic session about ERC 2010 algorithm and the effective resuscitation team dynamics was given to the participants. Following the didactic session the participants were asked to repeat the same scenario and another healthcare simulation educator moderated the debriefing session.

After finishing the course, participants of this study completed a horizontal numerical scale survey (1 - as I don’t agree at all to 4 - as I totally agree) about their perceptions of simulation based training for blue code course. Descriptive statistics were calculated to evaluate the data.

Results: The following results were obtained from the evaluation forms filled by the participants about Simulation-based PALS Management Training for blue code teams - as to be seen on our image. The participants concluded that simulation training increased their awareness about the importance of teamwork with a mean value of 3.79. They regarded simulation training to be supporting their leaning process with a mean value of 3.92 and they regarded simulation training to be improving their self-awareness with a mean value of 3.94.

Conclusion: The participants rated the Simulation-based PALS Management Course for blue code teams as highly efficient. They believed that knowledge and skills gained in this training would be beneficial in their daily practices. The participants concluded that simulation based training increased their awareness on the importance of teamwork and suggested that this training modality has to be mandatory in establishing the teamwork concept among blue code team members.
PO 05-2 – Collaborating Health Services for Improving Neonatal Resuscitative Care in Rural Areas

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

Submission ID: IPSSW2016-1158

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Neonatal resuscitation is a relatively uncommon event and real-life opportunities to practice the management of these events in rural areas are infrequent¹. The design of a high fidelity multidisciplinary simulation training program starting with pre-hospital management of neonatal emergencies and ending with the transfer to specialist paediatric care was developed. A key objective was to connect and test multidisciplinary protocols and practice guidelines with the consideration of current best practice and the impact of outcomes in patient care. This was achieved by collaborating between the Local Health District, Ambulance Service, and a paediatric simulation outreach program.

Incorporating a three stage longitudinal insitu design, the first stage of the scenario utilised community health services, including a private home midwife and paramedics with the replication of a home birth. The second stage of the scenario occurred in an ambulance to enhance the clinical authenticity of all aspects of the transfer of the sick neonate and mother from the community to the hospital setting. Thirdly, the scenario
continued into the Emergency Department of the local hospital where the collaboration of multidisciplinary teams was intensified with simultaneous coordination of the three health services to optimise patient care. To maximise realism, the scenario was delivered in ‘real time’ to test the local protocols and time taken to deliver patient care across a range of services including ambulance response times, handover and time to appropriate treatment and referral. Concurrent scenario design utilising a mother and newborn baby was intended to deliver learning objectives with appropriate context, realism and complexity. A questionnaire was used to explore the effectiveness of both formal learning activities and experiential learning components. Response rate was 61% (n=18). 87% of participants strongly agreed that they had gained knowledge from the session with 75% strongly agreeing that they had learnt new skills. 100% of participants recommended that the session would benefit other staff members of all disciplines. Response times indicated a fair and appropriate decision for treatment was made within adequate time frames according to local protocols. Two recommendations in improving neonatal and paediatric transport protocols were proposed. Collaborative, multidisciplinary simulation programs incorporating community to hospital teams are rarely employed within rural areas. This multidisciplinary neonatal emergencies simulation training program utilising a longitudinal design, offers an appropriate level of realism to test local protocols and train for real life situations. This program, built on collaboration between Local Area Health facilities and disciplines and a paediatric outreach simulation team has the potential to improve local protocols and skills and to impact on improving patient outcomes.

PO 05-3 – In-Site Inter-professional Pediatric CRRT Simulation Experience
Submission ID: IPSSW2016-LS-03

Elbaba M*,1
1Pediatrics, Hamad Medical Corporation, Doha, Qatar

Background: Continuous renal replacement therapy (CRRT) is an advanced treatment frequently required to support the critically ill children. Because of the complexity of this kind of treatment, physicians, nurses and other allied healthcare professionals frequently found some obstacle and disharmony to deliver effective and safe care to the children.

Aims & objectives: The aim of this work is to assess the effectiveness and safety of team management and to detect the problems associated with implementing the CRRT among inter-professional team.

Methods: Different In-site CRRT simulation scenarios are conducted in pediatric ICU in our center without prior notification to our candidates every few weeks. The candidates of those simulation sessions were pediatric nephrology physicians (targeted candidate), intensivists, nurses and clinical pharmacists. The targeted candidate performance and the Inter-professional education (IPE) domains were assessed among the team to delivery effective treatment to the child Manikin in PICU room. CRRT “Prismaflex” machine was used. Two forms are filled by two different simulation specialists who attended the scenarios before and after each session. The first form is the candidate performance and the second is the IPE form. Primary Results We conducted two simulation scenarios up-to-date. Three major themes were emerged from this study until now. First theme was the prolonged time taken to transmit the CRRT prescription from the protocol to implementing it on the machine. Second theme was the good harmony among the different specialties to deliver the treatment. The third one showed that the team members were more comfortable and faster with simulation experience.

Conclusions: The authors expect to conclude that CRRT simulation is an effective training method to enhance the quality of children care among the inter-professional team. Team members involved in the simulation are expected to be more confident and comfortable to deliver the CRRT.

PO 05-4 - Prescription Calculator in Pediatric CRRT Simulation
Submission ID: IPSSW2016-LS-04

Elbaba M*,1
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**Background:** Continuous renal replacement therapy (CRRT) is an advanced treatment frequently required to support the critically ill children. Because of the complexity of this kind of treatment, healthcare professionals frequently consume time to implement the CRRT prescription from the local guidelines and forms to the order form. A novel pediatric CRRT calculator is introduced by the author to facilitate this complex calculations and implementing the treatment faster.

**Aims & Objectives:** The aim of this work is to assess the effectiveness and accuracy of the new pediatric CRRT calculator compared to the manual calculations usually conducted by the pediatric nephrology physicians in a CRRT simulation sessions.

**Methods:** The pediatric CRRT simulation sessions were assessed by using the author’s calculator and without the calculator (manual calculation). A child Manikin was located in PICU room with a pre-primed CRRT “Prismaflex” machines during the simulation sessions. The time taken to write the CRRT prescription in the order sheet and the total time taken to start the CRRT treatment is calculated by two different simulation specialists. Inter-professional education (IPE) domains are used to assess the harmony among the CRRT team to avoid the time bias.

**Primary results:** Up-to-date, three scenarios are assessed. The results of this study are expected to show a significant difference between the manual group and the calculator-used group to write the CRRT prescription in the order sheet. Calculator-used group is able to deliver the treatment in very short time compared to manually calculating. The accuracy of the prescription and calculation errors will be assessed. Conclusions The authors expected to conclude that CRRT prescription calculator used in the simulation sessions was accurate and faster compared to the manual prescription calculation. The physicians are expected to be comfortable to use the calculator to avoid the complex mathematics.

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**PO 05-5 - A Trainee-Led, Multi-Disciplinary Approach to Paediatric Education within the Wessex Region**

*Facility development*

Submission ID: IPSSW2016-LS-01

James Edelman*,1, Clarissa Chase1, Ollie Bevington1, Fiona Hignett1, All members of the STrIPES Faculty

1Wessex Deanery

**Context:** Simulation is becoming a popular method of delivering medical education in paediatrics and many trainees within the Wessex region are developing programmes and courses with simulation at their core. These developments and innovations focus on improving clinical knowledge, optimising healthcare processes and enhancing patient safety, but are often difficult to disseminate and sustain within the region due to the frequent rotation of trainees between hospitals.

**Description:** Our trainee-led group - STrIPES (Speciality Trainers Involved in Paediatric Education & Simulation) - was established with the intention of encouraging collaboration, development and dissemination of new simulation and educational initiatives within Wessex. We aim to develop a faculty of trainees and nurses who are trained to develop and deliver high quality education and simulation teaching throughout our region and eliminate the problems associated with trainee rotations between hospitals. We also aim to be a source of information and experience for any trainee or nurse with an interest in developing skills in medical education and simulation so that we can continue to encourage trainee-delivered teaching in the future.

**Results:** Our faculty currently consists of 40 paediatricians and nurses with a diverse range of clinical and non-clinical experiences. Our members have been involved in developing simulation programmes for medical students, paediatric trainees, GP trainees, GPs and emergency medicine trainees, and we have delivered teaching throughout many of the hospitals within our region. Feedback from our courses and simulation sessions has been very positive, with particular comment that delivery of teaching by trainees rather than consultants allows for a less threatening and more realistic learning environment. We are keen to be able to collect data from all our projects to correlate the use of co-ordinated deanery-wide education with improved clinician skill and patient outcome.
**Potential impact:** As the use of simulation becomes more common as a modality for medical education, it is important to utilise the enthusiasm and skills of clinicians interested in simulation and education to develop and deliver teaching programmes, to ensure the greatest scope of impact and sustainability. We feel that there is great educational potential of STrIPES to improve the quality and safety of patient care within Wessex and we are keen to expand the multi-disciplinary elements of our group to ensure we reach the widest audience possible.

**PO 05-6 - Performance of Guatemalan Doctors and Nurses in Pediatric Emergencies Scenarios**

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

Submission ID: IPSSW2016-1238

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**Objective:** Determine the performance of doctors and nurses in simulation pediatric emergencies scenarios attending in rural hospitals in Guatemala.

**Methods:** A educational Project were discussed with Ministry of Health in Guatemala, and making priorities based in lower performance and transfer amount to upper complexity. The SOYUTZ (Good-Union mixed russian-mayan language word) Pediatric Simulation Emergencies Center located at Hospital General San Juan de Dios were based to make a evaluation and follow the training during 2016. The scenarios were based in validated algorithms and references. The scenarios were based in objectives and the debriefing were focused in asses in the algorithm and teamwork.

**Results:** Ninety nine (n=99) health workers were evaluated with a written tool. From this 46 were physicians and 43 nurses. The performance average for the physician group was 62.2 and for the nurses group it was 36.19. It seems that the average for physicians was higher than the nurses average; but there are no statistical significant differences between the two groups with the T-test for independent samples with a p value of <0.05 (CI95% 21.695, 30.363). All of them say feel comfortable with the debriefing and the teamwork empowerment is necessary to better outcomes. They accept follow the discussion as team about validated algorithms during 2016 course.

**Conclusions:** The averages between two different groups (Doctors and Nurses) of health workers do not represent real differences; then simulation as a tool that can be useful in all types of health workers independently of their previous experiences. And is necessary to develop as team.

**PO 05-7 - Improving Pediatric Septic Shock Clinical Outcomes through Multi-Disciplinary In Situ Simulation**

Submission ID: IPSSW2016-LS-34

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**Background:** The Pediatric Septic Shock Collaborative (PSSC) is a research network of 25 United States Pediatric Emergency Departments with a goal of decreasing septic shock morbidity and mortality through increased recognition and early goal directed therapy. As a member of this network, our institution does not currently meet benchmark goals for key interventions despite the implementation of a standardized orderset, electronic alerts and educational outreach. Simulation has been demonstrated to increase medical knowledge, provider confidence, checklist compliance, teamwork and communication. There is limited data directly linking simulation to improved clinical outcomes.

**Research questions:**
- Will multi-disciplinary in situ simulation sessions improve the efficiency of pediatric sepsis management in our emergency department?
- Will multi-disciplinary in situ simulation sessions impact pediatric sepsis clinical outcomes?
- Does the frequency of simulation sessions affect the knowledge retention of trainee physicians regarding the principles of pediatric sepsis management?

**Proposed approach:** Bimonthly multi-disciplinary in situ simulations were instituted to reinforce provider knowledge of sepsis management, to increase clinical efficiency through team oriented skills practice, and to identify systems issues via debriefing. Pre and post simulation session assessments of participant knowledge, prior experience and clinical confidence will be utilized to guide the content of subsequent sessions. Team performance will be evaluated in both simulated and clinical environments for time to key interventions including antibiotics and fluid boluses.

Data regarding time to interventions will be analyzed using run and control charts. Clinical outcome measures will include 30-day mortality and rapid clinical deterioration following hospital admission. Retrospectively determine if provider participation in simulation sessions impacted team performance in the clinical environment. Trainees will attend zero to three sessions per year.

The long-term knowledge and skill retention of trainees will be evaluated through the comparison of assessments completed at simulation sessions throughout the year.

**Conundrums/ Discussion questions:**
- What is the appropriate methodology for determining the effect of simulation sessions on patient care outcomes in the presence of other concurrent interventions including staffing changes and modifications to patient flow within the emergency department?
- How should the effect of simulation sessions on the care of pediatric patients with sepsis be demonstrated at a systems level?
- Are there existing strategies for maintaining staff engagement during simulation sessions and the implementation of changes to current clinical practice patterns?

**References:**

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**PO 06-1 – The Development of an In-Situ Mobile Perinatal Simulation Program for Rural South Central Texas Educational Outreach (including remote, rural and international simulation education)**

Submission ID: IPSSW2016-1240

Alejandro B. Gonzalez1, Mary E. Wearden2, Susan Dotzler2, Gillian Gonzaba2, Frances Chavez3
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In January of 2015, the Baptist Health System’s Outreach Program inaugurated a perinatal in-situ simulation program to aid in outreach to our rural South Texas community hospitals. The goals of the program were the following:
- To help prepare rural community hospital personnel for high-risk, low-volume neonatal and obstetrical emergencies.
- To focus on team dynamics.
- Identify areas for process improvement at the local level.
- To provide an “in-situ” simulation process in their own “home” hospital.

The program uses 4 to 5 camcorder cameras connected to an A-V digital switcher, large screen TV monitor (mounted to a mobile cart), DVD recorder, audio mixer and a high sensitivity microphone. High fidelity
mannequins are used as well. A pre-drill briefing is done with the participants. The program has developed five basic modifiable scenarios, based on objectives determined by local facility needs. The facilities can select from the following: postpartum hemorrhage, shoulder dystocia with subsequent depressed term infant, maternal pregnancy complicated by a prolapsed cord and extremely low birthweight infant, pregnancy complicated by placental abruption with resultant shock, and a five day old infant presenting to the Emergency Room in cardiovascular collapse. The simulation team was initially comprised of two team members (RN outreach coordinator and physician program director). The team has expanded with the addition of a quality improvement specialist. Five rural hospitals have participated in seventeen simulation exercises, with 73 RNs, 6 RTs, and 15 medical providers. To date, the rural hospitals have wanted either the shoulder dystocia or the Postpartum Hemorrhage drill. In the shoulder dystocia scenario, the baby is born very depressed and so the newborn team is activated.

Shoulder Dystocia and Infant Resuscitation Data

<table>
<thead>
<tr>
<th>Site</th>
<th>Communication of OB Time Keeper</th>
<th>McRoberts Maneuver Done</th>
<th>Closed Loop Communication Used for Epi Dosing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42%</td>
<td>14%</td>
<td>100%</td>
</tr>
<tr>
<td>2</td>
<td>33%</td>
<td>33%</td>
<td>100%</td>
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<tr>
<td>3</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
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</tbody>
</table>

A poster with the drill scenario, objectives and evidence based practice references is provided in addition to the results and comments from the evaluation and debriefing. Areas for process improvements identified during the debriefing by the teams is provided in a report to the hospital director. Through the development of this program, South Central Texas rural hospitals may be able to improve team work and communication during high risk obstetrical and neonatal situations, and identify areas for improvement at the local level1-2.

References:

PO 06-2 – Using Simulation to Teach Child Protection

Innovation/ Future Direction and Outreach Simulation

Submission ID: IPSSW2016-1153

Emily Payne1,*, Torsten Hildebrandt2, Matthew Obaid3
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Background: Addressing child protection concerns is a daunting task but there often is little opportunity to practice required skills. We felt this challenge could be aided using simulation. Simulation is used frequently and effectively to improve management of resuscitation situations but is rarely used for child protection.

Aim: To develop a simulation course for paediatric junior doctors to develop and practice skills in child protection.

Method: The course was aimed at paediatric trainees in the latter SHO years or early middle grade years. The faculty consisted of a Senior Social worker, a Consultant Community Paediatrician, a Consultant General Paediatrician and two paediatric community grid trainees. The programme incorporated two structured talks and table top exercises in the morning. The afternoon consisted of simulation scenarios conducted in a simulation suite, arranged mimicking a paediatric assessment unit. Three medical actors took various roles with one candidate actively running the scenario. The scenario was observed by all other participants in an adjacent seminar room linked via audio-
visual stream from the simulation suite. The scenarios lasted approximately 15 minutes with feedback for 30 minutes. Scenarios covered were: seeing a baby with bruising, sexual abuse disclosure and a strategy meeting. The bruising scenario was divided into three parts; meeting the family for the first time and history taking, discussing the child protection process and then discussing results of investigations. This case was then discussed at a simulated strategy meeting.

**Results:** Thirteen paediatric trainees attended the course. The overall feedback was very positive. Using a scale from 1-5 with 5 being positively “completely agree”, 12 out of 13 participants rated all feedback questions 4-5.

**Conclusions:** Child protection is a challenging issue for trainees to address. The skills required can be taught and practiced using simulation. We found simulation to be a popular way to teach child protection to our trainees.

**References:**
3. CORE Info www.core-info.cardiff.ac.uk

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**PO 06-3 – Just In Time Training for Lumbar Punctures in the Pediatric Emergency Department**

*Innovation/ Future Direction and Outreach Simulation*

Submission ID: IPSSW2016-1223

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**Context:** Quality time to teach procedures can be challenging amidst a busy Pediatric Emergency Department (ED) for a multitude of reasons: high census and patient turnover rate, increasing focus on patient safety, vulnerability of pediatric patients requiring specialized care, learner confidence with skills related to the procedure, and learner limitations with respect to duty hours and relatively fewer patient encounters. Our busy ED at KMCWC did not previously have a way of efficiently and longitudinally delivering quality lumbar puncture (LP) education prior to the implementation of the infant manikin Just in Time Training (JITT) simulation. Our study appears unique in addressing multiple levels of learners including medical students. (1-8) Few studies have addressed confidence for future procedures in learners which is being evaluated in our present study. (9)

**Description:** With the goal to assess the educational effect of JITT for LP procedures via simulation, we utilize an infant manikin which is kept in the ED in a clearly marked bin along with all required LP supplies. Learners can follow one of two pathways: mentorship through the training on LP manikin by an Attending Physician or Upper Level Resident (PGY 2 or PGY3) or independently by adhering to the provided LP check list if time permits. Blank “LP JITT Questionnaires” are taped to each kit. Eligible learners include fourth year medical students (MS4) and all levels of residents.

**Observation/Evaluation:** 12 Pediatric & Family Medicine Residents of varying levels as well as MS4 students have completed the JITT LP simulation to date. Of those who participated, confidence in future LPs as measured by perceived utility of simulation was 89%. Notably, in comparing training level of participants and impact of simulation, the MS4 students and PGY1 success was measured at 67% for actual LP and 100% with respect to increased confidence for future procedures compared to 83% success and 83% increased confidence, respectively, for upper level residents.

**Discussion:** JITT appears to be an effective and safe way to provide LP training in a busy ED. In the future, additional medical students should be included as learners in earlier phases of training appear most positively impacted by JITT. The results seem likely to be reproducible for other critical care procedures. The cost effective nature of JITT simulation is reproducible on an international scale and at remote facilities. Performance fidelity is perceived as high according to learner feedback. Lastly, time efficiency in accessibility of the JITT located in the ED and being able to utilize the simulation prior to the procedure adheres to the JITT model.
References:

PO 06-4 – The SUDIC SIM Programme
Innovation/ Future Direction and Outreach Simulation
Submission ID: IPSSW2016-1011

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Context: The death of each child is a tragedy. Every parent has a right to have such an event properly investigated (1,2). Paediatricians and police officers play a vital investigative role following a sudden unexpected death in infancy or childhood (SUDIC). Incomplete investigation has resulted in devastating consequences: false imprisonment, unresolved child deaths, and GMC disciplinary investigations. In 2004 a multi-professional intercollegiate working party developed national guidance.(2) . The need for appropriate training for all professionals involved in child death was highlighted (2). We are not aware of any current stand alone high fidelity simulation courses to facilitate practical SUDIC training.

Clinical SUDIC experience amongst paediatric doctors is lacking. A regional survey amongst senior paediatric trainees & first year consultants in the West Midlands UK found the average number of SUDICs ever seen was 1.6. None of the doctors had observed/taken part in the whole SUDIC process. None of the doctors felt confident to undertake a SUDIC investigation.

Description: We developed a programme for senior paediatric trainees to learn about initial and subsequent management of SUDIC through high fidelity simulation and experiential learning. Our diverse faculty included: a detective chief inspector, paediatric pathologist, simulation faculty, safeguarding and acute consultants.

9 participants took part in a simulated SUDI investigation. This included: simulation of attempted resuscitation, communication with parents, multi-agency SUDIC history taking, multi-agency home visit, a workshop on post-mortem examination and investigations, rapid response meeting role play, report writing, meeting with parents to discuss post-mortem findings and conclusions.

Evaluation
Self assessment of skills

<table>
<thead>
<tr>
<th>Skill</th>
<th>Pre Course</th>
<th>Post Course</th>
</tr>
</thead>
</table>

129
confident to explain the SUDIC process to bereaved parents 0.00% 87.50%

know how to examine a body after death 28.00% 100.00%

know how to perform post-mortem investigations 14.00% 88.00%

know how to examine the death scene 14.00% 100.00%

Free text responses were overwhelmingly positive: “I cannot remember another course when I learnt this much in one day”.

Discussion: Potential Impact of SUDIC Sim training is massive. It can be used effectively to close the gap between knowledge and clinical experience. This may ultimately improve the quality and outcome of multi-agency SUDIC investigations and experiences for bereaved families. As a result of this pilot – all senior paediatric trainees in the West Midlands are funded to undertake this training. There is potential for a national programme. Through this pilot development - improved working relationships and understanding of police and paediatrician’s roles has evolved. The SUDIC SIM programme could easily be adapted to deliver novel but essential multi-agency simulation training for health, social care and police.

References:
2. Sudden Unexpected Death in Infancy: A multi-agency protocol for care and investigation. The report of a working group convened by The Royal College of Pathologists and The Royal college of Paediatrics and Child Health. 2004

PO 06-5 – Difficult Conversations - Let Simulation Help You
Innovation/ Future Direction and Outreach Simulation
Submission ID: IPSSW2016-1020

Alison Dodds1,*, Vandana Tuszynska2, Catharine M. Walsh1
1Learning Institute, 2Paediatric Medicine, The Hospital for Sick Children, Toronto, Canada

Context: Effective communication skills are a core competency of health professionals, yet educators struggle with teaching these effectively. A needs assessment revealed that Clinical Support Nurses (CSNs) on a surgical pediatric unit at The Hospital for Sick Children felt ill prepared when having difficult conversations with colleagues and families. Additionally, CNSs articulated a need to develop their communication skills. In response to this need a quality improvement project was undertaken to increase CSN’s self-efficacy in having difficult conversations with colleagues and families. Difficult conversations are commonly encountered by CNSs and having the necessary communication skills to deal with such issues is important to enhance unit functioning and strengthen relationships with patients, families and colleagues.

Description: CSNs were asked to identify real life experiences where they had experienced difficult conversations. A nurse educator and simulation educators collaborated to create a difficult conversations workshop that consisted of a 40 minute small-group educational session and 2 simulations based on the CSN’s personal experiences. The simulations focused on (1). two nurses speaking badly about a relief nurse and (2) a stressful team experience prior to a code white situation. Both simulations required CSNs to engage in difficult conversations. After-action debriefing discussions regarding communication followed each simulation. Following the workshop, the CSNs were provided with two difficult conversation workbooks, which they were instructed to complete once a month for 2 months to help resolve challenging situations.
Evaluation: All participants completed a pre- and post-workshop questionnaire to obtain demographic data and relevant experience pertaining to difficult conversations. Participants also completed a difficult conversation self-efficacy inventory prior to attending the workshop, immediately after, and 4 months later. Additionally, a focus group session was held 4 months following the workshop to garner an in-depth view of participant’s perceptions.

Discussion: Twenty CNSs participated in the workshop. It is anticipated that CSNs self-efficacy when having a difficult conversation with colleagues and families will improve after attending the workshop and completing the workbooks. Simulation provided a safe experiential learning experience that allowed CSNs to practice and improve their communication skills when having a difficult conversation. The intention is that the education workshop will be offered broadly throughout the organization.

References:

PO 06-6 – Implementing an International QCPR Leaderboard Enrollment and Data Protocol Using QR Codes

Submission ID: IPSSW2016-1111

Vartan Pahalyants1, Chenthila Nagamuthu2, Charmin Gohel3, Priti Jani4, Diana Mitchell4, Maya Dewan5, Mona Khattab6, Karin Frisell7, Jonathan Pirie8, Chrystal Rutledge9, Katherine Forrester9, Deborah Atken10, Daniel Lemke6, Heather Wolfe5, Andreas Pikwer7, Tomas Ornstedt7, Cara Doughty9, Marc Auerbach3, Catharine Walsh2, David Kessler1, Nancy Toffi10, Alyssa Rake11, Ralph MacKinnon10, Anthony Scalzo6, Jim Gerard6, Danny Castro6, Patricia Bastero6, Amelia Bray-Aschenbrenner9, Todd P. Chang12

1Columbia University, New York, United States, 2Toronto Hospital for Sick Children, Toronto, Canada, 3Yale University, New Haven, 4University of Chicago, Chicago, 5Children’s Hospital of Philadelphia, Philadelphia, 6Texas Children’s Hospital, Houston, United States, 7Mälarsjukhuset, Eskilstuna, Sweden, 8University of Alabama, Birmingham, 9St. Louis University, St. Louis, United States, 10Royal Manchester Children’s Hospital, Manchester, United Kingdom, 11Children’s Hospital Los Angeles, Los Angeles, United States, 12Division of Emergency Medicine & Transport, Children’s Hospital Los Angeles, Los Angeles, United States

Context: High-quality chest compressions – in depth, rate, and minimizing lean – does not occur in 36% to 87% of in-hospital CPR. Prior studies have demonstrated feasibility of using competitive leaderboards to encourage practice with a feedback-enabled QCPR simulator. We created an online leaderboard for an international, multi-site competition, to examine whether an online leaderboard increases CPR practice and improves CPR quality. This innovation would serve as an educational and competency tool to improve CPR quality among health care professionals. The leaderboard had to be accessible, to provide real-time feedback, and to minimize barriers to data collection.

Description: An online leaderboard database was developed for each QCPR research study using PHP. Each participating institution, department, and mannequin type was assigned numbers to uniquely identify participants. Codes for participants from each group resulted in a unique 9-digit number for all possible participants. The number was converted to a unique URL, then was transcribed into a QR code for each participant.

The QR code solicits a percent score from the Laerdal QCPR mannequin and a selfie photo to prove the achievement.

The online leaderboard follows algorithms and filters to display scores and thumbnails in rank form. Algorithms for badges developed a priori are next to the study participant’s score when triggered by an appropriate pattern of scores. Badges were developed to encourage competition, collaboration, and repeat usage.

Observations: We enrolled subjects right after recruitment to perform CPR and to upload data using the QR code. Challenges included the logistics of the uploading process; motivating low scorers to upload their
scores despite the reassurance of anonymity and that individual performance and institutional rankings are not to be misinterpreted as indicators of quality of patient care.

To address logistics of the QR scanner to access the camera, we found three ideal applications across commonly used smartphone platforms (Android, iOS and Amazon). We noticed that participants with higher scores were more comfortable uploading a ‘selfie’ photo, fostering a competitive behavior among their colleagues. Further observations noted: bystander (colleagues) presence boosted competitiveness, but it also it deterred saving low performance scores. We also experienced some difficulty in motivating the bystanders to recruit, after seeing a low CPR performance.

**Discussion:** Individualized QR codes combined with ready access to smartphones, allow for rapid crowd-based data collection. The selfie photograph serves a dual purpose for data integrity and to increase the social-competitive nature of the intended leaderboard. The leaderboard adds new human factors challenges with group behavior and among low performing subjects. Further modifications to protocols would optimize use of the leaderboard and data collection.

**References:**


**PO 06-7 – Use of Online Video Based, Educational Networking Instrument in Preparing Trainees for Simulation-Based Sessions**

Submission ID: IPSSW2016-LS-35

Alterkait A.1,* Cheung J.1, Pirie J.1, Dubrowski A.1
1Simulation Centre, Learning Institute, The Hospital for Sick Children

**Background:** Trainees access simulation technologies to acquire the fundamental technical skills outside of the clinical setting [1-6]. However, the disadvantages of simulation require that trainees come well prepared to practice. To date, such pre-practice preparation typically consists of reading materials. However technical clinical skills are acquired better when the learner has the opportunity to observe and mimic the performances of others [7]. The use of computer based video instructions (CBVT) has been demonstrated to be an effective alternative to reading material [8-13]. However research to date has only examined the impact of CBVT in which learners watch instructional material passively; potentially leading to superficial processing of information and boredom. The introduction of educational networking and Web 2.0 technology into the preparation process could address these issue. It has been proposed that linking students through Internet technologies may be an effective way to stimulate the learning of clinical skills [14]. This approach has not been implemented in simulation-based training in the pediatric residency setting.

**Research hypothesis:** It is hypothesized that pediatric trainees who prepare for practice with educational networking CBVT will perform better before a single, 2-hour, hands-on simulation session, than trainees who prepare with reading materials. Secondly, it is also hypothesized that the educational-networking CBVT preparation group will perform better by the end of practice, evidencing that they benefited more from the practice.

**Methodology:** Junior pediatric residents participating in an emergency procedures workshop were assigned to one of two practice preparation groups: experimental or control. The experimental group prepared with educational networking and review of Lumbar Puncture (LP) and suturing videos. This involved standardized assessment of 2 staged versions of each of the 2 skills, provision of comments and the asynchronous viewing of the group’s assessments. After pre-practice preparation, participants were pre-tested by performing the procedures. Normal workshop practice ensued utilizing simulated models. After the workshop, participants were again tested performing the procedures. Performances were evaluated using modified Objective Structured Assessment of Technical Skills (OSATS) checklists and Global Rating Scores.

**Results:** A total of 10 participants were enrolled in the study. Each group contained 5 trainees. Comparison between pre-test versus post-test (before and after workshop) showed no significant improvements in skills performance effect (Suture p= 0.396, LP p= 0.654) Comparison between groups also showed no difference as seen in the table:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Checklist</th>
<th>Global Rating Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suturing</td>
<td>P= 0.42</td>
<td>P= 0.37</td>
</tr>
<tr>
<td>Lumbar Puncture</td>
<td>P= 0.88</td>
<td>P= 0.54</td>
</tr>
</tbody>
</table>
Discussion: Quantitative analysis shows no effect of using Internet based platforms in preparing residents for training of procedural skills. The lack of significant differences between the two groups could be attributed to a number of factors:

1. Low levels of engagement in educational networking
2. Previous experience with the skills
3. Adherence to the protocol (experimental group)
4. Small sample size

Although the use of educational networking was not more effective than reading material, it may be used as an adjunct in preparing residents for simulation settings. Future research should look into methods to increase learner engagement in the preparation process when using educational networking.

References:
**Description:** Graduating medical students at our institution are offered a variety of half day courses in team training as part of their culminating experience. Nursing students are required to participate in one session during their clinical rotations, and pharmacy students are required to participate during their third year. We developed a Pediatric-specific course open to all interested students. Students participated in team building exercises and a didactic session on TeamSTEPPS principles. They then received both large group and profession-specific educational interventions from leaders in their fields regarding the medical knowledge and clinical skills needed to succeed during the simulations. Next, participants rotated through three simulations involving septic shock with the same patient stem but increasing complexity, necessitating increasingly sophisticated team skills, followed by interprofessional debriefing sessions. Students were asked to provide feedback at the end of the session.

**Evaluation/ Observations:** We received overwhelmingly positive feedback from participants from all professional schools. Many medical students commented that interprofessional training should occur sooner in training. Students expressed satisfaction with the realism of the simulated team environment and felt that the targeted educational interventions helped prepare them for the clinical management of the patient while allowing focus on employment of TeamSTEPPS skills. Medical students expressed an increased understanding in the roles and skill sets of their allied health profession colleagues. Despite explicit medical instructions before each scenario, facilitators noticed variation from established treatment protocols providing opportunities to discuss situational awareness and speaking up during crisis situations.

**Discussion:** Interprofessional team training was highly valued by medical, nursing and pharmacy students. Allowing students to repeat a scenario with increasing difficulty after targeted educational interventions aimed at arming them with required medical knowledge and clinical skills provided participants with opportunities to focus on complex communication and team management skills. By working in simulated teams, participants may gain a better understanding of the roles and skills possessed by their interprofessional team members.

**References:**

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**PO 07-2 – Barriers and Facilitating Factors to Multidisciplinary Simulation Training: A Questionnaire Study**
**Interprofessional Education (IPE)**
Submission ID: IPSSW2016-1008

Rhiannon J. Ions1,*, Jonathan Cusack1, Elaine Boyle1
1University Hospitals of Leicester NHS Trust, Leicester, United Kingdom

**Background:** Involvement in simulation training is becoming an increasingly important part of education for doctors and nurses. As with any educational approach there are differing opinions about simulation training. Currently, there is a lack of knowledge regarding what encourages and, possibly more importantly, discourages attendance for this type of training. Gaining insight into these issues may help to improve attendance at training sessions and staff experience of simulation training, in turn improving knowledge and skills. Two previous studies have looked at this issue but look at doctors and nurses opinions separately1,2. This study aims to explore and compare doctors’ and nurses’ opinions in order to see how multidisciplinary training might be improved. The project will also compare opinions of those who work in an environment where there is an established simulation programme to those who work where simulation training is a rare occurrence.

**Research question:** The primary research question for this study is: What are the perceived barriers and facilitators to simulation training for doctors and nurses working in paediatric and neonatal intensive care? Secondary research questions are: Are the perceived barriers and facilitators to simulation training different for doctors and nurses? Do the perceived barriers and facilitators differ between intensive care work areas?

**Methodology:** Participants are doctors and nurses working in neonatal and paediatric intensive care units across University Hospitals of Leicester. The study design is that of a forced answer, Likert scale, questionnaire alongside free text fields ('other - give details'). The questionnaire draws on elements that have
been used before 1,2, but was tailored to the relevant study area. It was piloted to ensure ease of use and any issues raised in the free text ‘other’ box, were added to the final version. Categorical data will be described in terms of absolute numbers and proportions. Comparisons, if required, will be performed using chi-square tests. Continuous data will be few, if any, but will be analysed using t-tests for normally distributed data and Mann Whitney tests for non-parametric data. Thematic analysis will be used for qualitative data.

**Results:** Analysis of the data has not yet taken place as not all questionnaires have been returned.

**Discussion/ Conclusions:** Once the data has been analysed it will be possible to see whether the research questions have been answered. It is hoped that the results will offer suggestions as to how simulation training can be improved with regards to attendance and staff satisfaction with an overall view to increase uptake at simulation sessions. It is hoped that the results can be discussed in the context of medical education theories and also with regards to multidisciplinary team working.

**References:**

**PO 07-3 – Simulation Teaching in the Development of Advanced Paediatric Nurse Practitioners (APNP)**

**Interprofessional Education (IPE)**

Submission ID: IPSSW2016-1012

Christopher Vas¹,*, Fharhad Motaleb², James Blythe², Jenny Longden³
¹Embrace, Yorkshire and Humber Infant and Children’s Transport Service, Sheffield Children’s NHS Foundation Trust, ²Health Education Yorkshire and Humber, ³School of Nursing and Midwifery, The University of Sheffield, Sheffield, United Kingdom

**Background:** The University of Sheffield commenced the MMedSci APNP for the School of Nursing and Midwifery earlier this year. The aim of this new program is to equip “…paediatric nurses to advance their practice...playing a pioneering role in the multi-disciplinary team making pivotal decisions about practice, leadership and management.” (1)

As Paediatric simulation fellows for Health Education Yorkshire and Humber we were approached by the program lead to incorporate simulation training to fulfill the aims of the course.

**Educational goal:** Using simulation training to develop leadership / non-technical skills in trainee APNPs, in regards to paediatric emergency management.

**Proposed approach to addressing the goal:** Key components identified from the course curriculum included the following:
- Leadership skills
- Team management
- Communication skills
- Overview of crisis resource management

As such it was felt these could best be developed by using a simulation program.

**Difficulties encountered:**
- Creating a program that was relevant for all trainee APNPs, as each have different discipline backgrounds and level of experience.
- The fact that some trainees are educationally naive to simulation training, meaning we have to overcome the recognised difficulties this entails (e.g. participant anxiety) (2)
- The balance of promoting a safe learning environment versus accountability/probity in regards to unsafe practice observed during simulation training.
- Creating simulation scenarios that were challenging but within expectations of trainee competencies.
- The challenge of debriefing by a predominately doctor based faculty to nursing candidates.
Questions for discussion:
- What is the suitability of doctors developing and delivering a simulation program predominately aimed at nursing staff?
- Will in-situ simulation in trainee’s normal place of work enhance learning or have a negative effect on confidence?
- Is simulation training the correct teaching method to help achieve the course aims?

References:
1. https://www.sheffield.ac.uk/snm/postgraduatetaught/mmedsciadvancedpaediatricnursepractitioner

PO 07-4 – Improving Provider Comfort Through Institution of Mock Codes in a Neonatal Intensive Care Unit Interprofessional Education (IPE)
Submission ID: IPSSW2016-1039

Lee Donohue¹,*, Kristin Hoffman¹
¹Pediatrics, University of California Davis, Sacramento, United States

Background: Mock codes have become an increasingly important way for medical team members to practice and improve their resuscitation skills. Pediatric residents participating in simulated pediatric codes perceive that these experiences improve their performance in real events (1). Mock codes can also improve performance of nurse responders (2). Multidisciplinary training may be the most beneficial as this most closely resembles real life events. Simulated training with physicians, nurses, and respiratory therapists has been shown to improve performance in actual events in a pediatric intensive care unit (3). There has been research published in the use of simulation to improve provider performance in adult and pediatric patients as well as in neonates involving delivery room resuscitation but none specifically in older neonatal patients. The skills required for management of an event in this group of patients are often different than what is required in delivery room resuscitation. Mock codes were not being performed in the neonatal intensive care unit (NICU) at our institution prior to this study.

Research question: Does participation in multidisciplinary simulated code blue events in the NICU improve provider comfort level at performing role-specific tasks?

Methodology: Multidisciplinary mock codes including residents, fellows, neonatal nurse practitioners, respiratory therapists and nurses will be performed one or two times per month on both day and night shifts in the NICU at our institution. An application was sent to the IRB for exemption. A survey was sent to all NICU fellows, nurse practitioners, nurses, and respiratory therapists in which they rated their confidence level in performing tasks specific to their role on a Likert scale prior to the initiation of the simulated code events. Confidence in ability to communicate during the event was also measured. The surveys will then be sent again six and twelve months later. We will determine whether there is any difference in responses using ANOVA.

Results: The initial survey results have been collected. The survey was completed by 58 nurses, 5 fellows, 4 nurse practitioners and 3 respiratory therapists. The nurses rated their overall comfort level the lowest on obtaining emergent IV access, preparing medications and locating items required in the NICU. The fellows and nurse practitioners felt least comfortable locating and using the code cart, providing appropriate dosages of code medications, and initial assessment of an infant in a code situation. The respiratory therapists were least comfortable using MR SOPA and with the intubation procedure. Additional scenarios have now been created to address these items. Subsequent surveys will be sent in October, 2015 and April, 2016.

References:

PO 07-5 – Considerations When Creating Paediatric Simulation Teaching for the South Central Ambulance Service.
Interprofessional Education (IPE)
Submission ID: IPSSW2016-1073

Jennifer Rowley¹,∗
¹Warick Medical School, University of Warwick, Coventry, United Kingdom

Introduction: South Central Ambulance Service (SCAS) have recently launched their ‘Simbulance’; a specially commissioned ambulance for high-fidelity simulation training. This project explores the requirements, complexities and considerations when designing a paediatric specific training programme on the Simbulance for pre-hospital staff.

Method: A literature review was performed to establish the current use of paediatric simulation in pre-hospital education. A questionnaire was additionally distributed to frontline staff at SCAS in order to establish what paediatric education they currently receive, whether further paediatric specific teaching would be useful, and what their main concerns are when managing children.

Results: 44 questionnaires were completed using 3 separate distribution methods. The results showed a clear want for further paediatric education, with 100% of responders stating they would attend paediatric simulation if offered. Only 36% could remember receiving paediatric teaching since qualification. 91% of responders had experience of simulation, with 82% having experienced high-fidelity simulation, and 37% having used the Simbulance. The responders main concerns when managing children included their perceived lack of experience, confidence and knowledge in this area, the management of critically ill or deteriorating children, communication issues, equipment issues and drug and fluid calculations.

Conclusions: There is clearly a marked requirement, appetite and enthusiasm for the proposed paediatric Simbulance programme. The current austere financial climate may unfortunately prevent this project from being fully rolled out to all the frontline staff in SCAS. However, if it helps improve the care for even a small handful of the paediatric patients seen it will have been beneficial.

PO 07-6 – Taking a Step Back – Unlocking Team Based Simulation Learning for Paediatric Nurses
Submission ID: IPSSW2016-LS-11

T. Fontaine¹,∗, L. Stirling¹, S. Crosby¹, C. Williams¹, S. Harris¹
¹Royal Cornwall Hospital NHS Trust, UK

The paediatric department of Royal Cornwall Hospital has an established point of care (POC) simulation programme. One advantage of POC simulation learning is its potential access to all members of the multidisciplinary team (MDT). This is especially beneficial to those with limited or no study budget or protected teaching time. These two external factors are both significant barriers to the provision of ongoing professional development within economically and staff resource stretched departments.

From the departmental MDT simulation programme feedback we identified another very common, more internal barrier to learning from simulation. Those who are not taught using simulation techniques during their initial nurse training are often reluctant to participate and if they do are in many cases too anxious to facilitate quality learning. Simulation based teaching is making its way into the student nursing curriculum and there is evidence supporting this. However the majority of our current paediatric-nursing workforce has had little previous exposure to simulation training. We believe this is likely to be a common problem across other paediatric departments.

At Royal Cornwall Hospital we have designed a nurse only simulation programme to compliment the departmental POC programme. This has provided targeted teaching for nurses but has also helped bring about a sea change in attitudes towards simulation training across the nursing team. The benefit in this is
clear to the individual nurses but with increased buy-in from the nurses but following the course we suggest the quality of the departmental POC team training also improves. We describe how we have over come barriers to achieve this and demonstrate how taking a step back from the purest form of POC team training and investing in specific groups can be beneficial in unlocking this valuable and efficient learning resource for the wider MDT.

PO 07-7 – The Role of Video Laryngoscopy in Paediatric Intubation for Inexperienced Users: A Manikin Based Pre-Clinical Study
Submission ID: IPSSW2016-LS-36

L. Ford*, M. Lo1,2, T. Beattie2
1Department for Child Life and Health University of Edinburgh, 2Royal Hospital for Sick Children Edinburgh, UK

Introduction: Respiratory arrest is the predominant cause of mortality in critically ill paediatric patients. Appropriate airway management can be life saving for critically ill children, but it is a relatively low frequency, high-risk event, with significant potential for error. Clinicians inexperienced in paediatric airway management are often the first to attend paediatric patients in the emergency setting. We examine whether the use of a video laryngoscope can improve intubation outcomes in the hands of inexperienced users.

Outcome measures:
- Time to successful intubation using direct laryngoscopy. This time was be defined as beginning when the facemask is removed, to the first successful inflation delivered with chest wall movement.
- Time to successful intubation using the video laryngoscope. This time was be defined as beginning when the facemask is removed, to the first successful inflation delivered with chest wall movement.

Secondary outcomes included the ability of the participant to deliver effective bag-mask ventilation; the participants’ visualisation the larynx using both laryngoscopes, and the ease of use of each laryngoscope.

Methods: 22 junior doctors who were inexperienced in the management of paediatric airways participated in the study. Following a teaching session, which covered the anatomy of the paediatric airway and indications for intubation, and practical teaching on the use of both the standard, and video laryngoscopes, participants were asked to deliver bag-mask ventilation and proceed to intubation of 3 manikins – an infant, an infant with a difficult airway (Pierre Robin Sequence) and a child.

The manikins used were:
- Child: SimJunior, an interactive paediatric simulator manufactured by Laerdal
- Infant: Laerdal® Neobaby
- Infant with a difficult airway: The AirSim manufactured by TruCorp Ltd, Northern Ireland, is a Pierre Robin manikin which illustrates the various congenital defects of a paediatric patient with Pierre Robin Sequence. These congenital defects include: significant mandibular hypoplasia, glossoptosis, cleft palate and a bifid uvula.

The child manikin was intubated with a 6.0mm uncuffed endotracheal tube with a malleable stylet for standard laryngoscopy and a Gliderite® rigid stylet for videolaryngoscopy. A Macintosh blade size 2 was used for the standard laryngoscopy, and a size 2.5 stat was used with the Glidescope®.

The infant manikin was intubated with a 3.5mm endotracheal tube and a semi-rigid stylet. A Miller blade size 1 was used for the standard laryngoscopy, and a size 1.0 stat was used with the Glidescope®.

The infant with a difficult airway (Pierre-Robin manikin) was intubated with a 3.0mm endotracheal tube with a semi-rigid stylet. A Miller blade size 1 was used for the standard laryngoscopy, and a size 0 stat was used with the Glidescope®.

For direct intubation, the endotracheal tube and stylet were configured in an appropriate shape. For videolaryngoscopy the endotracheal tube and stylet were angled to allow passage of the tube. Airway manikin lubricant was applied as required. The required equipment was available for each manikin and the participants did not have the option to choose different sized endotracheal tubes, laryngoscope blades, or stats for the videolaryngoscopy.

Intubation of each manikin was attempted with both a standard laryngoscope and a video laryngoscope. The order in which these attempts were undertaken was randomised. A successful intubation was one in which chest expansion was demonstrated via a correctly placed endotracheal tube within 120 seconds of removal of the bag-valve mask from the face.
Results:

Table 1: Baseline characteristics of participants (n= 22)

<table>
<thead>
<tr>
<th>Gender:</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>7 (32%)</td>
</tr>
<tr>
<td>Female</td>
<td>15 (68%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Training Grade:</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY1</td>
<td>2 (9%)</td>
</tr>
<tr>
<td>FY2</td>
<td>5 (23%)</td>
</tr>
<tr>
<td>ST1/CT1</td>
<td>8 (36%)</td>
</tr>
<tr>
<td>ST2/CT2</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>ST3/CT3</td>
<td>3 (14%)</td>
</tr>
<tr>
<td>ST4</td>
<td>2 (9%)</td>
</tr>
<tr>
<td>Other (clinical fellow)</td>
<td>2 (9%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Speciality:</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaesthetics</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>10 (45%)</td>
</tr>
<tr>
<td>Foundation Programme</td>
<td>7 (32%)</td>
</tr>
<tr>
<td>Paediatrics</td>
<td>4 (18%)</td>
</tr>
</tbody>
</table>

Table 2: Previous experience of participants:

<table>
<thead>
<tr>
<th>Previous paediatric advanced life support certification (APLS or EPLS):</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>7 (32%)</td>
</tr>
<tr>
<td>NO</td>
<td>14 (64%)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Experience of adult intubation:</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 intubations</td>
<td>10 (45%)</td>
</tr>
<tr>
<td>1-5 intubations</td>
<td>5 (23%)</td>
</tr>
<tr>
<td>6-10 intubations</td>
<td>2 (9%)</td>
</tr>
<tr>
<td>11-15 intubations</td>
<td>1 (5%)</td>
</tr>
<tr>
<td>&gt;15 intubations</td>
<td>3 (14%)</td>
</tr>
</tbody>
</table>
Experience of paediatric/neonatal intubation:

<table>
<thead>
<tr>
<th>Intubations</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>16</td>
<td>73%</td>
</tr>
<tr>
<td>1-5</td>
<td>2</td>
<td>9%</td>
</tr>
<tr>
<td>6-10</td>
<td>1</td>
<td>5%</td>
</tr>
<tr>
<td>11-15</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>&gt;15</td>
<td>2</td>
<td>9%</td>
</tr>
</tbody>
</table>

Previous experience of inserting a supraglottic airway device:

<table>
<thead>
<tr>
<th>Experience</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>14</td>
<td>64%</td>
</tr>
<tr>
<td>NO</td>
<td>6</td>
<td>27%</td>
</tr>
</tbody>
</table>

Previous experience of inserting an i-gel supraglottic airway device:

<table>
<thead>
<tr>
<th>Experience</th>
<th>Count</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>13</td>
<td>59%</td>
</tr>
<tr>
<td>NO</td>
<td>8</td>
<td>36%</td>
</tr>
</tbody>
</table>

* One participant did not complete the questionnaire, and another participant only answered part of the questionnaire. These two account for the percentages not being 100% when totalled.

In 129/132 the bag-mask ventilation technique was satisfactory. 132 intubations attempts were examined. There were 15 failed intubations in the standard laryngoscopy group, and 4 failed intubations in the video laryngoscopy group (Fishers exact test p=0.007). There was no significant difference in the time to intubation between standard laryngoscopy and video laryngoscopy. In the most inexperienced trainees (FY1-CT/ST1), the intubation success rate was 32/45 with standard laryngoscopy and 42/45 with video laryngoscopy (p <0.01). There was no difference in the more experienced trainees (CT/ST2-ST4). Participants consistently over-estimated the time to intubation with standard laryngoscopy (p <0.001) and video laryngoscopy (p 0.039). Participants reported improved visualisation of the glottic structures with the video laryngoscope. (p <0.001) 64% reported a preference for the video laryngoscope over the standard laryngoscope.

Conclusions: We have demonstrated that success rates were superior with video laryngoscopy but video laryngoscope did not improve the time to required intubation. Experience of the clinician rather than the equipment used appears to be the main factor improving success rates in paediatric intubation. This would be in keeping with current opinion. This was a small study, and the topic warrants further consideration with a larger study.

PO 08-1 – Moving to Multidisciplinary In-Situ Simulation in Paediatrics - A Single Centre Experience

*Interprofessional Education (IPE)*

Submission ID: IPSSW2016-1186

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**Background:** Simulation is an integral part of paediatric teaching as it offers the opportunity to manage common medical emergencies in a safe learning environment. It also facilitates discussion about human factors that are key in the safe and efficient management of the acutely unwell child. The care of the critically ill child involves health care professionals from different specialities with varied expertise. Due to unfamiliarity with the paediatric patient they can exhibit a degree of anxiety when suddenly exposed to the sick child. This could potentially compromise the delivery of high quality safe patient care.
Learning objective:
- To evaluate and assess the impact of multidisciplinary paediatric simulation training

Methods: Simulation training sessions were aimed at paediatric junior doctors and paediatric nurses, and were designed and run by a team of senior paediatricians and the hospital’s Resuscitation Officer in a dedicated simulation centre. Each 1 hour session consisted of one clinical emergency scenario, followed by a debrief. Written learning points were circulated to all participants. The program was expanded to include anaesthetic and emergency medicine junior doctors and adult nurses. It moved to the resuscitation bay in the emergency department. The layout of the sessions remained the same.

Results: Over six months 12 simulation sessions were held. Two third included paediatricians and were delivered in the simulation centre. One third were multidisciplinary and in-situ. An average of 10 participants took part in the paediatric simulations and an average of 15 participants took part in the multidisciplinary paediatric simulation sessions. Evaluation for both groups showed that the sessions were relevant for clinical practice and that all felt more confident in approaching the critically ill child. Comments from non-paediatric participants included the benefits of discussing paediatric emergencies with paediatricians and clarifying commonly encountered issues such as choice of anaesthetic drug for intubation. Discussion on human factors was very active in multidisciplinary simulation training sessions. Issues like communication methods between different specialities, escalation pathways, and situational awareness like location of key equipment and leadership in the presence of multiple teams were highlighted.

Conclusion: Multidisciplinary in-situ paediatric simulation has been welcomed and endorsed by the specialities involved. It has offered an opportunity to jointly discuss paediatric emergencies, clarify uncertainties in management, introduce different members to each other and minimise anxiety that non-paediatric practitioners may have when encountering the sick child. Thus, enhancing patient safety. Plans for future development include extending the programme to other specialities (ENT, orthopaedics) and include uncommon paediatric emergencies.

References:

PO 08-2 – Improving Care of the Deteriorating Patient Through Interprofessional Simulation
Interprofessional Education (IPE)
Submission ID: IPSSW2016-1237

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Context: Pediatric and Medicine-Pediatric residents working at Children’s of Alabama in Birmingham, AL are required to evaluate the quality of their training yearly. Over the last 3 years, one key expressed dissatisfaction is their communication with nursing. Patient safety is enhanced when communication between nursing staff and physicians is without barriers.

Description: In July 2014, in an effort to decrease the number of codes occurring outside of the ICU, a simulation course was developed to improve nurse recognition of the decompensating patient. During the case, the nurses do not have a physician readily available and must call the physician expressing concerns. Physicians are scripted and tell the nurses they are busy seeing other patients unless the nurses are explicit about their concerns (i.e., “I am concerned”, “I am uncomfortable” or “I need you to come now”). If they clearly express their concerns, the scenario ends with the physician coming, treatment is initiated and the patient is transferred to the ICU. Debriefing focuses on nurse recognition of shock, communication with the physician and discussion of cognitive errors that can lead to decreased recognition of the deteriorating patient. During the onset of this course, 2 physician experts who participated in the debriefing also played the physicians. However, in July 2015, as a way to address the concerns of the residents and in an effort to improve interdisciplinary communication we began requiring resident attendance during their intern year.
Observation/ Evaluation: In its early phase, pilot data has shown an overwhelmingly positive response by both nurses and residents to this interprofessional simulation opportunity. Ten residents have participated thus far. 100% if residents either agree that this simulation experience will improve their performance in the clinical setting. All residents felt both the simulation scenario and debriefing were valuable learning experiences. Comments on evaluations from both nurses and residents have centered heavily on communication. One nurse states she enjoyed “having an MD in the room for debriefing; helped to understand how they think. Very helpful with physician communication.” One resident enjoyed “having the chanced to exchange our viewpoints” with nurses.” Another said, “I appreciate seeing things from nursing point of view.”

Discussion: Implementation of this simulation course has taken positive steps towards addressing resident concerns regarding the need to improve nurse-physician communication. We plan to continue to improve upon the course with residents participating yearly throughout their residency training with the goal of continuing to remind both disciplines of the need for clear, concise communication. We are also planning to follow up again with residents to determine if participation has changed their interactions with nurses.

PO 08-3 – Using Simulation to Develop the Confidence and Role of Enhanced Nurse Practitioners in Neonatal Care
Interprofessional Education (IPE)
Submission ID: IPSSW2016-1248

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Though advanced neonatal nurse practitioners have been established for many years in neonatal care, undertaking a variety of roles, the role of nurses who have undertaken enhanced neonatal practice training is less clear.

In our unit, a team of enhanced neonatal nurse practitioners (ENNPs) work alongside advanced neonatal nurse practitioners (ANNPs) and other medical staff in caring for infants in the high dependency and special care nurseries. At night, the ENNP has the responsibility to review sick infants in these areas and escalate appropriately to senior medical staff, as well as providing the continued medical care necessary. These nurse have all undertaken the enhancing neonatal nursing practice module to develop skills in cannulation and airway management as well as developing existing knowledge around the pathologies in the sick neonate, building on their studies during their qualification in specialty module.

Despite this, it can still be daunting and overwhelming when faced with the responsibility of managing the expected and unexpected deteriorating infant in the high dependency and special care areas. Simulation-based training has been grounded in both medical and nursing education over recent years and has the potential to dramatically improve the nurses’ preparedness to manage the real medical emergencies that confront them in professional practice¹.

As the role taken by our enhanced neonatal nurse practitioners have increased over recent years, mainly due to the number and complexity of neonates in the high-dependency and special care areas, there was an identified need for specific team education, not only around the medical aspects of managing these infant, but also the human factors – communication and situational awareness. A programme of specific simulation practices based around real patient events in the areas they work was devised and reviewed.

We present the feedback from the ENNPs, especially look at their confidence in recognizing and managing these situations as well as their awareness of the human factors: leadership skills, team communication when escalating and situational awareness.

References:
PO 08-4 – Status Quo in Pediatric and Neonatal Simulation in the German-Speaking Countries: The Dachi Survey

**Patient safety and quality improvement**

Submission ID: IPSSW2016-1182

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**Background:** Simulation has acquired wide acceptance as an important component of education in health care and as a patient safety tool. Successful recognition and resuscitation of critically ill or injured children requires proficient technical and non-technical skills¹,². While the simulated practice of these competencies has been well established in most Anglo-Saxon countries³, simulation training is still not established in many European countries.

**Research question:** The authors of this article and founding members of the Netzwerk Kindersimulation⁴ (Pediatric Simulation Network) aimed to survey all pediatric and neonatal health care institutions and departments in Germany (D), Austria (A), Switzerland (CH) and the German-speaking part of Italy, South Tyrol (I) (DACHI) on their current status of pediatric and neonatal simulation-based training.

**Methodology:** We composed a comprehensive online survey including 26 questions on the distribution and organization, target groups, resources, instructor and participant education as well as research activities. The questionnaire was validated according to established models⁵ including a pre-test (Table 1) and distributed electronically by the online tool SurveyMonkey®⁶.

**Results:** After dispatching a total of 472 surveys (n=359 in D, n=41 in A, n=65 in CH and n=7 in South Tyrol) we achieved a 25.8% response rate, with 62 responders from D (17.3% out of all D), 33 from A (80.5% out of all A), 21 from CH (32.3% out of all CH) and 6 from I (85.7% out of all I), at the time of abstract submission (i.e. November 1st, 2015). 67.2% of surveyed institutions already perform simulation-based training, including algorithm training (89.4%), simulation-based skills training (60.6%), high fidelity simulation training (53%) and other courses (10.6%). The most frequently stated impediments for establishing pediatric simulation-based training were lack of personnel (64.9%) and financial (59.5%) resources.

**Discussion and conclusion:** The significant response rate of our survey underlines the presence of a previously unknown, but strong interest in pediatric and neonatal simulation in the DACHI region. Our findings provide an initial position for the advocacy and expansion of simulation in pediatrics. The better knowledge of national and international resources, along with the recent foundation of the Netzwerk Kindersimulation⁴ will support a more effective collaboration in education, training, quality improvement, research and resource management among all simulation enthusiasts in this region aiming to ultimately increase patient safety of neonates, children and infants.

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Table 1: Number (=n) of comments per country in the pre-test analysis; 17 comments suggested a better phrasing of various questions, five comments recommended additional instructions and more adapted options for answering different questions.
References
5. Piault E et al. Linguistic validation of translation of the self assessment goal achievement questionnaire from English. Health Quality of Life Outcomes 2012,10:40

PO 08-5 – Craniopagus Conjoined Twins – Interprofessional Delivery and Resuscitation In Situ Simulation

Patient safety and quality improvement

Submission ID: IPSSW2016-1126

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Context: Craniopagus conjoined twins occur in approximately 1 in 2.5 million live births and account for 2-6% of all conjoined twins. Given its infrequency, delivery and resuscitation of craniopagus conjoined twins poses a significant challenge for obstetrical and neonatal healthcare providers.

Description: We developed an interprofessional in situ simulation to identify best practices and latent safety threats (LST) for delivery and resuscitation of craniopagus twins at our institution. Prior to simulation, potential issues were identified related to extraction of twins, equipment, positioning of staff relative to infants and one another, recruitment of the resuscitation team, coordination and prioritization of care, and transport of infants. Based on identified potential issues, a scenario was created, workflows were developed, a staff positioning plan was created, and equipment was prepared. In situ simulation was conducted one month prior to expected delivery. Two basic neonatal mannequins were fused at the temporal-parietal region based on MRI imaging. The fused mannequins were placed within a constructed uterus. Authentic equipment was used and simulated vital signs were displayed on cardiorespiratory monitors. Prior to the scenario, the interprofessional team of neonatal and obstetric health care providers was briefed on predetermined team composition, positioning of staff and infants, workflows and site of conjoining. Healthcare providers participated in their native roles and the 45 minute scenario which included delivery and resuscitation was followed by 60 minute facilitated debriefing.

Evaluation/Observation: Debriefing notes were analyzed using qualitative methods. The 7 LST themes that emerged were: 1) ergonomics, 2) technical, 3) communication, 4) roles, 5) equipment, 6) staff, and 7) staff recruitment (Figure 1). The majority of LST related to ergonomics, specifically positioning of staff relative to the infants and one another, and technical issues such as type of uterine incision and dosing of infants. Workflows were modified and LST mitigated prior to the actual delivery and resuscitation. The infants unexpectedly delivered at 32 week’s gestation within hours of the simulation, and the majority of the health care providers who participated in the simulation performed the successful delivery and resuscitation.

Discussion: In situ simulation is an effective strategy for testing workflows and identifying LST in various healthcare environments. We demonstrated that in situ simulation is highly effective for preparing a team for the safe delivery and resuscitation of craniopagus conjoined twins, an infrequently occurring event.
PO 08-6 – A Theoretical Framework for Simulation across Modalities
Submission ID: IPSSW2016-LS-12

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**Context:** An understanding of learning theories is essential to a simulation educator’s ability to properly select the correct simulation modality and design the scenario for specific audiences and educational goals or learning objectives. No single learning theory and its associated teaching techniques is applicable across all simulation modalities. The simulation education literature has detailed many learning theories, enough so that an educator may become overwhelmed with the options.

**Description:** We examined a wide range of learning theories and distilled these down to core learning theories that have the most utility with simulation as deemed by prior references in the simulation literature and our own experiences. We then constructed a model that allows these learning theories to be applied across a variety of simulation modalities.

**Observation:** Our model (Figure 1) accounts for a variety of simulation modalities ranging from isolated skills practice, to individual knowledge development, to team-based learning. It concentrates on three widely accepted learning theories (behaviorism, constructivism, and social learning) that are all underpinned by other approaches that cut across all simulation modalities (brain-based learning, adult learning, and experiential learning). The model also describes a continuum of feedback approaches relevant to the learning theory and simulation modality.

**Discussion:** There are many other learning theories and each may have specific application to individual simulation types. However, the choices are extensive and may make for an unwieldy educator toolkit. The approach we present simplifies (but not overly so) the options an educator can use to align his or her teaching practices to the appropriate learning theory to match the simulation modality.
References:


PO 08-7 – Combining E-Learning, Mastery Learning, Peer Teaching, and Remote Monitoring in a Hybrid Program
Submission ID: IPSSW2016-LS-13

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Background: Skills teaching in healthcare can be challenging in the best of conditions. Add in a lack of instructors or faculty and remote locations, and the difficulty is multiplied. The Crisis Research Centre at the Lithuanian University of Health Sciences was tasked with teaching or updating a wide variety of practicing clinicians in Kazakhstan with skills essential to newborn, pediatric, and adult resuscitation. The lack of access to experienced faculty and geographically isolated locations made this task more difficult. The Centre developed a hybrid approach to teach these skills that included four key components:

- Review of online, video driven descriptions and instructions of skills.
- Breaking each complex task into essential elements in an educational program that built mastery by having learners progress through fundamental tasks to complete simulations of the tasks in increasingly difficult increments.
- Devising a teaching methodology that relied on peer-to-peer teaching using procedural checklists that forced learners down correct pathways during learning exercises.
- Remote video monitoring of final performance tests of learners in Kazakhstan by the Centre’s staff in Lithuania.

Educational goal: Limitations in faculty availability at the local level forced a creative approach to the problem. The system has been developed and tested with over 2,500 resuscitation team members in Kazakhstan since 2013. Operationally, the system is working well. However, no formal test of its efficacy compared to standard faculty-led teaching has been done. A randomized controlled study comparing the hybrid model against standard instruction is planned with expected initiation in summer 2016.

Proposed approach: The proposed study will randomize medical students on anesthesia rotation at the Penn State Hershey Medical Center to either receive the hybrid training or standard instruction in basic and advanced airway procedures. Three primary data points are: Initial post-instruction skills test, faculty assessment of skills in actual OR patient cases, and exit skills test at conclusion of rotation (Figure 1). Additional data points will include learner and faculty time spent on instruction, learner evaluation of instructional methodologies, and learner perceptions of competence.

Discussion: While the Centre’s work has targeted low resource areas, findings of this study would have implications in all areas as faculty time could be better allocated to more productive functions. The use of a
mastery learning model is not in itself unique in medicine, but combining it with e-learning and peer teaching is unique. If the study hypothesis that the hybrid bundle will produce performance results equal to or greater than instructor led skills training is supported, this model of instruction will be a valuable tool for not only resource limited areas but also for healthcare education in general.

Figure 1

References:
6. Martineau B, MaMeds S, St-Onge C, Rikers RM, Schmidt HG. To observe or not to observe peers when learning physical examination skills; that is the question. BMC Med Educ. 2013;13:55.


PO 09-1 – Improving Residents’ Knowledge of Code Cart Items and Locations Using Simulation

Patient safety and quality improvement
Submission ID: IPSSW2016-1119

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Background: Effective and timely access to supplies in a code cart during an emergency is a key component of delivering optimal care to patients. While nurses often assist with gathering supplies from code carts, physicians can be extremely helpful if they know what is contained and where items are located. A knowledge deficit related to code cart resources was identified within our institution among Pediatric and Medicine-Pediatric residents.

Research question: Can residents’ knowledge of code cart items and locations be improved with simulation?

Methods: Pediatric residents during their Pediatric intensive care rotation participate in a simulation scenario of an infant with respiratory failure requiring intubation and chest compressions with epinephrine. After history facts are obtained by the confederate nurse, the nurse exits leaving only physicians to obtain items required for intubation and bradycardia from the code cart. Prior to the simulation, residents complete a pre-test gauging their self-assessed knowledge and comfort with code carts as well as their accuracy with a 29 part checklist of item availability in code carts. Following a structured debriefing post simulation, subjects are educated on the code cart and allowed to examine a code cart. Participants then complete a post-test.

Results: To date, 18 residents have participated over seven months. There is a statistically significant increase in knowledge of items in the code cart when comparing pre-test and post-test scores. The average pretest score was 13.8± 3.17 vs 22.9± 2.61, p <0.001. There is also improvement in self-assessed comfort following the simulation session (p<0.001). When comparing post-graduate year 1 (PGY-1) with upper-level residents (PGY 2-4), upper-level residents were found to have higher pretest scores of correct items in the cart (15.8± 3.69 vs 12.2±4.10, p=0.001). Interestingly, there was no significant difference in post-tests scores (p=0.4) among the two groups following simulation and education. Furthermore, upper-level residents were found to have higher self-assessed knowledge when compared to interns both before (p=0.01) and after education (p=0.04). The same was also found to be true with self-assessed comfort of carts pre- (p=0.01) and post-intervention (p=0.02).

Future directions: This study highlights the use of simulation to improve resident knowledge of hospital resources. The simulation appears to be effective in showing residents the usefulness of this knowledge in simulated patient emergencies. Future effort will assess attrition rates of code cart knowledge by having participants repeat a post-test 4-6 months after completion of the initial simulation and education. We will also be evaluating time from vocalization of need for intubation to retrieval of intubation supplies as well as the time to completion of fluid bolus administration to determine if simulation and education improves retrieval time of supplies.

PO 09-2 – Wrapping Your Arms Around PIV Infiltration and Extravasation

Patient safety and quality improvement
Submission ID: IPSSW2016-1128

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**Background/Significance:** Seattle Children’s noticed an increase in significant PIV infiltrations and extravasations. Staff nurses verbalized they were unaware of the difference between an infiltration and extravasation. Patients were experiencing preventable harm as there were a number of Grade 4 extravasations within the past six months that indicated a need for training, education, and competency assessment of this defined nurse sensitive indicator.

**Methods:** The Director of Nursing Professional Development, Clinical Nurse Specialist for Cancer and Blood Disorders/Ambulatory Infusion Center and Vascular Access Team, and Clinical Nurse Specialist, Nursing Quality and Safety collaborated on a plan to provide education and developed a simulated arm that nurses used to assess and measure PIV infiltrations and extravasations. After producing arms that mimicked an infiltration and extravasation, we trained trainers from each unit and provided them with simulation materials. The trainers scheduled sessions on each unit. Nurses were provided a PowerPoint™ presentation, competency assessment, and post test on Seattle Children’s Learning Management System.

**Results:** The following units are planning training sessions in October and November, 2015: Acute Care Float Pool, Ambulatory Infusion Center/Hematology-Oncology Clinic, Cancer Care, Intensive Care units (CICU, PICU, and NICU), Emergency, Interventional Radiology/Gastroenterology, Medical, Post Anesthetic Recovery, Psychiatry and Behavioral Health, Rehabilitation, Surgical, and Urgent Care. Follow up monitoring is part of Seattle Children’s Nursing Quality Plan and will evaluate the rates of PIV infiltrations and extravasations.

**Conclusions:** The potential implications for this competency assessment program are earlier recognition of infiltrations and increased vigilance of PIVs with vesicant medications.

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**PO 09-3 – Competent Co-ordinators - Meeting the Training Needs of Staff Reorganisation with Simulation**  
Patient safety and quality improvement  
Submission ID: IPSSW2016-1145

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**Context:** Taking charge of a ward clinical shift is daunting for newly qualified nurses. This abstract describes the development of a ward co-ordinators competency pathway, written to support and develop band 5 paediatric nurses in a leadership role, following Trust workforce review re-defining the band 5 role and requiring them to co-ordinate on a shift basis, 2 years post-registration. The Francis report states that Leadership training should be available at every level and the acquisition of these skills should be given priority (Francis 2012). The development of this pathway responded to the skill mix review comparing our nursing bands with other specialist children’s Trusts, (Civil Eyes Research 2010).

**Description:** Review of national paediatric job descriptions and band 5 role. Trust band 5 job description rewritten against AFC national profile and matching other paediatric Trust band 5’s. Consultation with other Trusts reviewing post-preceptorship training programmes for band 5 nurses. Trust steering group consisting of educators and nurse managers to design a training programme enabling our band 5 nurses to become competent practitioners. Band 5 nurses consulted to determine their development needs for this challenging role.

**Observation/Evaluation:** This learning consists of a Trust designed bespoke training day utilising simulation to introduce band 5 nurses to both clinical and management scenarios, complementing an accompanying pathway/clinical competencies booklet to be completed with a “buddy” in their clinical workplace within a specific timeframe. A local evaluation of the project shows that of 17 band 5 nurses who have completed the pathway, 9 are satisfied and 8 extremely satisfied with the efficacy of simulation day as a teaching method.

**Discussion:** The study day uses a blended learning approach utilising simulation, group work and role play and is facilitated by Simulation trainers, Clinical Educators, Matrons & Senior nurses.
Both the day and pathway document promote a reflective and interactive approach, highly valued by the band 5 nurses going through the programme and has resulted in supported and competent ward coordinators.

We have developed a unique and cost effective pathway which can be adapted to meet varying clinical environments/staff groups.

Currently gathering a larger sample of initial and post pathway evaluations as we have to date trained over a 100 nurses

The pathway meets service demands and encompasses modern technologies/teaching methods, resulting in essential staff development/retention and ultimately better patient safety (DOH 2011).

References:

PO 09-4 – Paediatric Tracheostomy Training Care Package
Patient safety and quality improvement
Submission ID: IPSSW2016-1136

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1Imperial College Lead Provider, London, 2Lancashire Teaching Hospitals NHS Trust, Preston, 3Imperial College NHS Trust, London, United Kingdom

Context: The prevalence of children with tracheostomies is increasing (1). Yet it is a condition that healthcare professionals in District General Hospitals face infrequently. This creates an under-confident workforce that lacks the skills and competencies to look after these children. This can adversely impact the safety and quality of care these patients receive.

The ultimate aim for these children is for them to be in the community. Parents and carers do have tracheostomy training prior to their child being discharged. Nevertheless, the first time they face an emergency situation independently may be when their child is life-threateningly unwell. A prior experience with Simulation may increase their confidence and preparedness for such a situation. However, there are currently no high-fidelity simulation paediatric tracheostomy courses for non-healthcare professionals.

Description: The Lancashire Simulation Centre developed a paediatric tracheostomy training package for healthcare professionals and carers of children with tracheostomies.

The learning objectives of the course are:

- To have an understanding of indications for neonatal and paediatric tracheostomies
- Understand the appropriate storage and testing of equipment
- Learn and demonstrate the appropriate management of a patient with a tracheostomy, including tube changes;
- Emergency management of a blocked or displaced tracheostomy tube, including practising with high-fidelity simulation scenarios

Evaluation: The course was piloted with the paediatric nursing staff at Royal Preston Hospital. Feedback via Turning-Point questionnaire and written feedback has been very positive. The participants unanimously reported:
- An increase in their ability to recognise deterioration in these patients
- More confidence with the emergency management of paediatric tracheostomy patients

Discussion: Since the pilot, all paediatric nursing staff at the hospital have undergone training. The course has been expanded to doctors, allied healthcare professionals, parents and carers of children with tracheostomies.

The course has received accreditation from the RCPCH, with CPD points available for healthcare professionals.
PO 09-5 - Nursing Vigilance: Simulation to Decrease Out of ICU Codes

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

Submission ID: IPSSW2016-1148

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Early recognition and prompt intervention of a child with a deteriorating condition remains paramount in preventing cardiac arrests from occurring outside of critical care areas. Children at risk must be identified so prompt interventions can avert a medical crisis or facilitate transfer to a critical care area.

In July of 2014, a three-part simulation-based education program was introduced consisting of a computer based training module (CBT), a simulation scenario and follow up in situ scenarios. All in-patient nurses were required to attend with the exception of psychiatry.

The interactive CBT included cognitive thinking, and communication content, emphasized by the inclusion of tragic stories of children and families harmed by medical errors. Completion of the CBT was required for simulation participation. The simulation case was designed to focus on the recognition and treatment of a deteriorating patient. Scenario is a child progressing into uncompensated shock. Debriefing focuses on assessment findings, how these findings are communicated to a physician and appropriate interventions for the deteriorating patient. Emphasis is placed on patient assessment, nurse-physician interactions regarding patient condition and treatment, and navigating the chain of command. Simulations were debriefed by simulation nurse educators and physicians. Scenario participants were limited to four per 90 minute course.

In the in situ scenarios nurses were asked to identify a patient on their unit with the highest risk of deterioration. A 10-15 minute simulation was then conducted rehearsing a worst case scenario for that particular patient including interventions, notification and identifying necessary resources.

This course exceeded our expectations in evaluations, anecdotal reports, and impact on patient safety. Codes in non critical care areas have fallen. We believe this course is an important component of this success.

Overall nurses demonstrated rapid and accurate recognition of the deteriorating patient, but lapses in timely care seemed to occur when these were translated by phone to a physician. Failures in communicating concise assessment finding to the physician were noted. Nurses used terms such as tachycardic and poor perfusion instead of actual numbers or clinical findings. The majority of nurses did not use the term shock when contacting the physician although they clearly recognized the signs and symptoms. Nurses are traditionally trained not to diagnosis and reported not being comfortable using language considered a diagnosis. Thus, when asked nurses felt they communicated the patient was in shock because a description of it had been given. This is one example where nurses and physicians had inadvertent communication failures regarding patient care that became repetitive themes in the debriefing. The post debriefing discussions have been so insightful all interns are now required to view the CBT and attend one simulation session with nursing.

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**PO 09-6 – Parent Confederates in Pediatric Simulation Increases Learning Communication Skills with Parents**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1159

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**Research question:** That parent’s of children receive insufficient information during resuscitation. By role playing a parent as a confederate in a paediatric simulation event can provide increased understanding and therefore learning of the questions and communication required for a parent in such a real life event.

**Background:** Communication within resuscitation is a key element in patient care. In paediatrics communication with the parent is not only key to obtaining the correct information. It is also crucial to provide appropriate information to the parents throughout their child’s condition and progress. This study is designed to increase medical staff’s confidence in communicating with a parent within a resus situation, and to provide staff with a simulated experience of the types concerns that a parent would have at that time in order to improve medical staff's ability to deal with similar stressful situations in real life.

**Method:** During the Emergency training program for Registrars in paediatric emergency Medicine at the Lady Cilento hospital a weekly simulation program is ran each term. A Doctor will be selected for each weekly sim to role play a parent as a confederate within the simulation event and will be given information as to how they are to behave within the Simulation event as a parent. Information on the level of communication they received as a parent will be discussed in the debrief and evaluated in Questionnaire form after the event.

**Discussion:** It is postulated that by role playing a parent during a simulated paediatric simulation that the participants will have a heightened awareness of the types of information that are important to a parent during a high stress event, such as resuscitation of a child.

**References:**


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**PO 09-7 – Using Simulation in Preparation for Pediatric OSCE Exam**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1176

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**Background:** Simulation-based education is a popular learning modality in the field of medical education. In pediatrics, simulation is mainly used in acute pediatrics, procedures and nursing learning. Using simulation for pediatric clinical exam “OSCE” preparation is minimal in the research body.

**Aim:** The purpose of this study was to evaluate the role of hybrid simulation (combined manikin and standardized patient) in the preparation of pediatric trainees for short cases OSCE examination.
Methods: Data from 28 trainees of clinical exam have analyzed. All the trainees attended the three days clinical workshop for the MRCPCH exam preparation done by the researcher. Data extracted from three sources; questionnaire (pre and post workshop), short interviews during the workshop and the researcher’s reflective journal. The hybrid simulation was used for short cases training during the workshop.

Results: The four major themes (and their subthemes) emerged from data analysis by manual coding of the three sources were; (1) Hybrid simulation is useful in short cases training, (2) Simulation is more effective compared to live patients training, (3) Hybrid simulation helps to pass the pediatric OSCE exam and (4) Trainees might be unaware about the effectiveness of simulation learning.

Conclusions: Hybrid simulation is a new effective modality of training for short cases stations in clinical pediatric postgraduate OSCE preparation. We suggest that focused simulation training might help MRCPCH clinical exam candidates to pass their final exam. Recommendations are made regarding future researches to study the use of different types of simulations for OSCE exam preparation.

References:

PO 10-1 – Using Mid-Construction Simulation to Guide Development of a Pediatric Special Isolation Unit

Patient safety and quality improvement

Submission ID: IPSSW2016-1183

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Context: The ability to care for pediatric patients with serious emerging infectious diseases is challenging, and to date no specially designed biocontainment units exist at a freestanding pediatric hospital anywhere in the world. An 8-bed special isolation unit has been built at Texas Children’s Hospital in Houston, Texas. Here we describe the use of mid-construction simulation scenarios to guide the development and design of such a unique unit, evaluating for latent safety threats in unit design before construction is completed.

Description: In collaboration with local and national public health and infection control experts, we designed and built a unique pediatric 8-bed special isolation unit at Texas Children’s Hospital West Campus, a large community pediatric hospital in Houston Texas. A mock-up area of the patient rooms and nursing stations to scale was built in an undedicated shell space, allowing us the opportunity to perform multiple simulation exercises in the space to identify and address potential design flaws before final construction. Two separate scenarios were created involving the care of a critically ill pediatric patient with Ebola virus. These scenarios were executed with multidisciplinary clinicians in full personal protective equipment in order to test the physical space, design, equipment, workflow, and communication barriers of this special isolation unit. Simulations were video recorded and debriefed using scripted debriefs focused on identification of design concerns as a team including simulation instructors, clinician participants, nurse and physician leaders, and members of the construction and architectural team.

Evaluation: Mid-Construction simulation resulted in 48 unique recommendations: 33 of these recommendations directly related to physical space, design, and audio/visual technology. An additional 15 recommendations related to systems and processes, personnel resources, or clinical performance and procedures. Examples of specific recommendations include insufficient counter space to safely perform laboratory work, the need for additional means of communication in all work areas, adjustment of sharps containers and call buttons for maximal safety of patients and clinicians, and the need to build into the unit specialized “pass-though” drawers to allow safe and easy passage of supplies in and out of isolation rooms. Additionally, needed changes in workflow and staffing were also identified, as well as the need for improved visibility into all patient areas.

Discussion: This is the first report of using mid-construction, high-fidelity simulation to identify and address unrecognized or latent safety threats to patients and clinicians within a newly designed pediatric biocontainment unit. These exercises allowed for decision support and solutions to unit design and
workflows, identifying and addressing multiple issues and ensuring safe, high quality care of children and staff in this unique pediatric unit.

PO 10-2 – Effect of a Simulation Based Training Programme for Nurses on Paediatric Emergencies Management
Patient safety and quality improvement
Submission ID: IPSSW2016-1232

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Introduction: Considering the emphasis on safety in health care, new methods for training qualified nurses are being considered (1). Nurses are often the first responders in paediatric wards when clinical emergencies occur. It requires effective training to ensure appropriate management of emergency situations in paediatric patients (2). Simulation can be used to meet this demand by creating learning opportunities that are unavailable in clinical practice.

Learning objectives: The aim of the study was to evaluate the efficacy of simulation-based training for ward nurses’ ability to detect and manage paediatric emergencies.

Methodology: A mixed methods design was employed using a group of qualified paediatric nurses who were matched into two groups. The control group had classical lecture training and the intervention group received two simulation-based training sessions added the same lecture training. Participants knowledge was assessed with a multiple choice questionnaire (MCQ) as pre-test and post-test (before-BT and after training-AT). Questionnaires completed before and after training asked participants to rate their perceived confidence. Participants also asked to evaluate their decision about the contribution of simulation on their improvement of knowledge and skills when managing the arrest patients.

Results: Forty six nurses took part in this study. Participants knowledge was higher AT than BT (78% vs 41%). Participants’ self-confidence to care for a victim of paediatric emergency was increased after completing the training (73.3 % AT vs 38.6 % BT). Results demonstrated a statistically significant improvement in confidence following simulation training, which was explained by the provision of insight and preparation for real life. Hundred % of the participants believed the simulation based education must take place in their continuing education.

Discussion: The results indicate that a simulation-based training is an effective method to improve knowledge and clinical performance ability in nurses learning paediatric emergencies management in ward. Nurses’ confidence are also enhanced following simulation.

In conclusion; such a training programme can be valuable to assist with continuing education, orientation programmes and staff development for nurses. Nonetheless further research should aim to replicate these findings using larger sample sizes and direct assessments of nurses’ clinical performance.

References:

PO 10-3 – Building and Validating a Proficiency Check for Healthcare Professionals
Patient safety and quality improvement
Submission ID: IPSSW2016-1045

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Context: The Pediatric Intensive Care Unit of the Erasmus MC-Sophia Children’s Hospital launched a patient safety program in 2004. This 28-bed, level-3 unit admits approximately 1400 children annually. The staff consists of 150 nurses, 11 paediatric intensivists, 5 fellows and 10 residents. Since 2008 all staff take part
in simulation training sessions to improve crew resource management (CRM) skills. While so far these have been learning experiences only, we are now dedicated to use these sessions for skills testing as well. Or, in other words, a ‘profcheck’ in the framework of simulation training. We believe a profcheck for our pediatric intensive care nurses is essential to sustain the high level of our patient care.

**Description:** September 2014 we started developing a three-stage profcheck in collaboration with the Dutch Central Institute for Test Development (CITO). Stage 1 consists of learning and a knowledge test. Stage 2 is a skills test, and stage 3 comprises application of the skills at team level. To guarantee an objective and uniform assessment method we have taken an assessor training course. Next we developed two different assessment forms. The one contains items relating to skills, the other items relating to aspects of the role of the first responsible nurse, such as leadership, cooperation, communication, professional performance and reporting. Since November 2014 we have been training all assessors - in a pilot of the profcheck encompassing the first two stages. The third stage will be started in November 2015. This stage is assessed by two assessors with special attention to skills at team level. The procedure will be filmed, but the footage will be used only in case of doubt about the outcome. The outcome may be reason to recommend further education.

**Evaluation:** As stage 3 is scheduled to start not until November 2015, we could evaluate stages 1 and 2 only. In general these have received a favourable response. The participants report they are more self-confident, particularly in acute situations. Furthermore, the role of the first responsible nurse has become clearer. Assessing a professional's performance at team level proved not easy and this was a reason to adapt the assessment forms. There is more clarity now about how to score the various items.

**Discussion:** Only limited literature is available about the assessment of a professional’s performance at team level. Developing this profcheck therefore took a lot of time and the process required careful consideration of each step. This profcheck may serve as a blueprint to assess other skills at team level, and perhaps in other disciplines as well. We believe it can clarify both the structure and expectations and remove doubts, eventually benefiting patient safety and quality of care.

**PO 10-4 - Learning Through Play? High Fidelity Paediatric Simulation for 4th Year Medical Students Assessment (including use and validation of measurement and assessment tools)**  
Submission ID: IPSSW2016-1198

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**Background:** Simulation is a powerful learning tool. It provides a realistic clinical encounter in a safe environment, allowing experimental learning and stimulates reflection, thereby enhancing education and ultimately, improving patient safety.1 We developed a simulation initiative aiming to improve the ability of medical students to assess and manage acutely unwell children.

**Methodology:** Students attended a prebrief and familiarisation session, followed by an individual simulation scenario of an acutely unwell child. The same scenario was repeated five weeks later. Students were marked against pre-defined criteria. We developed a scoring tool where each clinical intervention was scored on a 0-3 scale based on whether it was done efficiently, done in an untimely manner, done with prompting or not done at all. The same assessor rated each simulation in order to minimise variability. A formal debrief facilitated students problem solving and explored technical and non-technical issues. Learning points were documented and students were provided with a copy, along with relevant clinical guidelines.

**Results:** 90% of students gained a higher mark during simulation 2. Mean percentage increase was 20.1%. 100% of students found the verbal debrief to be useful and 76% strongly agree with the statement “I feel more confident managing an unwell child as a result of this session”.

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**Conclusion:** This simulation based teaching programme showed not only an improvement in trainee confidence but also a measurable improvement in performance (Kirkpatrick Level 3).

**PO 10-5 – Relationship between Self-Efficacy and Performance in Neonatal Resuscitative Tasks**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1058

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**Background:** Self-efficacy is often used as an outcome after an intervention in research on different methods to improve resuscitation skills. (1,2,3) The goal of many projects is to improve the care provided to real patients. However, this is often difficult to measure and self-efficacy is used as a surrogate measurement of ability to perform in real situations. Limited research has been done on the specific link between self-efficacy and performance in resuscitation. Self-efficacy certainly plays an important role in the ability of a provider to resuscitate a patient as it can influence the initiation, performance and maintenance of behaviors. However, it is not clear whether it can be used as a marker of how well someone will perform. Roh, et al found there was a significant correlation between self-efficacy and performance of chest compressions but not in other CPR skills. (4) There was no correlation between measured self-efficacy and performance of bag-mask-ventilation and intubation of pediatric patients in paramedics. (5) The strength or weakness of the correlation will impact the use of self-efficacy as a measurement of an intervention to improve skills.

**Research question:** Does self-efficacy as measured by questionnaire correlate with performance of chest compressions and bag-valve-mask ventilation in neonatal care providers?

**Methodology:** All neonatal fellows (n=6), neonatal nurse practitioners nurses (n=7), attending neonatologists (n=8), pediatric residents (n=39), and 50 nurses at our institution will be asked to participate. A questionnaire will be distributed and filled out by participants in which they rate their ability to perform bag-valve-mask ventilation and chest compressions both independently and with the assistance of a supervising provider on a Likert scale. Information will also be collected on the prior experience of the participants. They will then be asked to perform 1 minute of chest compressions and 1 minute of ventilation using a mask and a flow-inflating bag. Performance data will be recorded via eCPR, a program that when connected to a manikin(Gaumard S108 Premie Blue Simulator) records rate and depth of compressions as well as percentage of effective compressions. Rate, volume and duration of ventilations, and percentage of effective ventilations will also be recorded. The relationship between self-efficacy and performance in chest compressions and bag-valve-mask ventilation will be evaluated via calculation of Pearson's correlation coefficient. IRB approval is pending.

**Results/Discussion:** The project will be completed by January 2016.

**References:**

PO 10-6 – Mannequin Based Simulation to Evaluate Competence in Neonatal Resuscitation and CRM Skills

**Patient safety and quality improvement**

Submission ID: IPSSW2016-1092

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**Introduction:** One of the most important competencies of Neonatal ICU nurses is the Neonatal resuscitation. This competence should be evaluated and updated regularly for patients safety. Even though there are Neonatal Resuscitation programs in our country, there is no standardized method to evaluate their competence in Neonatal Resuscitation and also Crisis Resource Management skills.

**Aim:** The aim of our medical simulation study was to evaluate the competence in Neonatal Resuscitation and crisis resource management skills of Neonatal ICU nurses by using high-fidelity simulators.

**Method:** This prospective observational study was performed in the Center of Advanced Simulation and Education (CASE) in Acibadem University. 12 Neonatal Intensive Care Nurses participated in our study. After a pretest with a questionnaire of 30 items, the participants had to manage a case with newborn asphyxia using a Laerdal Simbaby simulator in our delivery room with high psychological fidelity. To assess their performance w the American Heart Association Guidelines for Neonatal Resuscitation was used. Based on 5 topics (initial steps, airway management, circulation, use of medication and patient assessment) we created an evaluation form with 44 items to assess the resuscitation process and another form with 19 items to evaluate crisis resource management skills.

**Results:** The correlation index of our 2 simulation educators doing the assessment according to the defined 5 topics was: 0.981. Knowledge of the participating nurses was 81% mean and their general performance was 92.4% in mean. According to our 5 topics, the performance in the initial steps was 90.2%, airway management was 97.2%, cardiac compression 96%, use and administration of drugs 100% and patients assessment 78%. Their performance in crisis resource management was 87%. In conclusion, patient assessment performance was not as good as their performance in the other fields.

**Conclusion:** We believe that high-fidelity simulators are very useful and reliable to assess and standardize Neonatal Resuscitation competence and crisis resource management skills of neonatal ICU nurses.

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PO 10-7 – Airway Foreign Body Simulation – A Cross-Departmental Learning Experience

**Submission ID: IPSSW2016-LS-37**

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**Context:** A foreign body in the paediatric airway is a potentially life-threatening event which is infrequent and as such, Children's Emergency Departments (CEDs) often have limited experience of these challenging patients. Courses are run for ENT surgeons to improve their foreign body extraction technical skills but, to our knowledge, this is the first published paediatric airway pathway simulation. [1] Thus it is the first study to investigate the effect of team-working skills and human factors in a paediatric airway foreign body situation; skills that are crucial in minimising and preventing adverse events. [2]

**Description:** This study explored the patient pathway from the CED to the operating theatre when a simulation child arrived with a foreign body compromising the airway; in particular the processes involved in contacting relevant specialties and preparing appropriate equipment.

**Observation/ Evaluation:**

1. **Leadership:** In CED there was dynamic leadership especially as the CED registrar asked to lead the scenario for learning purposes as it was a simulation but the CED consultant was present. The debrief highlighted subsequent confusion about who to inform of updates.
2. Equipment and Communication with theatre: The CED consultant asked the CED SHO to get the ‘difficult airway trolley’ from theatres. Theatre staff were confused about what this was, hence the CED SHO was given the standard transfer bag. Furthermore CED did not inform theatres about the time of transfer so neither the anaesthetic room nor surgical equipment were ready upon arrival to theatres. In debriefing CED staff were unaware that theatres hadn’t been informed and the consensus was that the leader at the time should delegate this as a specific crucial task.

3. Contacting necessary clinical staff: The CED SHO spent 9 minutes looking at the whiteboard trying to find the correct ENT contact. It was mentioned that an ENT registrar/consultant are always on site in outpatients during the day but this is not known or advertised. Similarly the need for specific paediatric anaesthetic skills was discussed, with confusion regarding when first, second and third on call anaesthetists should each be contacted.

**Discussion:** Several difficulties were encountered during this simulation:
- Concerns regarding filming and who should be informed of planned unannounced simulations;
- Requirement for an appropriate time, duration and location for debriefing the large number of individuals involved from different disciplines;
- Mixed opinions from different disciplines and grades regarding the use of in situ simulation.

As a result of this simulation several changes are being considered and implemented at the Royal Alexandra Children's Hospital, Brighton, including:
- Tabards / method of identification of individuals in emergency scenarios;
- Pathway to contacting ENT and anaesthetics teams reviewed and clarified through the use of posters and induction;
- Policy agreed on the use of unannounced paediatric simulation.

**References:**

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**PO 11-1 – Simulation to Inform and Improve Hospital Cleaning and Food Services Delivery in High Risk Patients**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1155

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At Sydney Children’s Hospital, patient service assistants (PSA) are an integral part of the health care team, undertaking a number of duties central to patient care, including environmental cleaning, internal transportation and food services. In Australia, the Clinical Excellence Commission sets standards for minimum requirements for hand hygiene and the cleaning of patient rooms. In particular, children undergoing bone marrow transplant (BMT) require high quality daily and weekly room cleaning. Assessments based on these guidelines are used to improve healthcare delivery and form an important element of organisational accreditation. Currently, simulation is rarely utilised to assist in the training of non-clinical staff involved in patient support roles. Therefore, an opportunity was seen to develop a novel simulation training program for PSAs designed to inform and overcome challenges in the implementation of local guidelines and to improve the quality of care that children receive.

The PSA simulation program was designed to address areas for current improvement and to better understand current processes for the cleaning of BMT rooms, including participants’ needs and expectations. Specific areas for improvement were informed by results of a time in motion study, hospital infection rates, hand hygiene audits and review of cleaning logs. The main areas for evaluation and improvement focused on within the training included: room cleaning, waste removal and food entry and
negotiation of cleaning requirements with the family. A simulated ward isolation room with an ante room and ensuite bathroom was created. Hospital cleaning equipment, checklists and room signage were utilised. PSA duties were undertaken in real time and with normal staff rostering. All simulations ran twice to maximise PSA interaction with the simulation space and to test modifications to existing patient care processes proposed during scenario feedback.

A questionnaire using a 5 point Likert scale (1-Very poor to 5-Excellent) was used to evaluate the relevance of simulation to practice. 80% of participants (n=8) completed the evaluations. All participants rated a greater acknowledgement of their role within the healthcare team and improved understanding of their role in preventing infection. Specific changes to existing practice were agreed in the simulation environment, including a change to the method employed for room entry and exit during waste removal. Following this change in work practice, improvements in hand hygiene were observed with an increase in donning potentially contaminated gloves prior to room exit.

Simulation training may be utilised to inform and improve cleaning and food service delivery in high risk patients. Scenario re-runs demonstrate the effect of altered work practices on hand hygiene. Simulation training may be used to drive quality improvement and validate individuals’ contributions to improved quality care.

PO 11-2 – The Augmented Reality (AR) Learning Media of Normal Mechanism of Labour
Submission ID: IPSSW2016-LS-05

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Context: The normal mechanism of labour is an unseen process during childbirth, and as such has proven to be a difficult content for Thai nursing students to understand. Thus, the augmented reality (AR) technology was used to create a three dimensional learning media for demonstrating and easily describing the process of normal labour in the case of Left Occiput Anterior (LOA) position.

Description: The augmented reality (AR) learning media is a Thai application program operated on smart phones or tablets. This program is free and available on the Google Play store. The process used to develop this program composed of three steps. First, three dimensional (3D) models of a pelvic bone and fetus were created using the Rhinoceros program. Second, using the Maya program, and the previously created 3D models, an animation of the normal labour mechanism was developed. Lastly, the application program, itself, was created using Unity program.

Evaluation: The quasi-experimental research design, one group with pre-test and post-test, was conducted to examine the effect of the AR learning media on knowledge of mechanism of normal labour in nursing students. Forty-six Thai nursing students participated as subjects in this study. After teaching a mechanism of normal labour using traditional media, such as video and a model of pelvis and fetal head, the students were given the pre-test to assess their level of knowledge. Subsequent to the pretest, the students were introduced to the AR learning media, and permitted to use such as a self-directed learning tool for 10 minutes. A post test was performed, and a paired t-test was used to analyze the pre and post test scores of each student. The findings reveal that post-test scores on the normal mechanism of child-birthing labour, subsequent to using the AR learning media (mean = 6.13, SD = 1.54) are higher than pre-test scores (mean = 4.61, SD = 1.62) with a significant value less than .001 (t = 5.70, p < .001).
Discussion: The nursing students indicate that the AR learning media is modern, interesting, and fits into their own learning style. They state that, the AR learning media is very helpful for imagining, understanding, and remembering the process of the normal mechanism of labour, and better than the traditional media. Although, the AR learning media is appropriate for Thai nursing s, midwifery, and medical students, translating to other languages is recommended.

PO 11-3 – The Quality of Pediatric Resuscitative Care in United States Emergency Departments

Patient safety and quality improvement
Submission ID: IPSSW2016-1173

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Background: The quality of pediatric resuscitative care in United States (US) Emergency Departments (EDs) is poorly described. The National Readiness Project, supported by Emergency Medicine Services for Children, developed a web-based assessment measuring compliance with pediatric readiness guidelines. However, this instrument has not been examined in relationship to other variables and whether this study is related to quality of pediatric resuscitative care. We propose that in-situ simulation can be used as a novel method to measure the quality of care provided by inter-professional teams in EDs, and that the quality of care is correlated to Pediatric Readiness.

Research question: The primary goal of this study was to measure and compare the quality of pediatric resuscitative care provided to three simulated patients presenting to US EDs. We also aimed examine the correlation of the quality of pediatric resuscitative care to PRS scores.

Methodology: This prospective, multi-center, in-situ, simulation-based cohort study measured the quality of resuscitative care provided by inter-professional ED teams to three critically ill simulated pediatric patients (infant: septic shock, seizure; child: cardiac arrest). The PRS was completed in person at each ED. A composite quality score (CQS) was measured as the sum of four distinct domains: (1) adherence to sepsis guidelines, (2) adherence to cardiac arrest guidelines, (3) performance on seizure resuscitation, and (4) teamwork. Independent variables included participants’ experience and the PRS. Correlations were explored between CQS and individual domain scores with the PRS.

Results: 30 hospitals participated with 58 inter-professional teams from 8 Pediatric EDs and 22 General EDs. The overall CQS was 71% and domain scores were: sepsis 83%, cardiac arrest 57%, seizure 71%, and teamwork 76%. The correlation of CQS to the PRS was moderate ($r=0.51$, $p<0.001$); however, this relationship was attenuated when excluding teamwork from the CQS ($r=0.45$, $p<0.001$). The correlation of the PCFs and PRS was strong for teamwork ($r=0.71$, $p<0.001$), moderate for sepsis adherence ($r=0.45$, $p<0.001$) and seizure performance ($r=0.43$, $p=0.001$), and small for cardiac arrest adherence ($r=0.24$, $p=0.073$).

Discussion/Conclusions: This multi-center study found significant variability in the quality of pediatric resuscitative care across EDs when measured by in-situ simulation. The overall quality of care was higher in PEDs compared to GEDs. The PRS provides one of the a comprehensive description of pediatric emergency care in US EDs to date; however, in this study, cohort PRS scores did not correlate well with the quality of
pediatric resuscitative care. Additional work is needed to understand the quality of pediatric resuscitative care in U.S. EDs.

References:

PO 11-4 – Why Shouldn’t We Throw Our Toys Out of PRAMS?
Patient safety and quality improvement
Submission ID: IPSSW2016-1200

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Croydon University Hospital has one of the highest Paediatric retrieval rates in South London & South East England. An interdisciplinary group consisting of a simulation Lead, Anaesthetist, Paediatrician from Croydon hospital and a South Thames Retrieval service (STRS) consultant met in 2014 to develop a multidisciplinary team (MDT) training course to improve local and regional management of these patients. The programme has been so successful that funding has released by regional education commissioners to pilot the course in other centres in 2016.

Description: The Paediatric Retrieval and Acute Multi-disciplinary Simulation (PRAMS) course was developed in collaboration with the South London Retrieval Service (STRS) to improve technical and teamwork skills such as cross specialty communication, enhanced team based situational awareness and enhanced team based resilience for all staff involved in paediatric retrieval care at Croydon University Hospital and the region. Poor communication across disciplines and between colleagues who rarely meet except in the stressful scenarios of Paediatric retrieval was felt to contribute to tensions at retrieval; therefore a better understanding of other disciplines’ roles in Paediatric retrieval is central to the course’s structure. PRAMs courses are run every 3 months in the Croydon simulation centre and monthly in-situ: taking the ‘toys’ (ie simulation equipment) to the bedside with unanticipated crash calls to either the ward or emergency department. The in-situ simulations have highlighted real challenges of effective and resilient inter-professional team functioning as well as latent errors (eg equipment availability). The advantage of the in-situ sessions is that staffs do not require study-leave to attend and also enabling faculty to encourage staff to attend not usually keen to get involved in simulation.

Observation/ Evaluation: A comparison of feedback received from attendees of both the in simulation centre PRAMS course (n=123) and in-situ mobile PRAMS (n=58) has been used to direct future paediatric retrieval training locally and across the STRS region. Post course evaluation forms demonstrate that objectives of participants from different backgrounds were met by creating a realistic team environment and encouraging inter-professional learning. Staff reported that the course had a positive impact on their subsequent retrievals and emergency experience.

Discussion: Croydon University Hospital developed this course in recognition of the risks and stresses related to Paediatric retrievals. The unique nature of the course is the integrated approach to development and delivery of the course by the MDT at the referral centre and the retrieval service. The current PRAMS model: a combination of formal simulation centre courses with ‘in situ’ simulation maximises the impact of simulation. Future course evaluations will need to focus on the measurable improvements to team interaction and patient outcomes.

PO 11-5 – Paediatric Simulation Training - A Hospital Wide Initiative
Patient safety and quality improvement
Submission ID: IPSSW2016-1210
Within a district general hospital in Scotland, paediatric simulation took place on a dedicated day every 4 months out with the ward area. This proved difficult to sustain because of ward constraints and only a small number of staff benefited because these sessions ran so infrequently. These issues prompted a review to investigate how effective simulation could be achieved for all staff involved in caring for children. In situ simulation according to Lok et al (2015) can detect deficiencies in clinical systems and the environment which in turn can improve clinical practice and patient safety. These findings reflected the goals of the unit’s educational philosophy. Two wireless mannequins were purchased which could be used throughout the hospital to enable staff to access training within their own clinical area.

**Description:** Following the above review it was decided that simulation would take place on a weekly basis on a day when the on-call consultant paediatrician was available for a period of time to facilitate simulation. The simulated sessions take place within the paediatric ward area with all members of the multidisciplinary team being involved. The Sessions are timetabled into the medical students teaching rota. In addition sessions have taken place in theatre recovery, clinics and accident and emergency. These scenarios have been developed to suit the specific learning needs of that particular area. Varied medical and surgical clinical scenarios are used to ensure there are a wide range of conditions covered.

**Observation:** Between January – September 2015, 21 documented simulations have taken place. The occasions where simulation did not take place were due to ward constraints and mannequin malfunction. Within the debrief, learning points are discussed and each participant is asked what they have learned from the session. These learning points are all documented as well as action points. The learning points are broken down to generic and condition specific and are highlighted every morning at the medical/nurse handover to ensure dissemination of the information to all staff. The learning points are displayed within the ward area as well as e-mailed. The action points are specific issues that have been raised within the simulation that require an action.

**Discussion:** Within the district general hospital, paediatrics are seen as the driver in simulation as it is now embedded into our teaching and learning practice. A study by Seethamraju and Mackinnon (2014) looked at behaviours within simulation and they found that there is an increase in confidence and skills through simulation as long as it is an ongoing process. The learning points have been greatly received by all members of the multidisciplinary team, however an evaluation needs to be undertaken to determine how beneficial the staff feel weekly simulation is to their practice.

**References:**
has been so successful that funding has released by regional education commissioners to pilot the course in other centres in 2016.

**Description:** The Paediatric Retrieval and Acute Multi-disciplinary Simulation (PRAMS) course was developed in collaboration with the South London Retrieval Service (STRS) to improve technical and teamwork skills such as cross specialty communication, enhanced team based situational awareness and enhanced team based resilience for all staff involved in paediatric retrieval care at Croydon University Hospital and the region. Poor communication across disciplines and between colleagues who rarely meet except in the stressful scenarios of Paediatric retrieval was felt to contribute to tensions at retrieval: therefore a better understanding of other disciplines & roles in Paediatric retrieval is central to the course & structure.

PRAMs courses are run every 3 months in the Croydon simulation centre and monthly in-situ taking the ‘toys’ (ie simulation equipment) to the bedside with unanticipated crash calls to either the ward or emergency department. The in-situ simulations have highlighted real challenges of effective and resilient inter-professional team functioning as well as latent errors (eg equipment availability). The advantage of the in-situ sessions is that staffs do not require study-leave to attend and also enabling faculty to encourage staff to attend not usually keen to get involved in simulation.

**Observation/ Evaluation:** A comparison of feedback received from attendees of both the in simulation centre PRAMS course (n=123) and in-situ mobile PRAMS (n=58) has been used to direct future paediatric retrieval training locally and across the STRS region.

Post course evaluation forms demonstrate that objectives of participants from different backgrounds were met by creating a realistic team environment and encouraging inter-professional learning. Staff reported that the course had a positive impact on their subsequent retrievals and emergency experience.

**Discussion:** Croydon University Hospital developed this course in recognition of the risks and stresses related to Paediatric retrievals. The unique nature of the course is the integrated approach to development and delivery of the course by the MDT at the referral centre and the retrieval service. The current PRAMS model; a combination of formal simulation centre courses with in situ simulation maximises the impact of simulation. Future course evaluations will need to focus on the measurable improvements to team interaction and patient outcomes.

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**PO 11-7 – Sharing the Knowledge: Paediatric In Situ Simulation Newsletter**

**Submission ID:** IPSSW2016-LS-38

Christine Richardson¹, Kat Smith²

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**Background:** One hospital in our cross-site trust carries out regular paediatric in-situ simulation sessions in both the Emergency Department and the inpatient ward; this activity is performed using only the staff who would typically be available to provide care in the given situation. Whilst this style of in-situ situation has unique benefits due to its environmental fidelity and ability to expose latent error, one downfall is that it can only be delivered to small “snap shot” of the full staffing cohort; this risks valuable learning points not being fully disseminated throughout the department.

**Educational goal:** The education team wanted to be able to circulate the learning outcomes of each scenario in a way that would reach out to all member of the multidisciplinary team, whether or not they were present at the time of the scenario. It was felt that a monthly newsletter would be the best way to both promote the education and learning from the scenarios whilst also capturing departmental changes and potential latent errors in a way that was non-judgemental and confidential.

**Proposed approach to addressing the goal:** Following a needs assessment performed by the education staff it was decided that the format of the newsletter would include: scenario highlight and a description of events, special points of interest and a section for feedback and action points. Monthly editions would be created and circulated throughout the trust to both clinical and educational staff to promote the innovation of in-situ simulation as well as sharing learning outcomes. Ultimately the aim is for this to become a multi-
Conundrum or difficulty encountered: Condensing the information to fit onto a side of A4 was challenging, but it was felt that expanding each scenario onto multiple pages may deter people from reading it. It was decided to not include time and dates of scenarios to maintain confidentiality for those who were involved in the scenario in case there were specific, sensitive issues that arose.

References:
2. doi: 10.1136/archdischild-2014-306237.462
3. Mary D. Patterson, MD; George T. Blike, MD; Vinay M. Nadkarni, MD. In Situ Simulation: Challenges and Results.

PO 12-1 – PROMS Course (Paediatric Revision OSCEs for Medical Students): Delivered via Simulation Educational Outreach (Including remote, rural and international simulation education)
Submission ID: IPSSW2016-1188

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Introduction: Simulation-based training is increasingly being adopted as part of the curriculum for medical students but this is very patchy across the medical schools and amongst different specialties in the UK. In our region, there is a lack of formal paediatric simulation training for medical students. We organised a PROMS Course [Paediatric Revision OSCEs (Objective Structured Clinical Examination) for Medical Students] as a pilot for 18 medical students in their 5th year, who had done their paediatric placement in the beginning of the year; and hence felt under confident and less prepared for the paediatric OSCE exams at the end of the year.

Methodology: A simulation-based training in an OSCE style was organised for a day with high fidelity mannequins Sim-Junior and Sim-New B and with low fidelity infant and junior mannequins. The students rotated through nine different scenarios in the day (three stations each in the morning, afternoon and evening) each based on common paediatric conditions including a resuscitation and a safeguarding scenario. In some stations, role players were also used to act as parent and carers. Students were given the task of history taking, examination, investigative approach, management and talking to and consoling parents. Each station lasted for 40 minutes with 2 candidates each performing different tasks for 10 minutes followed by debrief. The focus of debrief was supportive education and guidance rather than mock assessment. The students completed a feedback form at the end of the day.

Results: The feedback was extremely positive with significant improvement in confidence scores after the simulation event. The students felt that simulation teaching was very beneficial. The less stressful environment during debrief compared to a mock assessment was valued by the participants. They felt such OSCE style revision courses were extremely educational and improved their confidence and competence in dealing with common paediatric conditions.

Conclusions: Revision courses based on OSCEs with real patients in paediatrics might be challenging hence simulation-based training in an OSCE style is a useful way to consolidate student’s knowledge base and clinical management in paediatrics. This could also encourage the medical students to take a paediatric career in future.

PO 12-2 – Improved Learning in Small Group Sessions and Varied Fidelity - Paediatric Level 1 Sim Training
Programme development/ Administration and Programme Management
Submission ID: IPSSW2016-1227
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**Aim:** To compare the learning experience of a cohort of trainees between complete high fidelity simulation training with video debrief and a mix of high and low fidelity training but in small groups.

**Introduction:** Paediatric simulation, as a training tool, addresses a multitude of clinical, managerial and communication problems and has been shown to be educationally effective and improves safety. It is therefore of utmost importance that this simulation training is designed in such a way that is pitched at the right level for the learner with adequate psychological safety while at the same time challenging their decision making ability.

**Background:** We regularly conducted regional paediatric level 1 simulation training using a high fidelity mannequin with 2 trainees taking part while others observing them through video output in another room followed by video debrief. The number of trainees in these days was between 14-18. These sessions had good uptake and feedback from these sessions revealed improved confidence and learning to translate into clinical practice. However some of the trainees expressed concerns regarding performing in front of a big group and being videoed, despite having had previous simulation experience as medical students and foundation year trainees. Hence, we decided to plan the day slightly differently to cater to their psychological safety while keeping the same learning objectives.

**Method:** In the subsequent simulation day, we placed the 11 trainees in 3 groups of 4, 4 and 3 and made them rotate across three stations. There was no audio-visual recording. First station was high fidelity, second was medium fidelity and third was low fidelity with role player acting as mother. All the scenarios were mapped to the curriculum and a nurse was present at all stations.

**Results:** All the 11 trainees felt it was a positive learning experience. The feedback was similar to previous sessions, but the free text feedback often mentioned “small groups mean more practice, well-paced” and most felt relieved they were not recorded. Some had actually attended the previous simulation days and suggested the new format was less threatening and possibly more effective due to more hands on experience. Overall, the learning experience was less stressful but more conducive for learning when compared to the previous sessions where high fidelity video-debrief was used in large groups.

**Conclusion:** Simulation training is no doubt effective, but has to be designed to suit the needs of the learner. Though high fidelity simulation with video debrief has intense learning outcomes, is not always required. To optimise learning experiences, especially in most junior trainees, the new ST1 trainees in our case, the course plan with multiple stations of varying fidelity in small groups was found to be more beneficial. We found gentle introduction to the real deal helps improve learning experience and thereby improves engagement and morale.

**PO 12-3 - Bridging the Gap, K-I-T Simulation Training – For Paediatricians Who Have Taken Time Out of Training**

**Patient safety and quality improvement**
Submission ID: IPSSW2016-1168

Chetana Kallappa1,* , Sunil Sanka1, Pinki Surana1, Leanne Newall2, Prabh Nayak1
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**Background:** Time out from professional practice may happen for a variety of reasons: maternity, Paternity or family leave, ill health, a career break or extended travel or study leave. Research has shown that skills fade over time. The impacts of skills fade on the performance of doctors is a matter of concern to individual doctors and are keen to gain back the confidence prior to start of work. It is also of interest to the GMC because of its duty to protect the public by ensuring that doctors meet the expected standards of good medical practice.
Method: We designed a questionnaire on the “so go survey” tool which included both the paediatrics and neonatal practice. There were 18 questions and 3 areas were addressed. The first explored the demographics of the trainee; second gauged their confidence on clinical decision making, communication and procedural skills and third about their preferred way of training to meet their needs. The answers were rated on a sale of 1 to 10. The questionnaire was sent to all trainees in the country via their respective deanery.

Results: We received 21 completed forms of which 15 were from level 2 trainees, 4 from level 1 trainees and 2 from level 3 trainees. Average months of absence from clinical work were 17 months. Majority on maternity leave and equal on sick leave and out of programme. 3/21 trainees had undertaken K-I-T training days and 1/21 had returned to work training. All trainees had previous simulation experience. They rated their confidence level on an average of 5.5 for managing paediatric emergencies and 5 for neonatal emergencies, general confidence for return to work 5.95, communication 7.33, managing safe guarding 5.65 and lowest score of 3.6 for SUDIC. All 21 agreed that a keep in touch simulation training day would be valuable for their clinical confidence and competence. They felt extra support was needed for procedural skills, career planning, prioritisation and general back ground of common cases and felt these suffered being away for long. One trainee said, “I made my own plans to keep in touch. Therefore if K-I-T days were specifically organised and offered by deanery to trainees who are on long term leave on a regular basis would be very useful.

Conclusion: There is guidance for return to work and keep in touch training for doctors who are on time out. Most evidence is from medical education studies or research in trainees who are at work or finished training and none from doctors who are away. Our survey has clearly shown the need for incorporating K-I-T days for these doctors. As expressed by doctors themselves, the K-I-T training would help at a personal level focussing on their individual needs and improve patient safety. Along with return to work training, will help these trainees to ease into work a bit more confidently.

PO 12-4 – Extending the Impact of Simulation Sessions by Linking Scenarios to Supervised Learning Events (SLE)
Assessment (including use and validation of measurement and assessment tools)
Submission ID: IPSSW2016-1224

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Introduction: Simulation training is undoubtedly an effective way of training for various skills in a safe and non-threatening environment. It can be used for training, assessment and feedback. SLEs are part of the assessment strategy and are strongly promoted by the GMC. They are an excellent opportunity for the trainee to receive feedback, reflect and develop. They also give trainers the opportunity to see how the trainee functions in “real life” and enables the trainee to demonstrate skills such as professionalism and decision making.

Background: Regional simulation study days and point of care sessions for speciality trainees are conducted on a regular basis. Trainees partake in groups of 2 in challenging, yet realistic scenarios which are based on real cases, with learning objectives mapped to the appropriate curriculum. Apart from the initial feedback, ttrainees frequently continue to report of their improved knowledge, skills and confidence dealing with situations in real life after a simulated experience. Considering the amount of time spent on running and providing feedback, we felt linking the learning experience to the SLE s would not only enhance learning and reflection but document it as well.

Method: Following the simulation sessions trainees were asked to link scenarios to SLEs such as CBDs, minicexs, communication skills etc. Child safeguarding and SUDIC scenarios were sent on the separate forms as recommended by the RCPCH and completed by a faculty who is named the doctor. Assessments were duly completed.
Results: A total of 15 mini-CEXs, 12 CBDs, and 3 safeguarding CBDs were completed. Trainees valued the dual benefit of learning through simulation as well as simultaneously fulfilling training requirements by completing SLEs and linking these to curriculum. Trainees felt that their learning is continued even post simulation, some using extensive reflective summaries, highlighting the trainee’s learning points and the feedback on the faculty debrief styles. All these were positive outcomes more than those set in the learning objectives for the scenarios.

Conclusion: Simulation training is effective and SLEs are mandatory. We found providing a robust, documented feedback improved learning outcomes. It is WIN-WIN situation to the trainees and the trainers. It lives up to the true sense of the SLE’s description of Engage... Do... Reflect... Learn... (and record).

PO 12-5 – The Implementation of CPR Using Mobile Uploads, Gamification and Direct Feedback Manikins
Serious games and virtual environments (e.g. second life)
Submission ID: IPSSW2016-1203
Roxanne Applegate1, Deborah Aitken2,*, Todd Chang3, Ralph MacKinnon2, 4
1The University of Manchester, 2Royal Manchester Children's Hospital, Manchester, United Kingdom, 3Children’s Hospital of Los Angeles, Los Angeles, United States, 4Karolinska Institutet, Stockholm, Sweden

Background: Survival from out-of-hospital cardiac arrest (OHCA) in England is low. Increasing rates of bystander cardiopulmonary resuscitation (CPR) can improve OHCA survival. Panicking and a lack of confidence are reasons for low bystander CPR rates; these may be improved with effective training. The use of direct feedback in CPR training has been found to improve performance however the longevity of this effect is uncertain. Gamification has been used as a method of sustaining enthusiasm for other educational activities and could be applied to CPR training for a longer term training program.

Aims: The purpose of this study was to establish an effective way of implementing CPR training in schools using mobile uploads, direct feedback manikins, and the concept of gamification.

Methods: 203 sixth form (16-18 years old) students at five high schools received a teaching session on CPR and Automated External Defibrillator (AED) use followed by CPR training with direct feedback manikins. Questionnaires filled out before and after the session were used to assess change in students’ attitudes towards CPR and AED use. Feedback was also gathered regarding the use of gamification for CPR training.

Results: An independent samples t-test revealed a significant improvement in students’ attitudes towards CPR and AED use following the session. The qualitative data regarding gamification was 72.58% positive in nature with an additional 13.31% being suggestions.

Conclusion: CPR training using direct feedback manikins can have a significant positive effect on students’ attitudes towards performing CPR. Students are enthusiastic about the prospect of CPR training using mobile uploads and gamification, and anticipate it will improve motivation and enjoyment.

PO 12-6 – Self-Motivated Learning with Gamification Improves CPR Performance: Deeper into the Randomised Trial
Serious games and virtual environments (e.g. second life)
Submission ID: IPSSW2016-1209
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Background: Given the number of in hospital pediatric cardiac arrests which have low survival rates and high neurological squeal, it is surprising that high quality CPR does not occur despite staff recertification every 2-4 years. This is likely due to an undervaluation of the skill causing an overestimation of ability. A recent study, by this team, investigated an alternative training paradigm aiming to negate undervaluation of the skill through gamification prompted self-motivated training. Using a leaderboard gamification element in a
randomized control trial, there was significant increase from baseline to final CPR performance scores with access to the alternative training model while the control group saw no significant change in performance in the same time period.

**Aims:** To investigate the motivational influence of the leaderboard in the intervention arm of the randomly controlled trial conducted previously by this team; specifically to explore the frequency of practice, and the reasons for practice in the presence of a leaderboard.

**Methods:** Frequency of practice data was isolated from the sample of paediatric healthcare professionals randomized to the leaderboard self-motivated training model across the 6 month trial. Also, a subsequent online 10 question questionnaire regarding each participants views on CPR training, reasons for participating, training options, and the leaderboard.

**Results:** The total number of uses per week, and the number of individuals actively participating declined logarithmically across the study duration. The highest reported motivational factors were that participating would help improve their skill and that it was important that their efforts succeeded. Wanting peers to recognize their attempts motivated half of participants. The leaderboard was mostly used to monitor progress on an individual level; however, a third used it to compare their scores to others. Not wanting to be worse than others was twice as reported as wanting to be better than others. The preferred training style was free access to self-motivated training, but the public leaderboard rated poorly.

**Conclusion:** A fifth of individuals were self-motivated to train for the entire program showing this paradigm can be engaging over long periods of time. Motivational factors on an individual level are likely to be caused by the natural inclination of healthcare professionals to provide high quality healthcare. However, differences in motivation from comparison to peers are interesting especially as both wanting to be better and not worse, were factors. Therefore, from both the range in frequency of training and reported motivation factors; there is not a one size fits all approach to motivating self-training. This is likely caused by differences in personality and preferences. Consequently, motivational factors in a CPR training scheme for healthcare professionals must appeal to a range of personality types and preferences without creating barriers.

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**PO 12.7 – An Institutional Experience with Improving Code Sepsis Response Times with Hands-On Simulation versus Implementation of a Electronic Computer Alert System**

Submission ID: IPSSW2016-LS-39

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**Background:** Recognition of current sepsis-related mortality rates has led to initiatives to improve patient outcomes. Our institution also noted a higher than desired sepsis-related mortality rate due to a gap in sepsis-practice guideline ideal and guideline reality. We compared our experience in improving our adherence to sepsis guidelines between two different educational interventions, the utilization of simulation as compared to implementation of an electronic alert system.

**Methods:** The children’s hospital within our institution implemented a simulation-based training program and the adult hospital choose to implement a computer alerting system to improve sepsis team responses. The primary data metrics scored included improvement in time to obtain blood cultures, time to first administer antibiotics, time to give a fluid bolus and time to resulting a lactate level. All data metrics were measured both pre and post the educational inventions. The goal time for each intervention was set at under 60 minutes. The overall goal was to have all four interventions completed in a bundle in less than 60 minutes. Data was collected for 8 months following the educational intervention after a sepsis initiative go-live date.

**Results:** Over the 8 month follow-up period, there were a total of 136 code sepsis patients, 102 in the computer alert intervention group and 34 in the simulation educational intervention. Baseline completion of all four of sepsis measures prior to intervention was 30% on in alert intervention group and 33% in the
simulation intervention group. In the clinical areas with the sepsis alert system, there was a 30% to 50% improvement in completion of the bundle within 60 minutes. In the simulation group there was an improvement from 33% to 67%. Overall, in the simulation group there was a 80% improvement in time to obtain blood culture, 82% improvement in average time to antibiotic administration (211 min to 39 min) and a 75% improvement in average time to fluid administration from (146 min to 36 min). Data collection on the mortality rates and length of hospital stay is ongoing.

Conclusions: Simulation is an effective teaching tool that can be applied to reach across disciplines in small and large-scale institutions and positively affect patient outcomes. While the electronic alerting system did improve the sepsis response times, the hands on simulation training was more effective, emphasizing the utility of simulation team training. This method of training has grown within our healthcare as it continues to provide adult learners with the ability to learn through experience. We plan to continue our sepsis initiative and will continue to follow the clinical response times, mortality rates as well as length of stay.

References:

PO 13-1 – Immersive ECMO Simulation Program Improves Communication, Confidence and Reflective Practice
Simulation for procedural and psychomotor skills
Submission ID: IPSSW2016-1196

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Context: Extracorporeal membrane oxygenation (ECMO) is a high-risk, complex life-saving therapy for patients who have pulmonary and/or cardiac failure despite intensive medical care. Due to the nature of this complex therapy, emergencies or complications though rare, can be associated with mortality rates as high as 25% or greater. Immersive simulation allows ECMO specialists to be competent and skilled at intervening in ECMO emergencies, maintain competency and learn how to troubleshoot unusual situations. In addition effective communication, teamwork and confidence among ECMO care providers are necessary in response to crisis situations.

Description: Ability for ECMO specialists to gain experience in handling critical emergencies has mostly been limited to water-based drills and wet-labs, which do not create a realistic environment. Therefore the response of the ECMO specialist may not represent the same kind of urgency as an immersive simulation experience might. Water drills or wet labs are well suited for learning technical skills and proper handling of the equipment, but its limitations do not provide the intensity, stress and emotions of a real life-like ECMO emergency and does not adequately simulate the importance of communication and critical thinking skills. By also incorporating video debriefing, response times of ECMO specialists to recognize changes in ECMO circuitry and/or changes in patient assessment can be better assessed. During immersive simulation training, ECMO specialists are confronted with patient care scenarios in which a patient simulator is attached to a fully functioning ECMO circuit (primed with fake blood), ventilator to ETT, IV fluids and a physiologic responsive patient monitor. Water-based drills are also conducted separately to strictly practice technical skills.
Observation/ Evaluation: Specialists are introduced to simulation prior to the start of a scenario and confidential consent form signed to allow videotaping. A Likert scale evaluation tool is completed and compiled following each training session, with overwhelming positive results supporting immersive simulation as a superior way to train in preparation for ECMO emergencies. Simulations are run in real-time and accompanied by the sounds and events that might occur in a real-life emergency, thus allowing specialists to fully experience the emotions and stress of a crisis situation.

Discussion: Simulation-based training offers realism similar to actual patient care settings and provides an active learning environment. Same scenarios are performed six months apart to assess retention of knowledge, communication and response time; with overall improvement noted following each training session. Video debriefing is conducted following each scenario to evaluate performance of technical skills, knowledge, teamwork, response time, communication and critical thinking. Videotape debriefing allows not only instructors, but also specialist to assess performance.

References:

PO 13-2 – What Are the Barriers to Developing an Inter-Professional Paediatric In-Situ Simulation Programme?
Nia Williams\textsuperscript{1,4}, Simone Andreou\textsuperscript{1}, Stephen Goldring\textsuperscript{1}
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Background: In the papers Health Professions Education: A bridge to Quality\textsuperscript{3} and Redesigning Continuing Education in Health Professions\textsuperscript{2} the Institute of Medicine called for continuing education to have more of an inter-professional focus. Inter-professional education has been proven to improve professional practice and health care outcomes and is endorsed by the NPSA and the RCPCH as a method of improving patient safety\textsuperscript{3,4}. Best practice simulation training involves professionals participating in their own roles, which improves authenticity and helps suspend disbelief\textsuperscript{5}. It can also enhance the understanding of other professionals’ roles and improve working relationships\textsuperscript{6}. Previous studies have identified potential barriers to successful implementation of inter-professional learning including problems around curriculum design, availability of resources and stereotypes and attitudes of teachers and learners\textsuperscript{7}.

Research question: As a paediatric department at Hillingdon Hospital we run a weekly inter-professional in-situ simulation programme in which paediatricians, anaesthetists and nurses are invited to participate.
Anecdotal evidence suggests that some nursing staff were reluctant to take part in these sessions. We conducted a survey to assess their attitudes to simulation training and to explore any perceived barriers to engagement.

**Methods:** The same single interviewer collected data using a 5 point Likert scale questionnaire which included free comment interview questions. Answers were collected confidentially and stored anonymously. Free comment responses were documented verbatim. Quantitative data was analysed using Excel. Free text comments were analysed into themes using a pragmatic approach to framework analysis and were illustrated using tag word cloud analysis.

**Results:** 22 nurses ranging from students to band 8 nurses completed the questionnaire. They had a range of previous simulation experience and formal resuscitation training. 80% felt their participation was affected by their clinical commitments. Thematic analysis of free comments highlighted that nurses would feel more empowered to attend if there was more senior nursing endorsement. They also felt that sessions led mainly by medical staff could be intimidating and they would be better engaged with a MDT faculty.

**Discussion/ Conclusion:** Our findings are in keeping with previous studies that have found that the medical profession is usually perceived as dominant to other professions within inter-professional teaching sessions. In order to deliver a successful inter-professional in-situ simulation programme, all members of the team must be engaged in the planning and delivery of the sessions. Our future plan is to train our senior nursing colleagues in simulation facilitation to encourage a top down engagement in our ever growing in situ simulation programme.

**References:**
1. Greiner AC, Knebel E (Eds.), Health professions education: a bridge to quality, Institute of Medicine, National Academies Press, Washington, DC. 2002

PO 13-3 – Simulation Based Education to Bridge Clinical Competency Gaps of Critical Care Fellows

*Simulation for procedural and psychomotor skills*

Submission ID: IPSSW2016-1175

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**Context:** Loma Linda University Children’s Hospital Neonatal-Perinatal Fellowship developed an intensive one week course for incoming neonatal fellows entitled Fellow’s College (FC). The course was developed in response to the changing regulations by the Accreditation Council for Graduate Medical Education (ACGME). The changes in pediatric residency curriculums from the ACGME have decreased the time residents spend in the NICU. This decrease in training has resulted in fewer opportunities for procedures, critical thinking in emergency situations, and experience in neonatal resuscitation. This can lead to lack confidence in
perforing procedures and leading codes following residency training. The goal of FC is to improve procedural and critical thinking competencies.

**Description:** The curriculum consists of an intensive five day course of didactics with high and low fidelity multidisciplinary simulations. It has been adapted each year to meet the educational needs of incoming trainees through feedback evaluations. Incoming fellows are provided opportunities to perform standard procedural skills required in the NICU via one-to-one teaching by senior clinicians. These include umbilical vessel catheterization with the use of simulated cords, intra-osseous access, intubation and bag mask ventilation demonstrated on mannequins (Gaumard, S320.101 PEDI® Blue Neonatal, Miami, FL), needle thoracentesis, and competency with the use of defibrillators.

Once basic skill competency is demonstrated, the fellows perform as team leader in simulated case scenarios with nurses and respiratory therapists in their respective roles. The cases, prepared in advance, range from care of a normal newborn infant, to management of more complex disease processes such as neonatal seizures, congenital heart disease, and congenital diaphragmatic hernias. The simulation center is set up in the same fashion as in the NICU, with all of the necessary equipment. The high fidelity mannequins are controlled via a computer system adjacent to the simulation room, where the team can be monitored with cameras. The team is expected to run through the case scenario just as they would at a live delivery, and the mannequin is programmed to respond to the medical interventions just as a live infant would be expected to respond. The scenarios are video-taped and reviewed the same day during a debriefing session, where constructive feedback from the multidisciplinary team and senior clinicians is offered in a non-threatening, educational format.

**Discussion:** The simulated education offered during FC provides an important first step in helping trainees transition from pediatric resident to neonatal fellow and code team leader. The multidisciplinary approach lays the foundation for stronger team building and improved communication. The utility of FC is in its high and low fidelity simulations that can be included in any teaching institution to help prepare learners for an intensive patient care setting.

**References:**
1. Nevin, CR. A qualitative assessment of internal medicine resident perceptions of graduate medical education following implementation of the 2011 ACGME duty hour standards. BMC Med Educ. 2014 Apr 22;14:84. (PMID: 24755276)
2. Kalaniti, K. Do paediatric residents have the skills to ‘lead’ newborn resuscitations? Acta Paediatr. 2014 Jun;103(6):592-3 (PMID: 24673259)

**PO 13-4 – Simulation Workshop for Medical Emergencies and Patient Safety Concerns in Pediatric Radiology**

**Simulation Instruction design and curriculum development**

Submission ID: IPSSW2016-1066

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**Context:** Simulation-based education allows for experiential learning to practice and reinforce the CanMEDS roles² (as medical expert, communicator and collaborator) in the management of rare events such as medical emergencies in Pediatric Radiology and situations related to patient safety (such as disclosure of adverse events and discussions related to consent) that are difficult to teach in daily clinical practice. Our objective was to develop a simulation workshop to address these education gaps and to determine feasibility, acceptance and educational value as perceived by the participants.
Description: The Quality Management Department approved this project. All pediatric radiology trainees who recently started in the general division were invited to participate. The objectives of the workshop were based on needs identified by the trainees and staff. Topics were developed based on past morbidity and interesting cases, published Royal College of Physicians and Surgeons curriculum for Pediatric Radiology, the Safety competencies (Canadian Patient Safety Institute (CPSI)) and current literature. The workshop consisted of six time-based stations to address these situations: initial management of anaphylaxis, delivery of basic life support skills, handover of care, safe injection of contrast agents, informed consent, disclosure of adverse events, and triage of cases including selection of protocols for imaging. Checklists were used for scoring. Each trainee received brief personalized feedback at each station. A group debrief and facilitated teaching concluded the workshop. A mixed method approach was used for evaluation including a questionnaire on satisfaction, a one-minute paper and group discussions on perceptions and lessons learned.

Observation/ Evaluation: Five trainees and five facilitators participated in the workshop. Most trainees ranked “strongly agree” or “agree” on a 5-point Likert scale on questions on satisfaction. They had variable comfort level and experience with the topics covered and simulation-based education. The workshop was considered “pertinent”, “really good”, “it was...an eye opener...good to get feedback” and more than once different stations were stated as “the most useful station and helpful” and “they were fair”. Additional comments included “it was easy because it was a simulation, but real life... would be different” with “different comfort level”.

Discussions: This time-based simulation workshop was resource-intensive but it covered multiple intrinsic roles that are difficult to teach in daily clinical practice. This novel type of teaching and learning was acceptable to our Pediatric Radiology trainees. It was useful to practice by reinforcing the management of medical emergencies and patient safety concerns. It encouraged reflection of their own learning and revealed education gaps. The format may also contribute to the future development of a competency-based curriculum.

References:

PO 13-5 – Implementation of Simulation Debriefing Education in a University Pediatrics Residency Program
Simulation Instruction design and curriculum development
Submission ID: IPSS2016-1113

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Background: Standardized debriefing in simulation is a growing trend in pediatrics education, which provides a controlled and emotionally safe environment to facilitate active and meaningful clinical learning opportunities [1,2,3]. At our University pediatrics residency program in the United States, mock code simulation training has been part of the residency education for the past several years. Yet, across our hospital rotation sites where training occurs, simulation content and debriefing structure varies widely, without standardized debriefing practices.

Research question/ goal: Does implementation of standardized debriefing education improve quality of simulation debriefing sessions? Experience of implementation of standardized simulation debriefing education in a pediatrics residency program for a resident quality improvement project. Improve DASH assessment scores by 20% over 6 months and 40% over 12 months.

Proposed approach to addressing question/ goal: Our residency quality improvement project involves implementation of a structured debriefing education [1,3] at two University pediatrics residency simulation sites. Two chief residents were recruited for directing simulations and facilitating post-simulation debriefing
sessions. Primary learners include rotating pediatrics residents and University medical students. Simulation exercises take place 1-2 times per month at each hospital site over a one-hour block.

The debriefing tool includes the following:

1. A one-day debriefing training for chief resident debriefers. Training included the following topics: High fidelity case based simulations, how to create a good learning environment, and debriefing theory and technique.
2. Implementation of a standardized debriefing pre-prompt notecard for use during debriefing sessions.
3. A post debriefing DASH IV short version assessment for debriefers and peer evaluators.
4. PDSA cycle every 3-6 months. Modifications in debriefing practice will be made as identified in PDSA cycle. The project will utilize the DASH IV short version to evaluate the effectiveness of the standardized debriefing education. DASH assessments will be filled out following each simulation session by the debriefer and by a trained peer observer. Debriefing sessions will be filmed and evaluated by peer observers in 30% of debriefing sessions and analyzed for concordance. Responses will be evaluated at the 6, 9, and 12-month mark for consideration of PDSA modifications.

**Implementation:**

- 8/10/15 Two pediatric chief residents underwent the full day simulation debriefing training.
- 11/10/15 Two simulations, one at each simulation site, will assessed with DASH IV short form assessment for debriefers and a standardized peer evaluator prior to implementation of the debriefing pre-prompt note card.
- 11/15/15 Standardized debrief pre-prompt note card will be implemented.
- 2/15/15 Evaluation of DASH assessments will be done at 6 and 12 months after implementation.

**References:**


**PO 13-6 – Implementation of a Simulation Curriculum at a Pediatric Residency Training Program**

*Simulation instruction design and curriculum development*

Submission ID: IPSSW2016-1250

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**Background:** At the University of Minnesota Pediatric Residency program, there are four core sites that the residents rotate at during their residency. At each of these sites, residents attend a simulation or mock code session, once or twice during a typical 4-week rotation. There is currently no standard curriculum that we follow for our simulation program.

**Research goal:** Simulation education has been documented to be a effective way of learning providing trainees with a risk free environment to acquire and practice new skills.(1) It can be a useful tool to help residents gain confidence in the management of common and rare, simple and complex Pediatric diagnoses. (2) It has been demonstrated that retention of information is better with the use of simulation than in a lecture format (3)
Research questions:
• What is the experience of the Pediatric residents with the current simulation sessions?
• What can be improved about the current simulation sessions?
• Will the implementation of a simulation curriculum enhance the experience and learning of the residents and in turn improve their confidence in the management of patients?

Proposed approach:
1. A pre-intervention questionnaire was circulated to obtain an assessment of residents' opinions. All pediatric residents were surveyed on questions pertaining to a) their level of training b) the nature of inpatient cases they saw during their training c) what the residents felt least comfortable addressing d) confidence in performance of pediatric procedures.
2. Residents could also add comments about what they felt would improve their simulation experience and improve their confidence in performing procedures.
   a. With the results of the survey, a curriculum would be devised that would them be implemented across all four Pediatric sites, such that the same topics are covered at all sites. The topics would be chosen based on the results of the survey and are most challenging for the residents to manage.
   b. A post survey would be obtained 6 months after the implementation of the curriculum to gather the impact of the curriculum and make any changes if required.
2. Implementation - November 2015: Survey given out to the residents – December – June 2015: Curriculum devised and implemented across the 4 core rotation sites at the University of Minnesota - July 2015: Re-survey residents to assess simulation experience following implementation of the curriculum

References:

PO 13-7 – Use of Simulation-Based Training in Swiss Pediatric Health Care Institutions: A National Survey
Submission ID: IPSSW2016-LS-40
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Background: Simulation-based medical training (SBMT) is a powerful tool for continuing medical education. Despite SBMT’s rising popularity over the past decade, best practices guidelines pertaining to design and implementation have yet to be established. The aim of this survey is to assess, describe and analyze the current state of SBMT in Swiss pediatric health care institutions.

Methods: A national survey designed by the authors was carried out with medical education representatives of every FMH recognized Swiss pediatric health care institution. We defined SBMT as any kind of health care provider related training using a mannequin in a contextualized clinically realistic scenario. The survey reference day was May 31st 2015.

Results: Thirty Swiss pediatric health care institutions answered our survey (response rate 96.8%) with 66.6% offering SBMT. More than 90% of the institutions were conducting in-situ training and 62.5% were using high-fidelity mannequins. Technical skills, communication and leadership ranked among the top training priorities. All institutions catered to inter-professional participants. The vast majority conducted training that was neither embedded within a larger educational curriculum (79.2%) nor evaluated (66.6%) by its participants. Only 5 institutions (20.8%) extended their training to at least two thirds of their hospital staff (physicians, nursing staff).
Conclusions: Two thirds of the FMH recognized Swiss pediatric health care institutions are offering SBMT. The absence of a systematic approach and reaching a small number of healthcare employees were identified as shortcomings that need to be addressed to further improve continuing medical education with this powerful educational tool.

PO 14-1 – A Pilot Paediatric ‘Simulation’ Programme: How to Deepen our Understanding of Effective Team-Work through Game
Submission ID: IPSSW2016-LS-14

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Introduction: Simulation is an educational technique now widely used throughout medical and inter-professional training. It is often used to support the development of effective team-work, but is this the most effective tool for this?
The paediatric department at Newham General Hospital, have been avid adopters of simulation, with monthly attendance at the simulation centre, and a well established in-situ simulation programme running bimonthly. With this experience, and in the wider simulation discourse1 limitations have been recognised with the use of this educational tool and the ability to teach effective team-working skills. Simulation scenarios can be very predictable which, not only does not reflect real-life practice, but can encourage candidates to ‘perform’ in a way which is expected of them, rather than reflect their authentic behaviour. This can limit the value of the feedback that is given, and avoid addressing important learning such as the need to be adaptable, innovative and deal with clinical uncertainty.

Method: To address such issues, we have developed a set of three clinically based, team-working ‘games’ to support the in-situ simulation programme. The aim of these is to deepen the examination of effective team-work and explore the factors which can prevent the theory from translating to practice. These games are abstract, while being rooted in the clinical situation. We use a structured debrief to reflect and develop meaningful solutions which we can then apply to our clinical practice.

Games: I aim to outline how we run these games through illustrations in the poster.

Conclusion: We have had very positive feedback from our in-situ programme, which has improved with the introduction of these games. This has encouraged us to design a stand-alone course in effective team-work, using these games to open up the opportunity to develop these skills to the rest of the hospital.

References:
1. Bligh and Bleakley, (2006), Distributing menus to hungry learners: can learning by simulation become simulation of learning? Medical Teacher (28) 606-613

PO 14-2 – Just-In-Time Training for Intravenous Needle Insertion and Defibrillator Use in Pediatric ED
Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1051

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Background: Just-in-time training (JITT) is a method of simulation training that occurs within the clinical environment in a concise manner. Advantages of JITT include short time, relevance to the in-situ location, and ability to stay in clinical area, returning back to patient care when needed. JITT has shown effects at the learner, patient, system-wide levels and is enjoyed by trainees (1-3).
Research question: What is the effect of a JITT curriculum for the procedures of intraosseous (IO) needle insertion and defibrillator use in a pediatric emergency department (ED) with respect to trainees’ confidence level in performing the procedures (Kirkpatrick level 2a) and knowledge of the procedures (Kirkpatrick level 2b)?

Methodology: This prospective study was approved by the University of Hawaii's Human Studies Program and enrolled all 4th year medical students and residents who rotated through a single children's hospital ED. The JITT curriculum included location of equipment, procedure indications/contraindications, and hands-on practice. Two attending physicians facilitated the 10-20 minute JITT on IO needle and defibrillator use in the ED during their shifts. Trainees completed an anonymous survey to delineate background, previous experiences, procedure related knowledge, and confidence level to perform the procedures independently. Identical surveys were completed before and after the JITT. The data was analyzed using mean and standard deviation for continuous variables such as scores for the procedures/equipment items; frequency and percentage for categorical variables such as post graduation year. For comparison between pre and post-JITT, two sample t-test for continuous variables and Chi-square test or Fisher’s exact test (†) for categorical variables were used. A two-sided p-value<0.05 was considered significant.

Results: 68 surveys were included in the data analysis (3 surveys were excluded due to discrepant responses). The confidence level to perform procedures independently increased from pre-JITT 47.1% to post-JITT 85.3% (p=0.0009) for IO needle insertion and from pre-JITT 51.4% to post-JITT 87.9% (p=0.0011) for defibrillator. Correct answers for both procedures’ knowledge including location, body sites, contraindications, and equipment size selection also increased by ≥ 50% post-JITT (p<0.0001). The pre and post-JITT data was compared between the variables of trainee’s level of medical training, prior procedure training, and prior experience on patients and no statistically significant differences were observed (p>0.05).

Conclusion/Discussion: JITT in our pediatric ED increased the trainees' confidence level to perform IO needle insertion and defibrillator use independently. Procedure related knowledge also increased. JITT could be used to prepare trainees to be competent members of an acute medical response team in these respective roles, increasing likelihood of their performing these tasks correctly and independently in real patients.

References:

PO 14-3 – Breaking Silos: A Collaborative Approach to Enhance Operating Room Nursing Orientation.
Simulation instruction design and curriculum development
Submission ID: IPSS2016-1063
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Background: Recent review of the Operating Room (OR) nursing orientation curriculum identified that the activities are conducted for single professions, yet nurses are required to quickly integrate into an interdisciplinary team within the perioperative setting. A gap in the curriculum related to medical management of critical events in the OR was also identified.

Proposed approach to addressing the question or goal: Two activities were introduced within the nursing orientation program.
Part A – Interdisciplinary “Start and Stop” Simulation: focus on education, practice and communication in the OR; participants are encouraged to pause the simulation at any point to clarify and discuss actions and decisions made in critical events.
Part B – Knowledge test “Seek and Find”: focus on reinforcement of learning objectives introduced in Part A scenarios where participants are to access and identify location of key equipment and supplies in the OR.
**Measures:** To date, 3 sessions for 10 nurses were conducted between February and October 2015. A 30-minute informal focus group was conducted for each group of 3 to 4 nurses to discuss the impact of the activities, better understand new hires experiences and identify gaps within the current nursing orientation related to critical events in the OR.

**Project impact:** This project led to increased knowledge, clinical skills and confidence in the management of critical events in the OR. Simulation offered a hands-on approach to the understanding and management of critical events in the OR. The opportunity to learn from anesthesiologists is important and supports ongoing collaboration between the two disciplines.

**Lessons learned:** OR nursing education should be relevant, timely and practical to the clinical environment. A collaborative approach early in nursing orientation is important and necessary to build relationships within an interdisciplinary team. More in-depth education sessions on medications used in the OR are required. Issues related to interpersonal interactions and personal well-being should be recognized as the orientees are integrated into the OR.

**Questions for discussion:**
- How do we build a foundation of collaboration between disciplines?
- What engagement strategies have worked or have not worked so well?
- How can we increase acceptance on the use of simulation?
- How do we increase consistency in clinical practice to improve nursing orientation within a large interdisciplinary team?
- How can we reinforce/ sustain the knowledge and clinical skills learned and increased confidence gained during orientation?

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**PO 14-4 – Pediatric Anaphylaxis in the Operating Room for Anesthesia Residents: A Simulation Study**

**Simulation instruction design and curriculum development**

Submission ID: IPSSW2016-1097

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**Background:** Pediatric intraoperative emergencies are rare and even one of the more common emergencies; anaphylaxis, many residents will not experience this event during their training. Simulation allows for learning, improving skills and gaining confidence with handling operating room emergencies. The purpose of this study was to expose second and third year residents (CA2 and CA3) to a pediatric intraoperative emergency using simulation and evaluate time to recognize and treat anaphylaxis.

**Research question:** Our hypothesis was that knowledge gaps in the management of pediatric anaphylaxis exist among senior anesthesia residents.

**Methods:** A scenario was designed involving a 5yo undergoing a tonsillectomy/adenoidectomy for chronic tonsillitis.¹ The participant relieved a Nurse Anesthetist following induction, time out and antibiotic administration. After no more questions by the resident the scripted scenario started. The patient developed wheezing, bronchospasm with an obstructive capnograph, followed by progressive tachycardia and hypotension, eventually leading to bradycardia and pulseless electric activity (PEA) if anaphylaxis was unrecognized. Time to key events was recorded on a standard form developed from the PediCrisis Checklists.¹ A scripted debriefing followed and evaluations were completed by each participant. Statistical analysis used SPSS software (Chicago, IL). An un-paired student t-test and chi-square test was used to compare different level of learners.

**Results:** Seventeen anesthesia residents participated, including 11 CA2 and 6 CA3. Average time to diagnose anaphylaxis was 457 ± 147sec and time to give epinephrine (epi) was 388 ± 123sec. Only 35% of residents started an epi infusion following initial bolus. Only 1 gave the recommended dose of epi with all others giving a code dose. CA3 called for help earlier (150 ± 41 vs ± 300±41sec, p=.014) and were more likely to initiate
PO 14-5 – Organizational Change: A Simulation-Enhanced Perioperative Nurse Residency Program

Simulation instruction design and curriculum development
Submission ID: IPSSW2016-1147

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The simulation-enhanced Perioperative Nurse Residency Program at Yale-New Haven Hospital was developed to address a high vacancy rate due to aging workforce and limited qualified applicants and to decrease cost of orientation. The goals of the program were to decrease length of orientation and improve retention rate. The structure of the program allows educators to train newly hired nurses on basic skill sets that transcend adult and pediatric patient populations and explore the nuances of each. An inter-professional design team comprised of simulation experts and key stakeholders from perioperative nursing used organizational change models to design the program. Over several sessions, the team brainstormed ideal structure and support and defined essential content. The 12-week program focuses on core concepts and skills for new hires who are new graduate or experienced nurses transitioning to perioperative nursing practice. Learners are hired directly into a service-line and assigned a primary preceptor. Content is divided into 5 five phases of care: 1) pre-operative, 2) the scrub role, 3) receiving the patient, 4) intraoperative, and 5) post-operative. These phases of care, or Entrustable Professional Activities (EPAs) are interconnected competencies that require the learner to possess knowledge, skill and attitude and apply these to the practice area.1,2 High reliability organization concepts, teamwork skills, and patient safety initiatives are integrated throughout. Each phase offers multiple learning modalities including: on-line learning modules, skills practice, increasingly complex simulations, and application of skills within context in the clinical environment. Each phase culminates with a milestone simulation. Simulations are designed using the SMARTER approach with clearly defined expected actions and embedded “triggers” within the scenario script.3 The program is further supported by trained preceptors, celebrations of milestones, and time for reflection to evaluate performance and set goals.

Evaluation is two-pronged focusing on fiscal and learner outcomes. The following data will be tracked to document return on investment: length of orientation, retention rate, and costs. To evaluate learners’ self-efficacy, the validated Casey-Fink Graduate Nurse Experience Survey instrument will be utilized. Learners are evaluated and given feedback during milestone checks in simulation and by preceptors in the actual clinical environment.

In August 2015, the first group of 10 learners began the pilot program. Feedback is that simulation experiences and milestone checks help learners identify performance gaps and assist preceptors with goal setting during the preceptorship. Further evaluation data from two full cycles will be available by IPSSW2016. The collaborative design process can be utilized by simulation practitioners to create programmatic solutions at their home institutions.
References:

PO 14-6 - ‘Swimulation’ - An In-Situ Simulation in a New Paediatric Hydrotherapy Unit for education and System Safety
Submission ID: IPSSW2016-LS-09

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Context: In-situ simulation training has been practised in our unit for over a decade. In 2015, phase 2 of the Children’s Hospital for Wales opened. This led to the simulation team developing scenarios, not only to assist learning, but to test new equipment and ensure emergency teams were aware of new locations in an arrest situation.

Wheeler et al (2013) suggest that simulation can be used to test the implementation of new protocols, to ensure their applicability and discover potential issues that may otherwise not be discovered until applied to a real patient care situation.

With this in mind, simulation training was carried out in all areas, to ensure the emergency teams became familiar with the ward locations and the equipment available. These simulations implemented a combined purpose of improving medical knowledge and a training exercise to assess systems in new locations. The aim was to improve quality of patient care, whilst ensuring patient safety in a new environment.

Description: A new hydrotherapy suite opened and pool emergency procedures were developed. The aim of the simulation was to test these new procedures including: how to evacuate, how to call for the resuscitation team and how to transfer a patient from the pool to the designated resuscitation area.

Developing a simulation to test these new procedures proved challenging. Wanting to evaluate all potential risks, we proceeded with a ventricular fibrillation (VF) arrest scenario, where amongst other points, safe use of a defibrillator around a water-containing area could be ascertained.

The scenario commenced in the pool with a patient actor who was employed to act as if they had collapsed. The physiotherapy team instigated the resuscitation, evacuated the patient from the pool and commenced basic life support (BLS). As the resuscitation team arrived, the patient was transferred to a trolley, whilst continuing BLS. They were then wheeled to the resuscitation area, where our high-fidelity manikin was ready for the team to continue management.

Following the simulation, the team were debriefed regarding medical management, evacuation policies/procedures and practical issues were discussed.

Observation: The simulation was very well received, with all those taking part reporting they felt it useful and relevant to their practice. Seventy-two percent rated their overall impression of the scenario as ‘excellent’ with the remaining scoring ‘good’. Physiotherapy staff reported relief to discover how quickly they evacuated the patient and commenced BLS. They were reassured by the prompt arrival of the first members of the resuscitation team. As facilitators, we were encouraged that the change from patient actor to manikin mid scenario did not significantly disrupt the simulation. Patient care remained the focus.

Discussion: The simulation allowed us to identify twelve safety and training points which have subsequently been actioned. This is the first time we have used a patient actor progressing to a manikin mid simulation. It proved exceedingly useful in this difficult area of simulation, posing as an educational method we would use in the future to ensure high quality patient care.
We have subsequently filmed a 'textbook' hydrotherapy VF arrest simulation so it can be used as a teaching aid. We believe that other simulation communities could adopt this idea for complex scenarios.

PO 15-1 – Simulation-Based Pre-Departure Training for Global Health Electives During a Pediatrics Residency

Simulation instruction design and curriculum development

Submission ID: IPSSW2016-1112

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The Pediatric residency program at the University of British Columbia (UBC), Vancouver provides access to a number of well-established electives around the world. Though they offer significant professional and personal rewards, these electives are challenging for residents. Specifically, the patient social and disease demographics differ, the level of acuity is higher, and residents often must function more autonomously. Despite readily accessible support and mandated didactic preparatory sessions addressing medical and cultural preparedness, residents often feel unready. Simulation based education offers an excellent medium through which to more concretely teach skills and medical knowledge that will be applicable to global health electives. It is our objective to design and implement such sessions.

Educational objectives:
1) Improve technical skills in commonly encountered procedures:
   1. Lumbar puncture
   2. Intravenous catheter insertion
   3. Intraosseous catheter insertion
   2. Arterial line insertion via seldinger technique
   3. Oral and nasal intubation via laryngoscopy
   4. CPR
2) Improve management of acute presentations uncommon in residents’ current training environment but likely to be encountered during a global health elective.
   1. Meningococcemia
   2. Hypovolemic shock secondary to gastroenteritis in a patient with protein-energy malnutrition
   3. Tuberculous meningitis
3) Lead a health care team and manage acute illness with more limited human and medical resources.
4) Identify learning needs and discuss concerns or questions regarding global health electives with residents and staff members who have had a similar experience.

Approach: Sessions for residents will take place in high fidelity labs and be administered by residents and staff experienced with simulation and who have been on global health electives. Pre-reading including recent literature, international guidelines, and centre specific protocols will be provided. Sessions will include 2-3 simulated cases, with associated performance and medical expert debriefs.

Quality assurance:
1) Post-session questionnaires will explore whether sessions were worthwhile, prompted further identification of educational needs, and improved confidence
2) Post elective questionnaires will identify the level of fidelity of simulated sessions’ case presentations and medical management in retrospect.

Difficulties encountered:
1) Time delay between the pre-departure session and the elective.
2) There is limited research and no institutional experience in global health elective simulation based pre-departure training.

Questions for discussion:
1) Will these sessions reinforce reciprocal educational activity?
2) Could simulation based pre-departure training instill false confidence? Can we mitigate this by involving medical experts and educators from the elective sites in case and session development?
A Novel Simulation Curriculum Targeting Pediatric Interns as Early In-Hospital Medical Responders

**Simulation Instruction design and curriculum development**

Submission ID: IPSSW2016-1151

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**Context:** Simulation-based education for inter-professional and advanced learners often focuses on event management and teamwork (1-5). However, junior-level trainees are more likely to be initial responders than ultimate event managers during in-hospital emergencies. We developed a novel simulation-based curriculum for pediatric training focused on early rather than advanced care of the deteriorating patient, emphasizing safe escalation and clear handoff. We present the first phase of curriculum development, designed for pediatric interns in a large urban residency program.

**Description:** Two authors (TB, DH) created a standardized simulation-based curriculum for pediatric interns consisting of an 8-hour “Boot Camp” during intern orientation, followed by clinical simulation modules spaced throughout the academic year. The Boot Camp consisted of: 1) a short didactic introducing the “resuscitation team” and concepts of crisis resource management; 2) four 30-minute skills sessions instructing non-invasive assisted oxygenation and ventilation, intravenous access, and defibrillation; and 3) three simulated clinical scenarios to practice basic resuscitation skills and behaviors. The three scenarios in Boot Camp and the spaced modules were hemodynamic shock, respiratory failure, and cardiopulmonary arrest. Curriculum learning objectives encompassed five domains: 1) recognizing a clinically deteriorating child, 2) activating hospital-based emergency response systems, 3) providing initial life-saving therapies, 4) utilizing crisis resource management principles, and 5) practicing effective hand-off to receiving clinicians. Content was derived from evidence-based best practices described in resuscitation, simulation, teamwork, and medical education literature (1, 4-10). Six experts from pediatric emergency medicine, critical care, graduate medical education, and simulation reviewed the curriculum for content and feasibility. Simulation facilitators were recruited from pediatric emergency medicine and critical care; all were trained in simulation debriefing techniques.

**Observation/ Evaluation:** This phase will assess curriculum feasibility and impact on trainee confidence. Preliminary data from pre- and post-surveys of participating interns show improvements in confidence in all five domains. Attendance is tracked to assess curriculum delivery. Future curriculum iterations will evaluate objective performance measures, such as time to enacting life-saving interventions, and quality and content of handoff.

**Discussion:** We developed a novel simulation-based curriculum that improves intern confidence in early resuscitation skills, safe escalation of therapy, and handoff of care. Our next steps involve developing and validating objective assessments of knowledge acquisition and performance, recognizing trainee confidence does not equate competence (11). Ultimately, we hope to target patient outcome-based measures, but recognize these are more elusive.

**References:**


PO 15-3 – Using Simulation to Aid Neonatal Staff in Logistics and Parental Communication When Reorienting Care

Simulation instruction design and curriculum development

Submission ID: IPSS2016-1189

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The reorientation of care in neonates, from intensive care to comfort care, can be a highly emotional time for both families and staff – a process which requires enhanced communication between all parties involved. Both medical and nursing staff require the skills to encourage and support families in decision making throughout this time, encouraging families to see and hold their baby, and create memories.

It is widely recognized that simulation has a major role in high-acuity, low opportunity (HALO) events, usually resuscitation or critical incidents. There has also been a drive over recent years to use simulation in palliative care for adults, with scenarios being published on regional simulation network websites, though there is little published work on its use in neonatal end-of-life or reorientation of care.

Personal communication with NICU staff revealed a deficiency in knowledge and confidence in managing not only the logistics around reorientation of care (the transfer of a baby to a non-clinical environment, rationalising monitoring and infusions whilst optimizing comfort), but also the communications with families around their views and wishes for what happens in the few hours before and after the baby's death.

As part of a larger bereavement information package for doctors and nurses working on the department, a simulation scenario of a preterm infant undergoing reorientation of care where death was felt to be imminent was devised. The main aims were exploring the practicalities of transferring a critically ill baby to a non-clinical environment (e.g. bereavement suite) and exploring the lines of communication with other team members and parents: their views, wishes and expectations. The scenario involves two nurses and two doctors and two parent actors. It is focused on (i) the neonatal transfer from the intensive care room to a specifically designated bereavement suite, (ii) the certification of death and (iii) the discussions with the family – both factual about the immediate processes that need to occur, and the emotional support provided to the wider family at different time points.

This unique use of simulation in re-orientation of neonatal care is presented. The simulation setup and staff outcome assessments (knowledge and confidence gained) will be described.
References:

PO 15-4 – Devising a Simulation Programme for Advanced Neonatal Nurse Transport Practitioners
Programme development/ Administration and Programme Management
Submission ID: IPSSW2016-1164

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Transportation of a sick patient to an area where definitive care can be provided is saturated with risk, and neonatal intensive care is no exception. Neonatal transport requires specific skills, therefore specialised transport teams have been set up over recent years to undertake this role. To ensure optimal outcomes, it is expected that all members of the transport team are able to demonstrate and maintain competency in the stabilization and transportation of critically-ill neonates, specifically securing and managing the neonatal airway, maintaining adequate ventilation and oxygenation, and obtaining vascular access1.

However, the opportunity to perform these procedures during or around the time of transfer, for these practitioners, is rare. Currently there are no national standards for neonatal transport team education and training, nor the process by which the required competencies are assessed. Most of these competencies e.g. stabilizing an airway in the back of an ambulance, are classed as high acuity, though low opportunity (HALO) situations. It is these situations where simulation has its greatest benefits2.

Greater Manchester Neonatal Transport Service (GMNeTS) is a dedicated 24-hour neonatal transport service, staffed by transport nurses and Advanced Neonatal Nurse Practitioners (ANNPs), with remote medical support from tertiary consultant neonatologists. It undertakes approximately 900 transfers per year in the Greater Manchester and surrounding areas of the North West of England. GMNeTs team currently has in place a system for reporting any risk events that occur. Examples from these reported risk events and perception of the practitioners has been taken into consideration in developing scenario topics for a bimonthly simulation programme addressing a range of high acuity low opportunity situations e.g. recognizing and managing the sudden deterioration in the ventilated infant/. In developing these scenarios the learning outcomes would reflect the knowledge, skills and human factors in these various neonatal transport situations.

Due to the unique setup of the team and a future proposal of merging with neighbouring neonatal transport teams, it was felt imperative and timely that such a programme is established, to meet the specific needs of the operation divisional network. We present the setup of such a programme and the influences that this has on clinical practice.

References:

PO 15-5 – Improving the Admission Practices of Sick Neonates Using Simulation and Other Educational Media
Patient safety and quality Improvement
Submission ID: IPSSW2016-1241

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For many years it has been recognised that neonatal mortality increases with falling admission temperatures – for every 1°C below 36°C on admission temperature, mortality can increase as much as 28%^1. Within minutes of birth, the core temperature of neonates begins to fall, especially in those less than 1500 grams^2. Not only that, neonates that are admitted to NICU tend to have significantly reduced reserves, both from a respiratory and glucose utilisation point of view. Over the last decade, much has been highlighted in the literature about a ‘Golden Hour’. Though it is recognised that the neonatal transition period can last much longer than this, the idea of the concept was to drive perinatal management to optimise multi-system stabilisation.

Review of the National Neonatal Audit Project (NNAP) data concerning the percentage of babies having temperatures measured in the first hour of admission, and also the percentage of babies having an admission temperature above the set standard of 36°C., along with a recent audit of unit admission practices in the first hour highlighted multiple areas that required intervention and education.

To address this deficiency, we devised an education package, including simulation of the admission process, face-to-face presentation of the facts around hypothermia in neonates, and publication of the issues in the unit’s monthly newsletter. The simulation scenario centred around the admission practices required for a preterm infant, paying particular attention to thermoregulation, glucose measurement, fluids and antibiotic delivery. All of the junior medical staff and unit sisters, who are usually in the position of leadership, had exposure to this scenario. All staff on the unit were made aware of the issues in the monthly newsletter and received the face-to-face presentation.

We present the education package and the impact that this had on the unit practices relating to admission of neonates in the first hour, with particular emphasis on temperature control, documentation, glucose measurement, fluid and antibiotic delivery as well as human factor issues highlighted in the simulation exercise.

References:
microteaching within debriefing sessions. Initially the effectiveness of the scenarios was tested on a group of trainees who attended for a full day ‘beta’ course free of charge.

**Results and conclusion:** We have now successfully completed 5 ‘SCIPE’ courses. The feedback from participants has been excellent. SCIPE has been described as a ‘great balance between practical skills, reflection and revision of medical management’. Positively, we have had unanticipated high levels of interest from trainees in General Paediatrics, EM nurses, EM Consultants, EM Staff Grade doctors as well as ward-based Paediatric nurses. Consequently, we have broadened the criteria for course participation to allow multidisciplinary and multispeciality teams to enroll and we collaborate with the Scottish SAS initiative to facilitate access for non-training career grade doctors. Currently each now hosts 6 doctors and 3 nurses for true interdisciplinary training and co-learning. We encourage our trainee doctors to submit eportfolio assessments following completion of the course to address elements of the curriculum that were previously difficult to attain in daily practice. The weblink for SCIPE is also newly available on the RCEM UK website. We feel our course is a great success and will continue in our efforts to develop further similar courses.

**References:**
1. Scottish Centre for Simulation and Clinical Human Factors http://scschf.org/
3. UK Emergency Medicine Curriculum from August 2015 http://www.rcem.ac.uk/Training-Exams/Curriculum/Curriculum%20from%20August%202015/
5. ScotSTAR Paediatric Retrieval Service http://www.snprs.scot.nhs.uk/

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**PO 16-1 – Helping Babies Survive: Implementing Simulation to Improve Neonatal Outcomes**

*Simulation instruction design and curriculum development*

Submission ID: IPSSW2016-1208

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**Goal:** Provide attendees the opportunity to become more familiar with the Helping Babies Survive (HBS) training modules.

**Learning objectives:** At the end of the workshop the attendee will:
1. Become conversant with the causes of Global Neonatal Mortality
2. Understand the educational design of the HBS modules
3. Receive hands on orientation to educational simulators that were developed for the HBS modules.

**Method of delivery:** Hands on introduction of the three HBS training modules- namely Helping Babies Breathe (HBB), Essential Care for Every Baby (ECEB), and Essential Care for the Small Baby (ECSB).

Each attendee will have the opportunity to receive hands on practice with the following simulators that are used to master the following skills.

1. **Neo-Natalie**
   a. Newborn Resuscitation
   b. Stimulation of the newly born infant,
   c. suction of oral secretions,
   d. palpation of umbilical cord pulsation
   e. Bag and Mask Ventilation
   f. methods to maintain appropriate body temperature of the neonate

2. **Mama Natalie Breast feeding simulator**
   a. common breast feeding problems
b. expression of breast milk
3. Preemie Natalie
   a. alternative feeding methods
   b. placement of Naso-Gastic tubes
   c. administration of NG feeds
The workshop will discuss how all three of the modules can be used for simulation training in limited resource settings focusing on Quality Improvement projects, capacity building, low dose high frequency training approaches

Intended audience: The workshop is appropriate for all levels of attendees.

Relevance to the conference: Given the increasing use of simulation training globally, this workshop will offer attendees exposure to these Evidence Based programs that have been associated with improved neonatal mortality.

Workshop timeline:
- 10 min introduction, discussion on neonatal mortality and the educational design of the HBB program and the evolution of the HBS programs.
- 60 min hands on. The participants will divide into three groups. Each group will have 20 min at the following stations where they will receive hands on training in each program.
   a. HBB
   b. ECEB
   c. ECSB
- 20 min discussion of results of global implementation and ongoing projects and questions.

PO 16-2 – A Wireless, Cost-Effective, and Customizable Data Capture Solution for Simulation Events

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

Submission ID: IPSSW2016-1213

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Context: To run medical simulations effectively at Seattle Children's Hospital, there are three key elements to our background operations: the outlined medical simulation scenario, data capture for simulation events, and feedback surveys by participants and facilitators. Previously, these elements were captured through a paper-based system. This required a large amount of staff time and resources to complete many forms with a high probability for human error. To address this, we have combined cloud-storage technology, an online data capturing application, Apple iPads, and Bluetooth barcode scanning. This system has decreased our time spent on simulation preparation and data entry. By creating a robust, paperless, and cohesive system, many facets of our day-to-day operations have improved.

Description: Our medical simulation scenarios include a description of the medical case and instructions for the simulation technician. These documents are stored in PDF format in iCloud Drive and accessed through iPads using Documents 5, an iOS application. We provide the facilitator with an iPad to conduct the scenario, and the simulation technician with an iPad to operate the technology for the scenario. With Wi-Fi, our entire library of scenarios can be searched for and accessed within seconds on an iPad. To log pertinent simulation event information such as the participants, department, location, and equipment used, we have created an online survey through RedCap. RedCap is an online application designed for data capture in research studies, it is highly customizable and wirelessly pushes completed surveys to an Excel spreadsheet. To log simulation participants, a Bluetooth barcode scanner is used to wirelessly populate the iPad survey with the participant's badge number. This information is subsequently used in Excel to link the badge number with the participant's name, email, and title. Once a simulation is finished, we provide all participants and facilitators with iPads to complete a feedback survey.

Observation/Evaluation: We have observed a significant increase in feedback after implementing this system. Previously, our simulation feedback surveys were sent via email, 13% of participants responded. Currently, our simulation feedback surveys are completed on iPads immediately after the simulation, 100%
of participants responded. Additionally, the cost of this system is inexpensive to implement. This low-cost system has given us 100% feedback that can be used to improve our operations.

**Discussion:** Our wireless, web-based system is able to collect and store data in a streamlined fashion. Additionally, the online survey application has allowed for rapid revisions to increase our system’s effectiveness. This system’s Excel integration has made our data analysis more accurate and simplistic, with a significant reduction in human error. This system is reproducible, scalable, and can be tailored to the specific needs of a simulation center.

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**PO 16-3 – Keeping it Real: The Paediatric Surgical Airway Mask**

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

Submission ID: IPSSW2016-1233

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**Context:** An outreach team-based simulation training day was planned in Dorset County Hospital with input from the regional PICU. A critical airway scenario was devised to help evaluate the airway management algorithm for children as well as to reveal any latent threats within the local hospital environment. The scenario chosen was a child with epiglottitis requiring progression to a surgical airway. The main challenge in the scenario was the provision of realistic surgical airway capability using the currently available paediatric mannequins. We felt this level of fidelity was important to engage the anaesthesia and ENT teams in the training event.

**Description:** The scenario started in the ED using SimBaby (Laerdel) and progressed through the hospital to the operating department where the anaesthesia and ENT teams assembled to attempt to safely secure the airway. We wished to create something that could be placed over the mannequin’s face just prior to the surgical airway procedure to provide the clinicians with real substrate on which to perform the procedure. And so the ‘Life-Mask’ was born. In order to make a ‘Life-Mask’ to fit over SimBaby’s face, SimJunior was used as a template. Clingfilm was applied to SimJunior’s face to protect the mannequin and then layers of Plaster of Paris were carefully applied to shape the face and neck structures. An anaesthetic catheter mount was selected to mimic a child’s trachea with characteristic tracheal rings. This was plastered into position. A 0.5l reservoir bag was attached to the base of the catheter mount to make a working ‘lung’. Finally, whilst the plaster was still soft, a tracheal opening was carved where the cricothyroid membrane would be positioned. The mould worked well but resembled something akin to an Egyptian Mummy, so it needed a few more tweaks to look a bit more human! Skin-toned poster paint was applied and a damaged mannequin mask and neck skin modified and fitted.

**Observation/Evaluation:** The mask was used to great effect on the simulation day and hugely enhanced the fidelity of the team-based training event. It was well received by the ENT team and functioned perfectly. As the mask was made from expired or damaged materials, there was no cost to the clinical skills department.

**Discussion:** Simulation fidelity CAN be improved with a little time, thought and a box of bits and bobs!

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**PO 16-4 – Simulation Training to Improve Skills Based Mastery for Junior Paediatric Trainees**

*Innovation/ Future Direction and Outreach Simulation*

Submission ID: IPSSW2016-1053

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Context: The Royal College of Paediatrics and Child Health curriculum states that by the end of ST3 (third year of paediatric training), trainees should be proficient in a range of practical procedures including tracheal intubation of term and pre-term infants, chest drain insertion and percutaneous long line insertion (1). Opportunities to learn how to perform these procedures are encountered infrequently by trainees not in dedicated neonatal posts and there is competetion with senior trainees and Advanced Neonatal Nurse Practitioners (ANNPs) who need to maintain their skill set. Ensuring competence by registrar level training is therefore difficult and a source of anxiety for junior trainees.

Description: Simulation as a learning tool in paediatrics has gained momentum in recent years, particularly for improving skills in the management of the most acutely ill children (2). In the West Midlands, ST1 trainees currently participate in a simulation session based around identifying and responding to the acutely unwell child at a purpose built high fidelity centre. The session and debrief are designed to focus on non-technical skills. Trainees enjoy these sessions but evaluation has indicated trainees at this level would prefer the opportunity to focus on the more technical aspects of each scenario, including practical procedures.

Observation/ Evaluation: A short survey was designed and emailed to ST1-ST3 paediatric trainees in the West Midlands to establish trainees’ experience and confidence in performing each of the RCPCH mandated procedures. 22 responses were received. The majority of trainees (68-77% depending on procedure) had no experience at all of observing or performing intraosseous needle insertion, peripheral arterial cannulation, chest drain insertion or emergency needle thoracocentesis. Trainees reporting good or very good experience (defined as having performed the procedure >5 times and working towards independence) ranged from 4% for suprapubic urine aspiration to 64% for lumbar puncture (Figure 1). 21/22 respondents thought that ST1 skills mastery simulation sessions would be useful and would attend.

Discussion: As a result of the findings, skills mastery simulation sessions are currently being developed for ST1 paediatric trainees in the West Midlands. The focus will be on technical skills and aseptic technique, but non-technical skills including explanation of the procedure, gaining consent and patient communication will also be considered. Repetitive practice of these skills will then be implemented throughout the ST1 year to improve skills mastery.

It is hoped that this blended approach to simulation encompassing both technical and non-technical skills will be more beneficial to junior trainees early on in their paediatric career.

References:
1. RCPCH Run through level 1 curriculum (Procedures). Royal College of Paediatrics and Child Health, London.

PO 16-5 – Pediatric Surgical and Anesthesia Teamwork in Guatemala

Educational Outreach (Including remote, rural and international simulation education)
Submission ID: IPSSW2016-1242

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Objective: Determine the performance of common objectives and teamwork in pediatric anesthesia and surgical patient in Hospital General San Juan de Dios in Guatemala City.

Methods: An educational Project was discussed with Postgraduate Professors of Surgery Department, anesthesia, pediatrics and Pediatric intensive care. The objective is to integrate simulation based on the common use of algorithms and teamwork even different medical specialities. The SOYUTZ (Good-Union mixed Russian-Mayan language word) Pediatric Simulation Emergencies Center located at Hospital General San Juan de Dios was based to make an evaluation and follow the training during 2016. The scenarios were based on validated algorithms and references. The scenarios were based on objectives and the debriefing was focused in assessing the algorithm and teamwork.

Results: 18 2yr anesthesia residents, 10 2yr surgery residents, 25 1-3yr pediatrics residents, and 5 Pediatric Intensive Care residents participated in 20 sessions related with the evaluation based in simulation of pediatric emergencies. The checklist was based on validated algorithms, none of them can integrate teamwork with different medical specialties. All of them define simulation as a good experience to reduce conflict and define common treatment objectives based in validated multidisciplinary algorithms.

Conclusions: Simulation is a useful methodology to improve the inter medical specialty teamwork and define common objectives based on validated algorithms in Guatemala.

PO 16-6 – Simulation Improves Decision Making in Pediatric Postgraduate Students in Guatemala

Educational Outreach (Including remote, rural and international simulation education)
Submission ID: IPSSW2016-1230

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Objective: Determine the impact of simulation training to improve the performance in 4 year pediatrics postgraduate students in Guatemala.

Methods: 54 4yr Pediatrics Postgraduate Students of Universidad de San Carlos de Guatemala, they were distributed in 7 groups. The training was developed first with Pretest OSCE with topics about the main problems in public services. After that they performed a clinical simulation scenario at SOYUTZ (Good-Union mixed Russian-Mayan language word) with checklist based in validated algorithms and references. The scenarios were based on objectives and the debriefing was focused in assessing in the algorithm and teamwork. A post test OSCE were performed.

Results: None of 54 obtained a satisfactory score at pretest OSCE, none of the 7 simulation groups performed the scenarios based on checklist and the validated algorithms. All medical students said they feel fine and the methodology of simulation was useful to describe the assets and pitfalls; describes well the algorithm as checklist and the improvement of the importance of teamwork. In the post test the score (as individual and as a team) scenarios of Head Trauma, Shock, Cardiopulmonary Resuscitation, Electrical Injury...
and Foreign Body in Airway whom were discussed all of them obtain satisfactory score and have statistical difference related with the pretest (p<0.05).

**Conclusion:** Simulation is a useful educational methodology in pediatric postgraduate students to assure the performance and improve the teamwork in public hospitals in Guatemala.

**PO 17-1 – Utilizing Simulation to Identify Latent Safety Threats During Neonatal MRI Intramural Transport**

*Patient safety and quality improvement*

Submission ID: IPSSW2016-1207

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**Background:** *In situ* simulation can be used to identify latent safety threats, which allows for the detection of a range of system issues that can negatively affect patient safety, offering an opportunity for improvement and change (1-7). The neonatal population can be vulnerable to the risks associated with obtaining an MRI scan, including physiologic instability, noise, the potential for requiring sedation, and the need for transport. [8,9] Extended transports of fragile neonates away from the NICU or delayed/cancelled MRI scans are also problematic. In our institution, a review of all infants who underwent an MRI scan over a one-year period was conducted (unpublished data). Adverse events were reported in 10% of cases. Overall, the process by which to obtain an MRI scan for an infant in the NICU is substantially complex. There are multiple human, environmental, policy, and system factors that are involved, with the potential for errors in each area. Therefore, there is a critical need to evaluate current intramural transport practices in order to improve patient safety.

**Research question:** Can simulation be used to identify latent safety threats (LST) during neonatal MRI intramural transport and to improve understanding of neonatal intramural transport processes?

**Methodology:** This will be a prospective observation study, conducted in a tertiary neonatal intensive care unit. We will run 10 in-situ simulations with scenarios modelled after typical transport runs. Participants will be recruited from the existing pool of transport personnel. These simulated transport ‘runs’, will consist of taking a simulated infant to the MRI suite and returning to the NICU. The study team will observe each simulation and use a checklist to identify safety threats related to protocols, tasks, and equipment, and document any threats. Each simulated run will also be video recorded in order to: compare team performance (using Clinical Teamwork Scale) [10] amongst different teams and to enhance team education. After the simulated transport, each team member will be provided with a questionnaire, which will be used to identify additional latent safety threats and evaluate team function. They will also be asked to complete the NASA Task Load Index to assess workload. Identified latent safety threats will be categorized according to a classification scheme based on the most common risk factors as identified by van Beuzekom [11]. Histograms and Pareto charts will also be used to report the identified latent safety threats. Fishbone diagrams will be used to in order to further understand the contributing factors to the most commonly identified safety threats.

**Results:** At the time of this submission, we are anticipating to start simulations by December 2015. We expect to have preliminary data, and very possibly will have completed the study by the time of IPSSW 2016 and be able to report our final results and interpretation.

**References:**

PO 17-2 – Use of Simulation in Canadian Neonatal-Perinatal Medicine Training Programs

Simulation instruction design and curriculum development

Submission ID: IPSSW2016-1211

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**Background:** Neonatal-perinatal medicine is a high-acuity speciality, requiring the need for timely clinical decisions and proficiency in complex procedural skills. This can make training in this field challenging and stressful. Furthermore, there are decreasing opportunities for trainees to gain competency in important skills, such as in intubation, which ultimately affects patient safety [1, 2]. Given the decreased training opportunities along with patient safety concerns there is now a paradigm shift from the traditional model of ‘see one, do one, teach one’ in the real life situation to utilizing simulation to gain experience and competency through deliberate practice [3]. Simulation is effective in improving knowledge and in many fields has been associated with improved skill performance and interprofessional team training [4-6], and is now in of itself a specialized focus of numerous fellowship programs across North America [7]. Current faculty are indicating that they require simulation training to ensure effective teaching [8]. Simulation is being considered not only for delivery of education but also for assessment and future accreditation [9]. However we need to be careful in integrating simulation into curriculum, because as with any educational tool, simulation should only be utilized if it is the most suitable modality to achieve the intended educational goals. There are also significant costs associated with this education technology. Previous reviews of neonatal simulation training was limited to a US context [10]. Therefore, we are undertaking a study to assess the current use of medical simulation and the perceived simulation based training needs in Canadian neonatal-perinatal training programs. This information will lead to opportunities for further development of simulation based training initiatives in neonatal-perinatal training across Canada.

**Research question:** What is the current use of medical simulation along with perceived simulation-training ‘needs’ in Canadian neonatal-perinatal medicine training programs?

**Methodology:** A 23 item online descriptive survey will be sent to all neonatal-perinatal medicine program directors in Canada. A similar 14 item survey will also be sent to all current neonatal-perinatal medicine fellows in Canada. The survey has been modelled on a previously validated tool by Johnson et al. [10], which was used to assess the use of medical simulation in neonatal training programs in the United States. This survey will be sent out within two weeks from the time of this abstract submission and participants will have one month to respond.

**Results/Discussion:** We expect to have results compiled and analyzed before January 2016. Our findings and relevant discussion will be ready for presentation at IPSSW 2016.


PO 17-3 – Evaluation of Teaching Techniques and Simulation-Based Methodology

**Process improvement and organizational change**

Submission ID: IPSSW2016-1068

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**Objective:** To study the perception and performance earned by medical students regarding the elective “Medical Simulation in Pediatrics” subject. This is part of formal education planning in the Faculty of Medicine at the University of Seville.

**Material and methods:** An observational study, with the aim was to evaluate undergraduate teaching in Medicine using new learning technologies and methodologies with a medical simulation-based programming, was performed. Program, methodology, teaching techniques and subject results are analyzed for two years of the subject: “Medical Simulation in Pediatrics”.

To perform the study, we took a sample of 174 students that were enrolled in this course, that was offered at the Faculty of Medicine of the University of Seville. This subject had a comprehensive program that focuses on training skills for diagnosis and therapeutic in a secure way. This learning was possible due to the use of clinical stuff and simulation mannequins. An anonymous survey with “ad hoc” design was distributed to students at the end of the course in order to evaluate teaching and teachers.

**Results and conclusions:** The perception and assessment by students of the course were very positive in all areas; also dynamics of classes, which were entertaining and encouraged thanks to the active participation of students in their learning, the teacher knowledge and the practical program of the subject were some of the issues best rated at the final course survey. Students feel they have fulfilled its initial expectations. However, the high number of students, is a weak point in the subject based on simulation. We concluded that subjects with a simulation-based program should be included as a permanent part in undergraduate medical education.

**References:**

PO 17-4 – Simulation-Based Learning in Pediatrics. An Experimental Study

Patient safety and quality improvement
Submission ID: IPSSW2016-1067

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Introduction and objectives: Learning to perform a lumbar puncture in a pediatric simulator, allows to achieve competences and increases the probability of success when done on a real patient. This study's main objective is to demonstrate the benefit of using simulation to teach the technique, achieving better results in undergraduate learning compared to regular teaching.

Material and methods: Experimental study based on a controlled clinical trial with simple parallel design and randomized allocation, where two groups of undergraduate students are compared. It’s assessed, by a multiple-choice test, the acquisition of lumbar puncture skills based on usage or not of the simulation in teaching. A pretest is performed in both groups to study the homogeneity they have.

Results: Averages of “Increase grade rates %” are, for the control group (G1) of 45.216 %, and for the study group (G2) of 55.593 %; each group has its own confidence interval: 33.785 to 56.647 (G1) and 47.225 to 63.960 (G2). Exam averages for theoretical and practical questions were calculated for each group: 7.2 in theoretical and 5.04 in practical (G1); 6.8 in theoretical and 7.56 in practical (G2).

Conclusions: Higher scores are achieved in group with simulation-based teaching in both theoretical and practical exams due to a complete learning. In order to do an optimal performance of the technique, it would be needed the use of simulators before performing them on real patients, or even having it done previously. It is important to have enough time to teach both theoretical and practical sessions to perform with mannequin.

References:
1. Sánchez Santos L, Rodríguez Nuñez A, Iglesias Vázquez J, Civantos Fuentes E, Couceiro Gianzo J, Rodríguez Suáon avanzada para pediatras de atenció

PO 17-5 – Rolling Refresher Simulation to Improve PICU Nursing Code Cart Management

Simulation for procedural and psychomotor skills
Submission ID: IPSSW2016-1035

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Context: Pediatric intensive care unit nurses (PICU RNs) manage the code cart during pediatric emergencies at the Children’s Hospital at Dartmouth but have infrequent opportunities. Simulation of such scenarios can help ensure adequate response times and appropriate interventions when pediatric emergencies occur. This quality improvement project was developed to improve patient safety by establishing code cart competency.

Description: Five simulated scenarios, including 22 code-cart skills, were developed in collaboration with MD and RN experts. Scenarios were piloted by several members of the study team who were considered pediatric code cart experts and refinements were made in an iterative fashion. For each task, expected actions including time limit, were defined based upon expert performance. Each RN underwent monitored competency assessment. If a task was not performed competently within the established time, the participant received immediate feedback and repeated the task to mastery. RNs received individualized education based upon their baseline knowledge and experience.
**Observation/ Evaluation:** 32 RNs participated. Median PICU RN experience was 3 years [IQR 1.38, 8]. RNs had attended a median of one pediatric code in the preceding year [IQR 0, 2]. Median number of first attempt failures was 2 (IQR 1, 5). No participant completed all tasks successfully on first attempt. The following characteristics were significantly associated with first attempt failure: most recent PALS course >6 months (OR 3.51, p<0.01) vs <6 months; decreased feeling of preparedness with 4 or 5 (OR 0.12, p=0.02), 3 (OR 0.13, p=0.01), and 2 (OR 0.32, p=0.02), vs 1 (1-unprepared, 3-neutral, 5-prepared). Comfort managing the code cart was related to first attempt failure with 3-5 more likely to have first attempt failure (OR 3.39, p=0.04) vs those less comfortable 1-2 (1-uncomfortable, 3-neutral, 5-comfortable). The following were not significantly associated with first attempt failure: years as a PICU RN, timing or number of previous code or mock code, last code cart use, and number of codes.

80% of RNs found the program to be “very helpful” and that it “greatly” improved confidence in finding and using medical equipment on the pediatric code cart. Suggestions for future trainings included involving medication dosage calculation, running the training as a team, and training more frequently than every six months.

**Discussion:** Our pediatric code cart simulation program identifies key life-saving skills requiring additional training/refreshing while establishing mastery of low frequency high-risk skills. Our program can serve as a model for training providers in other low frequency, high-risk procedures. We plan to use a similar program to train RNs in areas other than the PICU where pediatric emergencies are less frequent. We plan to explore the benefits/drawbacks of repeating training on rotating basis more frequently than every 6 months.

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**PO 17-6 – Development of a Simulation Course for Pediatric Anesthesiology Fellows**

*Simulation Instruction design and curriculum development*

Submission ID: IPSSW2016-1243

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**Context:** Pediatric anesthesia fellowship is a one-year clinical training program, providing anesthesia trainees knowledge and skills to become consultant pediatric anesthesiologists. Simulation has been integrated into all levels of anesthesia education. (1,2) We designed a pediatric anesthesiology simulation course to enhance our pediatric anesthesia fellows' clinical experience. It is designed to improve knowledge, skills, decision making, and communication. This course also provides exposure to rare disease processes that occur infrequently.

**Description:** A needs assessment querying alumni from our pediatric anesthesiology fellowship was done, 74% of respondents said that a simulation program would have benefited them. Therefore, a simulation curriculum was developed. It was designed based on case logs and surveying the fellowship directors and fellows. Gaps in clinical experience and pediatric anesthesia emergencies were included. The course consists of 3-8 hour modules with 4-5 anesthesia fellow participants and 3 staff anesthesiologists facilitating. The simulations occur in the operating room in our hospital. They are run by the facilitating anesthesiologists and simulation technologists that know the scenarios. Two of the modules consist of 4-5 scenarios each followed by a debriefing session. The scenarios contain: 1) high risk clinical situations 2) common pediatric adverse events 3) rare cases that are unique to pediatric anesthesia. The third module is a difficult airway workshop with difficult airway scenarios.

Debriefing sessions include case specific didactic sessions and then an open discussion about the topic with participants and facilitators share their own clinical experiences. Principles of crisis resource management and the importance of communication are introduced at the beginning of each module and are carried through the course. This course is in no way evaluative.

**Observation:** We have run this course since 2011 (about 45 fellows). At the end of each module, fellows anonymously evaluated the content. They rated the sessions very highly. They found the opportunity to review the cases with staff members and exchange ideas of management was very beneficial. They valued the debriefing among colleagues, and felt it provides a non-judgmental atmosphere where they felt safe to make mistakes and ask questions. Additionally, they found the skills training components very useful to their clinical practice.
Discussion: Based on the positive end of module evaluations, we feel we are, thus far, achieving the educational objectives of the course. However, we evaluate the course content yearly to ensure that we continue to meet the needs of our fellows. We will be assessing how this curriculum influences the practice of our program graduates in their first two years as consultants. We would like to examine how this course changes fellows’ decision making and response time and whether it improves patient care and safety.

References:

PO 18-1 – Facilitators of Effective Teamwork during Resuscitations - An Analysis of In-Situ Simulations in NICU

Crisis Resource Management/ Human factors and Teamwork
Submission ID: IPSSW2016-1216

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Background: Resuscitations are one of the most stressful events in the in the newborn intensive care unit (NICU) and requires all the team members’ concerted effort. Thus, it is an ultimate show of a good interprofessional teamwork. Interprofessional education (IPE) has been called as the new era in healthcare education (IPE expert panel). In a recent Cochrane review for IPE it was concluded that to improve the quality of evidence relating to IPE and patient outcomes or healthcare process outcomes, we needed qualitative studies examining processes relating to IPE and practice changes (Reeves, 2013).

Research question: In this study we wanted to identify the perspectives of the interprofessional staff for what made a resuscitation successful in neonatal intensive care unit. Specifically, we wanted to explore the perceived barriers and facilitators while resuscitating an infant in the NICU, especially the issues related to interprofessional teamwork.

Methodology: This was a part of a larger project where the aim was to investigate the effects of structured debriefings on teamwork skills during in-situ simulation sessions for resuscitations in the NICU. 12 teams of five interprofessional staff were recruited. They participated in three scenarios; two back to back and third three months later. Each session was followed by a 40-60 minute sit-down debriefing session. During these debriefing sessions staff was allowed to discuss mostly teamwork related issues and received feedback/training using a framework that was based on extensive literature search and a Delphi process. These sessions were audio and video recorded and transcribed. A qualitative method called qualitative description was used to identify the perceived barriers and facilitators as described above (Sandelowski, 2010).

Results: Authors coded 34 transcribed debriefings independently. Then they came together and discussed what the categories should be. Three main categories and eight subcategories were identified (table 1). We found that effective communication at every stage of resuscitation was the most commonly cited facilitator for a well perceived resuscitation. Staff also provided personal experiences/opinions how to make communication better in a close unit like NICU.

Table 1:

<table>
<thead>
<tr>
<th>Speaking out loud</th>
<th>Getting Task Done Well</th>
<th>Working Well Together</th>
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<tbody>
<tr>
<td>Speaking out loud</td>
<td>Having clear tasks to focus on</td>
<td>Working synergistically</td>
</tr>
<tr>
<td>Sharing Thoughts</td>
<td>Having tasks well-coordinated</td>
<td>Managing conflict</td>
</tr>
<tr>
<td>Clarifying what is heard</td>
<td>Having the right team to do the tasks</td>
<td></td>
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</tbody>
</table>

Table 1:
**Conclusion:** This is the first study exploring staff perceptions of barriers and facilitators for a successful resuscitation using debriefings after simulation as a research tool. Results should inform the researchers and educators while designing interventions to improve resuscitations in especially NICU setting.

**References:**

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**PO 18-2 – Facilitating Post-Simulation Debriefing – Eye-Opening Behaviors**

**Debriefing and teaching methodologies**

Submission ID: IPSSW2016-1167

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**Background:** Feedback (including debriefing) has been identified as the most important feature of simulation-based learning.1, 2 Now and then debriefing is referred to as an art.3 Important elements4 and different approaches have been proposed (e.g.5, 6) but surprisingly few papers explicate the practice of how to debrief. Post-simulation debriefings in teams with professional practitioners have been described as following trajectories with recurring phases7, 8: ignorance or unawareness of problems, identifying problems, giving explanations to their occurrence, and finally proposing strategies for managing similar future problems. Nevertheless, little is known about how analyses of team performance develop during debriefings and which facilitator interactions are productive in advancing and supporting such analyses.

**Research question:** Which kinds of facilitator behaviors contribute to the advancement of participants’ analyses of team performance during debriefs?

**Methodology:** Data from 17 one-day simulation courses have been collected with 4-10 participants in each course. The teams were interprofessional, consisting of undergraduate medical and nursing students. Detailed analyses of video recordings (interaction analyses) of debriefings were performed9-11. The analytic focus was on how the participants’ analyses developed during simulation courses and on the character of facilitator interactions immediately preceding a shift to the next phase of the participants’ analyzing of team performance.

Questionnaire data were collected about the students’ expectations, self-rated performance and experiences before and after courses as well as before and after each simulation and debriefing.

**Results:** The debriefings with medical and nursing students followed trajectories with recurring phases in similar ways as with professional practitioners. Different types of facilitator behaviors that preceded a shift to the next phase were identified. Some types of interventions typically occur only before a specific phase, e.g., the use of video (before problems are identified), questions about rationales (before explanations), or quoting and enacting behaviors (before strategies). Other interventions were observed before several different phases.

Students rated their own and the teams’ general performance and teamwork higher after the debriefing in comparison with immediately after the simulation. Data also showed that they noticed more examples of optimal and suboptimal behavior after the debriefing.

**Discussion and conclusions:** Support from facilitators may be decisive for helping teams in moving to the next phase of analyzing their performance, but the facilitator behaviors need to be aligned to the specific phase of the debrief or else they risk not being effective. This study characterizes different types of facilitator
interventions which successfully advanced the participants’ analyses and which may be transferable to other contexts.

References:

PO 18-3 – Paediatric Resuscitation and Stabilisation (PReS): A Simulation Outreach-Training Program

Educational Outreach (including remote, rural and international simulation education)
Submission ID: IPSSW2016-1026

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Context: Critically ill children can be challenging to manage, especially when it occurs infrequently. With the centralisation of paediatric intensive care1, critically ill children are resuscitated and stabilised in district general hospitals (DGHs) prior to being transferred to a tertiary unit. A recognised concern of centralisation is that it de-skills DGH staff in managing critically ill children. Acknowledging this concern, the Yorkshire and Humber Paediatric Critical Care Operational Delivery Network (Y&HPCCODN) implemented outreach training days to DGH staff. The aim is to ensure staff can maintain their skills, confidence and knowledge.

Description: PReS is a one day course which uses simulation as a tool to train and develop skills of the DGH in the resuscitation and stabilisation of the critically ill child. Hosted by Y&HPCCODN, it allows intensive care consultants and Y&HPCCODN educators trained in simulation and debriefing to deliver education to all hospitals in the region. This brings specialist knowledge and credibility to the course. The day also introduces the concept of crisis resource management (CRM) including key facets such as team work and leadership to provide good quality care.

The course has been running for two years with very positive feedback. It allows multi-disciplinary specialities within the hospital to work together in several emergency paediatric scenarios and also identifies any latent
risks in their workplace. Debriefing allows the different specialities to discuss difficulties when dealing with critically ill children and identify means of overcoming these.

**Evaluation:** All staff attending PReS were asked to fill in feedback forms in order to evaluate and if necessary adapt the course. Feedback from August 2014 to July 2015 showed PReS is highly valued by attendees. 95% (178/188) participants scored the course as either “excellent” or “very good” at meeting the learning objectives. 97% (183/188) felt the subject matter was “excellent” or “very good” and at the appropriate level. 98% (185/188) scored the course at either “excellent” or “very good” in equipping them with skills and knowledge that they can use in clinical practice.

Feedback comments included “Very helpful to have multidisciplinary teams that we can become more familiar with” and “Compared to sim based courses (e.g. APLS) this is the most useful to perform in our own roles, more realistic. Allowed practice with inter-specialty working”

**Discussion:** Our experience and feedback shows that PReS is a very successful outreach simulation course and helps improve staff skills in managing critically ill children. Feedback recognises the importance of having multidisciplinary teams work and learn together and this highlights the benefits of inter professional learning. We recognise that this training needs to continue and further work will ensure that analysis of the feedback is used to keep the program fresh and maximise the learning potential.

**References:**
2. Department of Health (2006) The acutely or critically sick or injured child in the district general hospital

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**PO 18-4 – Making it Real - Utilizing Simulation Environments to Enhance Learning for Critical Care Transport**

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

**Submission ID:** IPSSW2016-1043

Christopher Vas1,*, Steve Hancock1, Jo Whiston1, Ian Braithwaite1, Bob Basu1

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**Overall goal:** To explore the use of simulation environments in a critical care transport setting. A range of environments will be discussed and demonstrated from the simple use of space and props to more sophisticated designs including a low cost air ambulance. The workshop will enable participants to share their own experiences and give them the opportunity to create simulation scenarios and put them into practice. The goal is for participants to see first hand how changes in environment can aid learning and discuss how this can be transferred to other areas.

**Define learning objective:**
- Understand the benefits of simulated environments to improve clinical learning. This will be measured via feedback and should be achieved by the end of the workshop
- Learn about the challenges involved in writing scenarios in simulated environments. Achieved during the interactive small group work. Feedback will measure if this was achieved
- Identify areas in participant's own practice where using simulated environments would improve fidelity and learning. To be addressed during debriefs and questions and measured via feedback

**Method of delivery:**
- Didactic
- Simulation demo
- Small group work
- Questions
- Summary/Live Demonstration

**Intended audience:** educators/technicians:any level
Relevance to the conference: The use of simulation environments has successfully allowed us to train staff in challenging transport scenarios. This workshop will highlight the benefits of increasing fidelity to maximise the learning potential of simulation without huge costs. We will give participants the opportunity to see the benefits it provides by observing, designing and participating in a simulated paediatric transfer.

Workshop timeline:
- **Introduction:** Faculty and participant introductions, aims and objectives of the workshop, assessment of participants experience with the topic/changing environment for simulation (10 minutes)
- **Background:** Discussion about the creation of the low cost environments. The Embrace team will then participate in a scenario allowing participants to observe how the simulation works and see the potential benefits for themselves. A short debrief will occur to highlight how the environment can add to the learning process. (20 minutes)
- **Interactive:** The participants will be split into groups of five and asked to spend 10 minutes writing a small scenario for a paediatric transfer with help from facilitators. Each group will then get to run their scenario allowing the other participants the opportunity to be immersed into the different environments. Short debriefs will focus on the benefits, limitations and challenges encountered (50 minutes)
- **Final Summary and Questions:** Summarize learning points from the session. Explore how participants could adapt this to their areas. Time for questions. (10 minutes)

References:
1. Braithwaite I, Hancock S et al. Creating a low cost air ambulance environment for high-fidelity simulation training. IPSSW2014, Vienna

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**PO 18-5 – Enhancing Residents’ Neonatal Needle Thoracentesis Competency Through a Novel, Low Cost Model**

*Innovation/ Future Direction and Outreach Simulation*

Submission ID: IPSSW2016-1225

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**Context:** Needle thoracentesis is a life-saving procedural skill required by pediatricians. The Residency Review Committee for Pediatrics of the Accreditation Council for Graduate Medical Education mandates pediatric residents demonstrate procedural competence in this skill. This implies they are confident and have the self-assuredness in their ability to perform the skill in a competent manner. Traditional training in needle thoracentesis comprises a Neonatal Resuscitation Program (NRP) video demonstration complemented by clinical experience. However, this procedure is a rare clinical event, and pediatric residents have few opportunities (<5 in the literature) to perform a needle thoracentesis during training.

**Description:** Simulation is used in procedural skills training, but there is currently not a neonatal training model for needle thoracentesis. Simulators are expensive devices and few task trainers exist for thoracentesis and none of which are appropriate for neonatal needle thoracentesis. Using easily accessible supplies found on every neonatal unit, a task trainer was developed and implemented for simulation training. This study examined pre- and post-intervention performance using a low cost simulator.

**Observation/ Evaluation:** The study took place in UAB’s Women and Infant’s Center Regional Neonatal ICU (RNI). Twenty pediatric residents completed the training. The needle thoracentesis workshop took place in the RNI in small groups of 2-3 residents, spending 30-45 minutes going over the model, relevant equipment, and clinical indications for the procedure. Residents took turns performing the procedure, were given feedback, and allowed to repeat the procedure until they were deemed competent by the instructor. Assessment measures were based upon individual perceptions of confidence pre- and post-participation evaluated using a six-point Likert scale. Significant improvements in perceived procedural confidence and competence were achieved with p<0.001 using this low-cost trainer.

**Discussion:** Residents have limited and decreasing opportunities to perform rare life-saving procedures. Access to simulator training workshops can increase their perceived confidence and competence in
performing these rare procedures such as needle thoracentesis. Due to budgetary constraints, the cost of high-fidelity task trainers and mannequins present a barrier in teaching this critical skill. We have demonstrated a low-cost simulator made from easily accessible supplies is adequate for training as a task trainer. There is growing concern that improvements made from simulation practice may not translate into improved-clinical performance. Further study into skill retention, competence, and confidence are required.

References:

PO 18-6 – In-Situ Simulation to Assess Hospital Preparedness For Trauma Designation in a Pediatric Hospital

Interprofessional Education (IPE)
Submission ID: IPSSW2016-1169

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Research question: Does the implementation of a pediatric in-situ trauma simulation curriculum adequately prepare the trauma team and the institution for designation as a trauma center?

Discussion: Trauma is the known leading cause of death and acquired disability in children and adolescents. Initial intervention in the Emergency department makes a tremendous impact on patient outcomes. Adhering to developed protocols, activating adequate and appropriate resources, competency of equipment and team communication is necessary to mitigate severity of injury. The Advanced Trauma Life Support (ATLS) protocol has shown consistently to improve patient outcomes and is the gold standard for acute trauma management. There are no current curriculums that are developed for trauma teams to evaluate adherence to protocols, clinical competency, efficacy and communication as a multidisciplinary team.

Background: A not for profit children’s Hospital with 356 licensed beds is obtaining designation as trauma center. The facility is participating in the process to achieve designation as a Level II trauma center. A trauma task force is developed within the hospital to evaluate staffing, resources, educational and programmatic development. The IPE Simulation Program is charged to develop a curriculum to access the competency of the trauma team, system process for trauma patients and latent safety threats.

Phase I: In-situ high fidelity scenario in the Trauma Bay once a month. Participants include nursing, surgeon and respiratory therapists.

Phase II: High Fidelity Simulation SimCamp to train all nurses, respiratory therapists and physicians who respond to trauma activations. 2 hour intensive session with three simulated trauma scenarios. In the Trauma bay, with a video orientating participants to simulation and 20 minutes of facilitated debriefing after each scenario.

Phase III: High fidelity simulation drill conducted monthly with activation of a Level I trauma. All hospital wide staff and who respond to trauma activations attend.

Primary outcomes: Equipment and supplies, Team Communication/Technological Communication, Hospital system performance, Staffing Model.

Secondary outcomes: Questionares accessing preparedness for high fidelity simulation, realism of the experience, the impact of the simulated clinical experience improving knowledge and skills with trauma patients.
Condrum: The project required the utilization of high fidelity simulation. As a new and novel concept for most of the institution concerted effort to establish support for simulation across physician and healthcare provider domains is required. The necessary staff participating demanded relief of scheduled individuals from their clinical duties. Educational funding for supplies and additional staff to work for participants had to be acquired and approved outside of an already preplanned hospital budget. There is no existing curriculum for training/evaluating a multidisciplinary team for pediatric trauma.

PO 18-7 – Building and Maintaining Skills for Multidisciplinary Team Members in a Level One Neonatal Unit
Submission ID: IPSSW2016-LS-32
Raman M1, Wooding EL1,2,*
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Context: Errors in healthcare cause significant patient morbidity and mortality. (1) Inadequate teamwork and communication can result in serious consequences for patient care. (2,3) The Royal College of Paediatrics and Child Health’s “Why Children Die” report demonstrated preventable factors in 26% of child mortality cases reviewed. Common factors included poor communication skills and poor situational awareness. (4) Level one neonatal units need to maintain skill and knowledge bases for common neonatal emergencies despite limited exposure, including preparing critically ill neonates for transfer to tertiary units. (5) Simulation can provide an important platform for maintaining these skills in the multidisciplinary team. (6)

Description: We have developed a programme of simulation for neonatal nurses and doctors in a level one neonatal unit which aims to refresh and teach new skills, both technical and non-technical, to enhance and share learning. The programme incorporates resuscitation, practical skills, such as prescribing drugs and fluids and developing situational awareness and teamwork skills. Simulations also aim to improve practice through the identification of latent safety threats. Simulations take place in small groups and are a mixture of high and low fidelity in situ simulations lasting approximately 20 minutes prior to debriefing by trained facilitator.

The programme of simulation is recorded for use as a teaching tool, where consent is given. This enables participants to share in extended debriefing and feedback sessions. It is our aim to share videoed simulations in paediatric teaching sessions, with consent, and progress to telematically-linked simulations between level one units in our region. We are also developing a transport simulation where we will work alongside a multidisciplinary team of level one and level three staff, and transport team, to simulate stabilisation of a neonate for transfer. We have piloted several simulations and now plan to expand to a regular pro-gramme of monthly simulations.

Observations: Simulations to date have identified latent safety threats which have been rectified in our neonatal unit, for example inadequate oxygen tubing length on certain resuscitaires. Participants have offered positive feedback on their experience of taking part in neonatal simulation. Challenges to the success of the programme include staffing levels and scheduling clashes. Previous simulations have required cancellation due to staff illness or patient load. Literature around cancellation of in situ simulation in paediatrics suggests a rate of 15-28%,7 however in our experience it is higher than this.

Discussion: These multiple concepts come together to form a programme of in situ simulation which can provide a rolling educational programme for nurses and doctors, sharing practice locally and regionally. Further work is needed to safeguard the programme against cancellation and to engrain it further in the training calendar to ensure continuity.

References:

PO 18-8 – Teamwork Interventions in Paediatric Simulation – A Literature Review
Submission ID: IPSSW2016-LS-33

Wooden EL1,2,*, Gale T1, Maynard V1
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Background: This study reviews the contemporary literature in teamwork training in skills laboratory-based simulation and in situ simulation focusing on paediatrics. The aim was to collate the evidence surrounding teamwork and non-technical skills training, informing a future intervention as an output. In situ simulation holds potential benefits over laboratory simulation, including increased perceived functional fidelity and reduced costs.

Research question: What teamwork and non-technical skills frameworks are a suitable surrogate measure for teamwork competencies in paediatric multidisciplinary team simulations in situ and in skills laboratory-based simulation? Can these scales provide a validated measure for objective and subjective multidisciplinary team functioning?

Methodology: A literature search was performed using common clinical and educational databases from 1st January 2005 to 1st January 2015 using Boolean searching focusing on simulation, teamwork training, paediatrics and associated terms, alongside hand-searching of key journals. Abstracts unrelated to clinician education and/or papers without an intervention methodology were excluded. Evidence was collated from studies with sufficient methodological rigour, using the CASP framework where appropriate.

Results: 47 papers and peer-reviewed conference proceedings met all inclusion criteria. Most suitable studies related to obstetrics, emergency medicine or paediatrics. Included obstetric studies mostly contained a relevant neonatal focus, and paediatric studies mostly related to neonatal or paediatric intensive care, over general paediatrics. All eligible studies reported improved team functioning, but with varying methodological quality. Some studies intending to assess teamwork actually measured attitudes or knowledge instead (n=11); and improved teamwork functioning may only be demonstrated through subjective measures such as participant-reported outcomes (n=15). In studies where scenarios were videotaped and objectively rated (n=5), this was largely carried out appropriately with multiple, trained raters and statistical analysis demonstrating acceptable inter-rater reliability. Most studies used mixed teaching methodologies questioning the role of simulation alone in developing teamwork (n=28). Many studies preferred laboratory-based simulation to assess its impact on teamwork, but only one study directly compared the two.

Conclusions: The importance of good teamwork in clinical care is well evidenced, and simulation plays a role in this. In paediatrics simulation meets the needs of training frontline staff to manage high acuity, low opportunity events. The literature, whilst filled with examples of simulation-based teamwork training, lacks appropriate surrogate measures or validated teamwork scales to ensure training, without the confounding presence of additional training media. Following this review a paediatric teamwork rating tool is being adapted and validated.
PO 19-1 – Extremes of Age; Combining Paediatric and Geriatric Simulation – Can it Work?

Simulation instruction design and curriculum development
Submission ID: IPSSW2016-LS-15

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Context: Adult medicine simulation days for final-year medical students in our hospital receive very positive feedback; this inspired a pilot of paediatric and geriatric simulation for fourth-year students. Limited curriculum time dedicated to these areas and small numbers of students on clinical attachments meant an isolated day of simulation in either speciality would be costly and difficult to deliver. Whilst paediatric and geriatric pathology varies significantly we felt that there were also many similarities in patient care - such as systematic assessment and challenging communication with patients and relatives – where combining simulation for both specialities could provide important, universal learning outcomes1 regardless of this contrast.

Description: We piloted a one-day simulation programme for ten fourth year medical students currently on paediatric or geriatric attachments, and due to rotate through both areas within the next two months. Student pairs participated in a 10-minute clinical scenario involving assessment and management of a simulated patient, watched by the group by video-link; a 20 minute debrief covering clinical aspects and human factors with all students was then facilitated. Scenarios were curriculum-mapped, with four paediatric cases; wheeze, suspected meningococcal sepsis, head injury with possible non-accidental injury, and a well baby with anxious parent: and four geriatric; delirium secondary to UTI, falls, cardiac arrest, and end-of-life care. Six students participated in at least one scenario for the speciality they were not currently on attachment in.

Observation: All students submitted written evaluation and feedback; all “strongly agreed” that the day was useful and worthwhile, addressed their specific learning needs, and that they would recommend it to fellow students. Learning outcomes submitted by the students covered clinical areas and human factors, with the importance of “A to E” assessment, reassessment and communication with relatives being cited repeatedly. Combining paediatric and geriatric simulation was not identified as being problematic, with one commenting “each student should have [the] opportunity for one paediatric AND one geriatric station”.

Discussion: Despite the significant difference in pathology seen within paediatric and geriatric patient groups there are also many similarities in patient care that, at an undergraduate level, ensure combining paediatric and geriatric simulation is an effective and welcomed way of delivering teaching. Limited curriculum time dedicated to these specialities can be a significant challenge to undergraduate educators2,3, but combining paediatric and geriatric simulation is a plausible and cost-effective strategy to enhance undergraduate learning.

References:

PO 19-2 – Marshmallows and Spaghetti; Interactive Adjuncts to Clinical Simulation

Debriefing and teaching methodologies
Submission ID: IPSSW2016-LS-16

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1PGMDE, King's College Hospital NHS Foundation Trust, Surbiton, Surrey, United Kingdom

Context: We run regular, compulsory simulation course days for foundation doctors and undergraduate medical students; their compulsory nature presents unique challenges, and we consistently received feedback from learners that these courses involved “too much sitting and watching...sitting and talking”. It
was also observed that candidates regularly seemed deflated following cardiac arrest scenarios - which were often disorganised and demonstrated poor team work – despite being told explicitly that the arrest was non-punitive, and engaging well with debrief. We felt a non-clinical activity might engage learners further by varying the stimulus.

**Description:** We introduced a short teambuilding exercise following a cardiac arrest scenario. In groups of 4-5 candidates were given 1 minute to decide a leader and team name, and a further 8 minutes to complete a simple non-clinical task in their group. Tasks used included building the highest tower possible using only a packet of dry spaghetti and bag of marshmallows, and using scrap materials to build a device to protect an egg from cracking when dropped from a first floor window. Following “judging” the task, a learner-led debrief was conducted lasting 15-20 minutes.

**Observation/ Evaluation:** Learner-led debrief persistently prompted in-depth discussion regarding teamwork; leadership styles, examples of good and poor leadership, followership, OK Corral/ life positions1 and how these affect teams. Whilst these topics were similar to those covered in the cardiac arrest scenario, it was notably easier to engage learners in discussion.  Feedback from learners echoed this, citing the team building challenge as one of the main things we did to help learning, and recognising its role in making the day “interactive” and “refreshing”.

**Discussion:**
- Teaching human factors using non-clinical tasks can be used to vary the educational stimulus and re-invigorate fatigued learners, and their non-clinical basis can invite in-depth discussion of topics which might otherwise be too overwhelmingly stressful to invite deeper learning
- Cardiac arrest is particularly well-suited to the simulation environment, as clinicians are likely to be exposed to this scenario in real life and improved management has the potential to drastically improve outcomes
- Whilst we are aware of precautions that need to be taken to ensure psychological safety of learners when simulating morbidity and mortality outcomes
- Few solutions to successfully engaging learners in post-arrest debrief have been suggested; we propose that utilising non-clinical adjuncts such as these could help address this gap.

**References:**

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**PO 19-3 – What do Emergency Departments Really Need to Know about Newborn Resuscitation?**

**Patient safety and quality improvement**

Submission ID: IPSSW2016-LS-17

Kat Smith1*, Kunal Babla1, Sam Thenabadu1

1PGMDE, King’s College Hospital NHS Foundation Trust, Surbiton, Surrey, United Kingdom

**Background:** UK Emergency Department (ED) registrars are expected to be able to deliver and resuscitate a newborn infant as per Neonatal Life Support (NLS) guidelines 1. Relatively few deliveries occur in or en-route to the ED, however prehospital and ED delivery have consistently been shown to be associated with a high rate of maternal and infant complications 2,3 whilst few emergency department staff feel comfortable performing neonatal resuscitation 4,5.

**Educational goal:** Our local ED registrar cohort identified a need for further teaching and simulation on neonatal resuscitation.
Proposed approach: A two-hour teaching session was delivered to a multi-disciplinary group of 15, predominantly ED registrars. This covered physiological transition to extra-uterine life and its relation to the NLS algorithm, an introduction to the Resuscitaire, and two planned in-situ simulation scenarios covering resuscitation of term and moderately preterm infants.

Observation: There was high anxiety regarding the resuscitation of newborn infants amongst ED staff. Knowledge of the NLS resuscitation algorithm was incomplete, with little theoretical knowledge of transition to extra-uterine life. All ED staff were unfamiliar with the Resuscitaire. Due to resulting time constraints only the term newborn simulation scenario was conducted, during which there were numerous difficulties with the use of neonatal resuscitation equipment.

Evaluation: Feedback from this intervention was positive and the group expressed a desire for more simulation-based newborn resuscitation teaching from ED staff.

Discussion: ED staff’s lack of familiarity with neonatal resuscitation equipment could represent a significant risk of delayed or inadequate resuscitation for newborn infants, but there is limited clinical exposure due to low numbers of prehospital/ED births. Previous research has shown that a simulation-based intervention can improve neonatal resuscitation by ED teams6 and we believe structured newborn in-situ simulation should be furthered embedded as a way to teach NLS skills to ED staff who are likely to require them on an ad hoc basis. This should include the introduction of in-situ simulation as a valid and recognised method of teaching and assessing NLS skills in the Royal College of Emergency Medicine (RCEM) curriculum 1.

References:
Methods: The primary outcome of this study was to retrospectively compare the degree of either knowledge or skill assessment scores for NRP certification, among 210 residents trained, by the same instructors, with the use of a traditional plastic mannequin (ALS Baby, Laerdal Medical Corporation, USA) in the period of 2009-2011, in comparison to 230 residents trained with the hi-fi mannequin (SimBaby, Laerdal Medical Corporation, USA) in the period of 2012-2014. Currently the recommended passing standards for NRP certification is set as >80% on the knowledge assessment and >85% on the megacode assessment PLUS completion of 5 critical tasks. Knowledge was analyzed by using the standard written examination taken from the NRP instructor's manual. Skills were analyzed by using the megacode assessment form provided in the NRP instructor’s manual. Both were evaluated in terms of percents of correct answers and performances.

Results: In comparison to them trained with the use of a traditional plastic mannequin, residents who were trained with the hi-fi mannequin reached a greater mean score either in the knowledge assessment (90% ± 5% versus 92% ± 8%; P = 0.0020) and in the performances at the megacode assessment (90% ± 7% versus 92% ± 6%; P = 0.0015).

Conclusion: In our experience, the use of hi-fi mannequin in neonatal resuscitation training was well-received by learners and, providing a more realistic model for training, significantly improved the degrees of educations of residents, in comparison to the traditional plastic mannequin.

References:

PO 19-5 – Simulation - A Participant’s Perspective
Submission ID: IPSSW2016-LS-19
Alexandra Childs1,*, David Bartle1
1Royal Devon and Exeter Hospital, Exeter, United Kingdom.

Background: Participant ‘buy-in’ to simulation is essential to successful simulation delivery. Three elements contribute to the reality of simulation; physical, semantical and phenomenological1 (the emotions and thoughts of the simulation participants). Despite this there is little research into the participant experience of simulation.

Research question: We felt it was important to gain an insight into the attitudes and experiences of Paediatric trainees exposed to simulation in training as their experience with simulation develops

Methodology: We conducted an internet based regional survey sent to Paediatric trainees (ST1-8) across South West England. This was sent to 268 recipients. This not only asked about the exposure of trainees to simulation but their perception of these sessions. Participants were also asked how intimidating they found simulation, initially on their first involvement and then currently (rated; never, rarely, sometimes, frequently or always).

Results: We received 66 completed responses (plus 5 incomplete) from trainees based in Health Education Southwest. All 3 levels of training were represented in the responses. 60% of trainees suggested the sessions frequently or always changed their practice. None said that their practice was never changed by the sessions.
83% found simulation intimidating (sometimes, frequently or always) when 1st exposed to it. 56% found it less intimidating with continued exposure. The most commonly reported advantages felt with simulation teaching were: promotion of teamwork, ability to practice in a safe environment and the advantage of managing critical or life threatening presentations with no harm to patients. Many mentioned that they felt simulation was very important in Paediatrics due to the high levels at ‘stake’ and the variety of presentations
seen but often at low numbers. Most frequently reported disadvantages were; lack of realism, participants finding the experience intimidating and stressful and time required for organisation and delivery. A recurrent theme in the free text was a request for more simulation delivery and trainee appreciation that time and effort is put into the delivery of regular programmes.

68% of responders had regular timetabled simulation sessions in their hospital. 85% reported that the simulation sessions they experienced had multidisciplinary involvement.

Conclusions: Simulation leads to change in the clinical practice of Paediatric trainees. This survey also demonstrates benefits felt by Paediatric Trainees undergoing regular simulation. Increased exposure appears to lead to a decrease in the degree of intimidation felt during simulation.

References:

PO 19-6 – Implementation of a Paediatric Simulation Programme in a Paediatric Emergency Department
Submission ID: IPSSW2016-LS-20

Durand C.L.1,*, Kerr A.C.1, Messahel S.1, Rotheram M.1
1AlderHey Children’s Hospital NHS Foundation Trust, Liverpool, Merseyside, UK

Context: Paediatric simulation is vital to ensure optimal patient management, improve patient safety and develop clinical skills. This is particularly important in the Emergency Department (ED) of a tertiary Children’s hospital where there is rapid turnover of medical staff (Adult & Paediatric trainees) and a varied skill mix of nursing & medical staff. We have implemented a twice weekly simulation programme in the Paediatric ED including fortnightly sessions with the hospital trauma team as part of our role as a Paediatric major trauma centre. The hospital moved to a new purpose built site in Oct 2015 bringing a set of challenges in a new physical space. Simulation sessions were used prior to the hospital move to familiarise staff with the new department and to identify any potential issues.

Description: Multidisciplinary simulation sessions are run every Tuesday & Thursday morning. These medical and trauma scenarios are held within the resuscitation area of the ED, using simulation mannequins and real equipment. Hospital wide simulations involving the trauma team are held once a fortnight. There is an ED Paediatric Consultant allocated to facilitate the session, with support from resuscitation officers and a senior nurse. Sessions last up to 45 minutes and run in real time, followed by a 15 minute debrief with all members of staff, reviewing the learning objectives and outcomes including clinical and human factors.

Observation/ Evaluation: From Oct 2013 to Feb 2016 we ran 100 simulation sessions. The facilitator documented details of the scenario, staff involved and learning/action points. Feedback was collected from participants using qualitative questions and a visual analogue scale looking at perceived confidence levels of managing a sick/injured child. From Aug 2015 – Feb 2016 there were 30 sessions with 206 feedback forms collected. 47% doctors, 21% nurses and 20% students. 97% found the simulation session useful with positive comments. With a supportive learning environment all members of staff found this a helpful learning experience. Comments were particularly noted from nursing staff who enjoyed supporting junior medical and nursing staff. It has also been beneficial for medical staff rotating into the department, by taking part they can gain clinical skills in a safe and supportive environment. The hospital wide trauma scenarios have given opportunities to work with staff outside the ED, improving working relationships and the management of trauma patients.

Discussion: We have successfully implemented regular simulation sessions in a busy Tertiary Paediatric ED. This has been well received and is a useful educational tool as well as improving team working. It has identified practical issues within the department and facilitated the process of moving to a new physical space. It has been challenging to ensure the sessions do happen regularly whilst balancing clinical need but all staff members realise the value of the sessions.

To increase awareness in the hospital a simulation demonstration was carried out at the hospital Grand Round meeting prompting discussions with other teams on how they can be involved with simulation. Future
plans include nurse led scenarios, hospital wide scenarios involving other specialties as well as research and trial recruitment simulations.

Through regular simulation sessions we have managed to educate, build confidence and improve team working both in the department and within the hospital community.

References:

PO 19-7 – Development of a Simulation-Based Procedural Sedation Curriculum for Senior Pediatric Residents
Submission ID: IPSSW2016-LS-21

Rathgeber S.1,*, Reimer E.2, Chin C.2, Kang K.T.1
1Department of Pediatrics, 2Department of Pediatric Anesthesia, University of British Columbia, Vancouver, Canada

Pediatric residents at our center are responsible for performing most minimally invasive diagnostic and interventional procedures. Although residents are approved to utilize intranasal and orally administered sedation, the level of sedation and analgesia by these means is often inadequate, making procedures difficult or impossible to perform well. Attending general pediatricians utilize intravenous sedation according to their own clinical experience and comfort, so residents have variable exposure to intravenous sedation techniques and safety measures. Due to the absence of consistent practice and formal training, intravenous sedation is not available for residents to utilize. Intravenous sedation is an important part of general pediatric practice and therefore achieving competency is an essential component of residency training. Our experience is consistent with a needs assessment by Schinasi et al, which demonstrated a need for resident training in pediatric procedural sedation (1).

We have developed and implemented a competency-based curriculum to educate, evaluate, and credential pediatric residents to safely perform intravenous procedural sedation independently according to the standards of care within our institution. Simulation-based medical education is the core of the curriculum and is supplemented by a written manual and final examination. Simulation has previously been demonstrated to be effective in this context (2). The curriculum was devised in collaboration with a multidisciplinary sedation committee and approved by hospital administration. The curriculum consists of a written manual adapted for resident use from current policies in our institution, two checklists to be used before and during the sedation, two high-fidelity simulation scenarios designed to be debriefed by faculty or subspecialty residents trained in pediatric anesthesia, and a written examination. The curriculum was implemented in March 2016 as a part of our senior simulation curriculum that includes all second and third year post-graduate resident trainees. The satisfaction and progress of the residents participating in the curriculum is currently being assessed by surveys conducted before and after the simulation sessions. This curriculum successfully addressed a current gap in resident education at our center. Additionally, it will also serve as a model for how simulation can be an important modality in curriculum development as our program transitions to a competency-based format along with other pediatric training programs across Canada.

References:
PO 20-1 – Child Health Inter-Professional Resuscitation Pilot (CHIRP)
Submission ID: IPSSW2016-LS-22

Coral Rees²,¹, Alison Semmens¹, Sally Richards¹
¹Child Health, NHS, Childrens Hospital for Wales, ²Child Health, Cardiff and Vale University Health Board Trust, Cardiff, United Kingdom

**Context:** Simulation has been shown to be an excellent way to recreate an event in a safe learning environment for practitioners to practice clinical skills, communication and team working with no compromise to patient safety and quality of care (Vyas et al 2012). At the Children’s Hospital for Wales, a dedicated number of medics and nurses ensure simulation takes place at the point of care. During these sessions it was highlighted that inter-professional simulation teaching should be undertaken at undergraduate level with both medical and nursing students to enhance learning.

**Description:** A meeting between both nursing and medical academics and the simulation facilitators highlighted the possibility of bringing together nursing students and fourth year medical students for a day of skills and simulation teaching related to paediatrics. The days were initially arranged only for medical students, but it was felt to be an ideal opportunity for inter-professional learning and best practice education to take place with both sets of students. 8 days in total were arranged. Child branch students were invited to take part in the teaching that was arranged on days when they had private study or were in clinical practice. Participation for the nursing students was entirely on a voluntary basis. For the medical students it was compulsory. In total, 100 medical students and 30 child branch nursing students took part.

The days were formulated so the students would receive short interactive lectures, followed by three skills stations and three simulations. The latter involved them working as an inter-professional team in different simulations that were designed to practice what the lectures and skills stations had taught them.

The Learning outcomes were:
- To provide the necessary knowledge to effectively assess a sick child
- To teach the practical skills necessary for the effective management of basic childhood emergencies
- To evaluate the acquisition of skills and knowledge through simulated practice
- To practice working as a team using simulation

**Evaluation:** Evaluation forms were completed anonymously by all 130 students. The following questions were posed:
1) How useful/enjoyable was your day?
2) How relevant were the Paediatric life support scenarios for your training?
3) How would you rate your pre course knowledge?
4) How would you rate your post course knowledge?
5) What was your overall impression of the day?

**Results table (Percentages)**

<table>
<thead>
<tr>
<th></th>
<th>Q1</th>
<th>Q2</th>
<th>Q3</th>
<th>Q4</th>
<th>Q5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very useful/Excellent</td>
<td>88</td>
<td>86</td>
<td>7</td>
<td>32</td>
<td>85</td>
</tr>
<tr>
<td>Useful/Good</td>
<td>12</td>
<td>14</td>
<td>15</td>
<td>65</td>
<td>15</td>
</tr>
<tr>
<td>Satisfactory</td>
<td>50</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unsatisfactory/Poor</td>
<td>28</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A further 3 questions allowed the students to comment freely on anything else they would have like to have been included, any general comments they wanted to make and whether they thought inter-professional simulation learning was of benefit to them.

**Discussion:** CHIRP evaluated excellently by all who participated with the underlying theme from the students being that they wanted more inter-professional simulated practice as part of their training. The importance of academics and clinicians working together to recognise where inter-professional teaching can be provided is paramount in the organisation of such days. However, incompatible timetables, resourcing faculty and time issues remain limitations that make this type of teaching a challenge.
PO 20-2 – Workshop Integrated in Interprofessional Non-Technical Skills (NTS) Simulation
Submission ID: IPSSW2016-LS-23

Kurt Bjarne Nielsen1,*
1Anaesthesiology, Roskilde Sygehus, Roskilde, Denmark

**Context:** On Zealand University Hospital, Roskilde, three Hospital departments; Obstetrics/Gynaecology, Paediatrics, and Anaesthesia has been conducting interprofessional team training since 2008. The simulation group has organized 6 interprofessional simulation courses, mainly training non-technical skills. We have during the years tried to optimise our methods, both for the simulation scenarios and for the debriefing. We have used debriefings after the 3-phase model; description, analysing, and application (1), and the TeamGAINS 5-phase model (2). We have focused on the NTS. In the first years, the medical professional content in the scenario was not known in advance. In the recent years, the medical professional content has been known in advance for the participants.

We had over the last year heard from colleagues that there had repeatedly been problems obtaining intravenous access in neonates. Several times it had been necessary to use intraosseous access. The reason for this was that colleagues did not feel safe about the positioning of the umbilical vein catheter. Therefore, we organized a workshop to be integrated in the simulation scenario as a part of our course in 2015.

**Description:** The scenario was an interprofessional team-training scenario, dealing with a vaginal breech birth.

The learning objectives of the course were:

- Time out, qualified summary and its plan for further treatment
- Team management and skilled use of present resources.
- Input from the team for optimal care for the patient.

The participants were the normal staff that, under normal circumstances, would be called in case of emergency at the maternity ward. 6-9 participants took part in each course; Paediatrician(s), assisted by neonatal nurse, Anaesthesia Doctor(s), Anaesthesia Nurse(s), Obstetrician(s), Midwife(s).

We had a midwife student to play the mother giving birth. The course took place two days a week for three weeks and the instructors took turns at the different functions. The participants were briefly introduced to the environment. The participants that were not supposed to start in the scenario from the beginning, went outside and took part in a UVC-workshop, and were called to the scenario when relevant. The scenario was timed to 40 minutes, which was followed by a structured debriefing, which lasted 60 minutes including a 10-minute professional feedback.

**Evaluation:** The UVC workshop contributed to the feeling of safety among the participants, which was obvious in the main scenario as well as in the debriefing. In this way, the workshop supported the main scenario and the unfolding of the learning goals.

**Discussion:** The Main key points in our discussion:

- It appears as if a medical professional basis in a NTS scenario supports the reflections about the learning objectives in the debriefing
- The participants find it easier to discuss the non technical skills, if a part of the course has space for technical training
- Presentation of the case before the course and using a relative simple case offers more space to the reflection among the participants in the debriefing

Our focus will in the future be to find the balance between creating a well-known and “safe” learning culture and create appropriate disturbing elements in order to challenge the medical professionals in their reflections during the scenarios and the debriefings.

Further research in this field is considered both relevant and interesting.

**References:**

1. Steinwachs B. How to Facilitate a Debriefing Simulation Gaming June 1992 vol. 23no. 2 186-195

PO 20-3 – How Low Can You Go? A Low Fidelity In-situ Simulation in the Paediatric Emergency Department

Simulation instruction design and curriculum development
Submission ID: IPSSW2016-LS-24

Jennifer Mann¹,*, Gareth Lewis¹, Damian Roland¹, Jamie Sillett¹, Rebecca Prest¹
¹Paediatric Emergency Department, University Hospitals of Leicester, UK

Context of the problem: We are not aware of any published literature describing paediatric mental health in situ simulation. Potential barriers include:
- Realism is difficult to achieve through the use of mannequins as assessment emphasises both physical and psychological factors.
- It is perceived to require experienced individuals to role play, which may involve sourcing actors.

However, young person’s presenting with mental health concerns to the Emergency Department (ED) are increasing, particularly out of hours where specialist staffing may not be present. A combination of age, mental state and side effects of deliberately ingested drugs, can lead to unpredictable behaviour within the ED.

We designed a novel mental health simulation that successfully instills a knowledge basis for the management of these patients, whilst also being simple and reproducible.

Description: The scenario required no equipment and was run by two facilitators. We created case notes for a 14 year old girl who had attended the ED alone. These recorded she was feeling suicidal, and had taken an overdose. The circumstances and parameters given were specifically calculated to require immediate treatment and indicate the patient’s current mental state put them at high risk of further harm.

We presented the information to a nurse within the department and requested further observations. The nurse was signposted to a cubicle which would turn out to be empty.

Observation/ Evaluation: The scenario ran for 20 minutes seeking to identify the following learning outcomes:
1. Simple steps first – physically look for the patient. Attempt to call the patient (answered by one of the facilitators) and ask relevant questions to try and determine location.
2. Involve seniors and identify urgent need for treatment.
3. Appreciate the need to urgently notify appropriate agencies to ensure the child is located and receives the time critical medical care needed.

This was followed by a debrief session with the facilitators.

Discussion: This simulation is very successful and demonstrates that elements of mental health simulation can be performed with no equipment but still generate excellent learning points.

PO 20-4 – Cross Regional Collaboration to Test Protocol for Management of Paediatric Status Epilepticus

Interprofessional Education (IPE)
Submission ID: IPSSW2016-LS-25

Alexandra Quayle¹,*, Liam Wilson², Omer Farooq³, Fharhad Motaleb⁴, James Blythe⁵, Chris Vas⁴
¹Lead Clinician for Simulation at NLAG, ²Simulation Project Lead, ³Sheffield Childrens Hospital, Health Education Yorkshire and Humber, Sheffield, United Kingdom

Context: Successful management of status epilepticus in children requires close adherence to protocol with specific timing of interventions and treatment. Emergency teams form ad hoc and cohesive team interaction with knowledge of best practice, equipment and good communication are vital. At Northern Lincolnshire and Goole NHS Foundation trust the Development and Simulation Hub (DaSH) in collaboration with paediatric Leadership and simulation fellows from Health Education Yorkshire and Humber and the Yorkshire School of Paediatrics tested the management at both Scunthorpe and Grimsby hospitals in the Emergency departments (ED) followed by debrief and education.
**Description:** We used a medium fidelity manikin to simulate a fitting 5 year old child brought in by a parent to the ED. The responding team were called initially with ED nursing and medical staff, paediatricians, and finally anaesthetic team. The scenario dictated that seizures would persist, requiring timely treatment with benzodiazepines, phenytoin and finally anaesthesia and intubation. The team were observed for their assessment of the child, knowledge and adherence to the treatment protocol, use of equipment and team work. For a team to function effectively there must be a sense of collective responsibility [1]. A joint interactive debrief concluded the session.

**Observation/ Evaluation:**

<table>
<thead>
<tr>
<th>Findings at Scunthorpe</th>
<th>Findings at Grimsby</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doctors in ED loading too many tasks onto nursing staff at one time</td>
<td>Timely response from all specialities</td>
</tr>
<tr>
<td>Damaged lock on cupboard delaying access to benzodiazepine</td>
<td>No senior paediatricist</td>
</tr>
<tr>
<td>Rapid response from paediatric team and Outreach nurse</td>
<td>Poor access to protocol concealed - behind a whiteboard</td>
</tr>
<tr>
<td>Good knowledge of protocol</td>
<td>No leadership.</td>
</tr>
<tr>
<td>Excellent timekeeping by paediatric trainee, protocol on wall.</td>
<td>3 doses of benzodiazepines leading to apnoea</td>
</tr>
<tr>
<td>Timely use of phenytoin, calculated and drawn up correctly</td>
<td>Phenytoin only after Embrace advice</td>
</tr>
<tr>
<td>Good handover to anaesthetic team</td>
<td>Good use of SBAR handover between</td>
</tr>
<tr>
<td>Decision to intubate timely</td>
<td>Multi-disciplinary teams especially ED and anaesthetics.</td>
</tr>
<tr>
<td>Inadequate understanding of bag valve mask mechanics in pre-oxygenation</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion:** Orchestrating in-situ simulation is challenging in busy resuscitation rooms. To minimise impact on clinical activity we organised the simulation at 08:30 concluding after 40 minutes, then relocating to an education room for debriefing. The realism of in situ allowed us to detect and address the physical problems at each location eg faulty lock, access to protocol. We revisited the resuscitation bays at a later date to ensure the latent risks identified were corrected. At Scunthorpe the cupboard lock had been replaced. At Grimsby the protocol is now clearly visible in the paediatric bay. At two sites the knowledge and understanding of the management protocol differed greatly. The debrief facilitators comprised of staff from DaSH, the paediatric leadership fellows as well as experienced local clinicians. This mix was very effective in delivering feedback whilst maintaining local engagement. The visiting team reiterated key learning points from the scenario in other trusts. The exercise was felt to be beneficial by all team members in improving knowledge,[2] pointing out team working improvements and addressing latent errors. The collaboration with a regional team has benefitted our organisation and we are now running regular paediatric simulations.

**References:**

1. World health Organization Being and effective team  
   www.who.int/patientsafety/education/curriculum/course4_handout.pdf
PO 20-5 – Paediatric Emergency Medicine Made Easy... – Multidisciplinary Learning from Home to Hospital
Submission ID: IPSSW2016-LS-26

Sian Jones1, Zoe Roberts1,*
1Paediatric Emergency Department, University Hospital of Wales, Cardiff, United Kingdom

Context: The Emergency Department (ED) is a challenging environment where excellence in team working is intrinsic to smooth, effective running and the ability to provide consistently, high quality care for all patients. Training as a team is a recognised and useful way of maintaining skills and improving practice (Flowerdew et al 2011).

With the increasing separation of paediatric from adult nursing provision within the Emergency Department at the University Hospital of Wales, Cardiff, staff were feeling increasing deskillled and unfamiliar with the management of common paediatric presentations. In addition, frustrations were raised regularly around incompleteness of basic observations pre-hospital and poor completion rates of department-specific paperwork, all of which led to the development of the inter-professional EM study day.

Description: The ‘Paediatric Emergency Medicine made easy...’ sim day was designed for staff ranging from pre-hospital personnel (ambulance technicians and paramedics) to nursing and medical staff from Paediatrics, Anaesthetics and Emergency Medicine.

The three key aims were:
1. To address the management of common paediatric complaints presenting to a Paediatric ED
2. To encourage multi-disciplinary working amongst pre-hospital and hospital teams
3. To familiarise staff with local and national paperwork and guidelines

The study day is comprised of two lectures followed by a series of scenarios, using a combination of high-fidelity simulation, more basic resusci manikins and actors for communication workshops. Each station is designed to start within the pre-hospital setting, e.g. home or GP surgery and progresses into the ED.

Evaluation: Evaluation forms were completed anonymously by all 24 candidates, who each stated they would recommend this course to a friend. In addition to the marks given below, the common theme running through the feedback was that of candidates enjoying ‘working alongside others’ and ‘being able to appreciate everyone’s role.’

Results table:

<table>
<thead>
<tr>
<th>Session</th>
<th>5 excellent, 1 poor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lecture 1 – ‘First point of contact: what’s really important’</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Anaphylaxis</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Fitting Child</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Burns / NAI</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Sepsis</td>
<td>4.8</td>
</tr>
<tr>
<td>Lecture 2: Patterns of injury</td>
<td>4.8</td>
</tr>
<tr>
<td>Sim: Adolescent</td>
<td>4.8</td>
</tr>
<tr>
<td>Sim: Major trauma</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Upper airway obstruction</td>
<td>4.9</td>
</tr>
<tr>
<td>Sim: Cardiac arrest</td>
<td>4.9</td>
</tr>
<tr>
<td>Course overall</td>
<td>4.9</td>
</tr>
</tbody>
</table>

As a general observation, increased baseline observations have been done, particularly BMs, by the Welsh Ambulance service, safeguarding documentation has improved and communication between those who attended the first study day together appears more effective having learnt together in a safe environment.

Discussion: Although the concepts of teamwork training are relatively straightforward and the need for it obvious in training multidisciplinary teams, much of the ‘MDT’ simulation work locally continues to take place in silos – either within pre-hospital teams or within the hospital setting, among team members from different...
disciplines. This session highlighted the benefits of true inter-professional working and the future plan is to open it up to staff across Wales aiming to ultimately produce teams that perform proficiently.

References:

PO 20-6 – Developing an In-House Neonatal Simulation Training Programme – Experience and Challenges
Submission ID: IPSSW2016-LS-27

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Background: Improving patient safety by training teams to successfully manage emergencies is a major concern in healthcare. Simulation Based Training (SBT) has evolved over the recent past in overcoming this issue and encourages medical and nursing staff to reflect on clinical and behavioural skills. The AAP Neonatal Resuscitation Programme (NRP) encompasses SBT in its curriculum1. There is evidence of SBT in improving the confidence of doctors in emergency scenarios2,3 thus achieving high standards of patient care and improving patient safety4. We wanted to develop an in-house SBT programme for neonatal staff to deal with neonatal emergencies apart from delivery room resuscitation.

Methods: The SBT programme was aimed at junior doctors and nurses with senior trainees as facilitators. We ran one formal high fidelity simulation programme every 3 months in our SimLab and informal sessions every 2-3 weeks in the department. This was ad-hoc depending on the work pressure and available resources. The programme commenced in Nov 2015 and we have run 2 formal sessions and 4 informal sessions so far. Participants are grouped as a team of four with a team leader, followed by a detailed group debrief. The formal programmes are video recorded and debriefing include a video run. Each session has 2 scenarios of 45 mins with 5 mins introduction and preparation, 15 mins for simulation and 25 mins for debriefing. Written feedback is obtained from the participants including scores (1-5; 5=excellent) for 5 key domains (resuscitation, clinical decision making, communication, confidence, team working), scores for their experience with the SBT(1-5; 5=excellent) based on the following criteria (content, relevance to level of experience, execution of scenario, debriefing, overall learning experience).

Results: There has been a 69.5% response rate (16/21). Majority were junior doctors with 19% being nurses. All (n=16) had experienced SBT beforehand though majority (68.5%) in paediatric/adult setting (n=11/16). Majority (62.5%) felt that the in-house SBT programme was very useful for their training and recommended one formal session per month to be effective. Feedback on the following 5 key domains gave a weighted score as in Table 1:

<table>
<thead>
<tr>
<th>N=16</th>
<th>Weighted average (total =5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop resuscitation skills</td>
<td>4.44</td>
</tr>
<tr>
<td>Develop clinical decision making skills</td>
<td>4.56</td>
</tr>
<tr>
<td>Develop communication skills within the team</td>
<td>4.56</td>
</tr>
<tr>
<td>Improve confidence in emergencies</td>
<td>4.63</td>
</tr>
<tr>
<td>Improve overall team working</td>
<td>4.50</td>
</tr>
</tbody>
</table>

The weighted response for the conduct and the content of the programme were as follows (Table 2):

<table>
<thead>
<tr>
<th>N=16</th>
<th>Weighted score (total score = 5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content of the scenario</td>
<td>4.31</td>
</tr>
<tr>
<td>Relevance to level of training</td>
<td>4.38</td>
</tr>
<tr>
<td>Execution of scenario</td>
<td>4.19</td>
</tr>
<tr>
<td>Debriefing</td>
<td>4.25</td>
</tr>
<tr>
<td>Overall learning experience</td>
<td>4.19</td>
</tr>
</tbody>
</table>
**Discussion:** The in house SBT in our unit is still at a nascent stage but has received good positive feedback and was considered a useful tool in training junior doctors and nurses. Many challenges remain with organisation of resources:

- Availability of SimLab on a monthly basis with audio-visual support
- Manpower
- Equipment availability and maintenance.

Lack of space within the ward setting and activity level was a major challenge in doing the informal sessions and running it ad-hoc.

**Conclusion:** SBT is a useful method in improving clinical skills and confidence of staff in managing neonatal emergencies. We intend to do more formal sessions and integrate into regular teaching programme. We hope to consolidate on our experience and extend it to include midwives and nursery nurses in future.

**References:**
2. Davidson SL, Hassell KJ et al. Neonatal Simulation Training improves paediatric trainees’ confidence in emergency scenarios (abstract)
4. Sharma Alok, From evidence to implementation: Introducing neonatal simulation to a tertiary neonatal centre in the UK. Open journal of Pediatrics, 2013 (3); 10-16

**PO 20-7 – Multi-Platform Simulation Course Improves Health Professionals’ Knowledge and Skills of Paediatric Emergency Care in a Low Resource Setting**
Submission ID: IPSSW2016-LS-28

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**Background:** Mortality in under-fives' in Sub-Saharan Africa remains unacceptably high at 137/1000 live births (1,2). Studies of hospital based paediatric deaths highlight that patients have deteriorating observations for several hours preceding a catastrophic arrest (3). Introduction of observation charts and teaching on interpretation of abnormal vital signs improve infant mortality rates in low resource settings (4).

**Aims:** To design and deliver a multi platform educational programme for healthcare professionals including interactive lectures, video sessions, workshops, bedside clinical sessions, and simulation scenarios. To improve candidates' knowledge and skills in the recognition of sick children, provide appropriate life support intervention, objectively assess sick children, document findings and act on observations using Paediatric Early Warning Scores (PEWS) charts.

**Methods:** We used quantitative and qualitative methods to obtain data from the candidates. Quantitative data was collected by a pre and post course assessment test and analysed using Excel. Qualitative data was collected by free text comments. Free text comments were analysed into themes using a pragmatic approach to framework analysis and were illustrated using tag word cloud analysis.

**Results:** Eighty-six qualified healthcare workers participated in the one day training course delivered over four days. 81% of participants completed the assessments before and after the course to evaluate their knowledge of paediatric emergency assessment and management. There was an average of 10% increase in candidates' scores from 52% pre-course to 62% post course. Analysis of the word cloud revealed that candidates assimilated new skills for assessing sick children such as 'Triage', Alert. Voice. Pain. Unconscious. 'AVPU' scale and use of PEWS charts and demonstrated greater understanding of the principles of paediatric life support.
**Discussion:** This project demonstrated that a one day multi-platform training course on paediatric emergency care can be successfully delivered in low resource settings and lead to improved clinical knowledge and skills.

**References:**
4. Jones R and Kantono EB. Interventional based study to reduce child mortality in rural Uganda. Trop Doct July 2013 vol. 43 no. 3 103-105