BOOK OF ABSTRACTS

All abstracts listed in IPSSW2015 Book of Abstracts have been assigned a prefix for the type of presentation, and a sequential abstract number. The authors' whose names are in bold and are marked with an asterisk (*) are the presenting authors.

Abstracts have been divided in 9 topics as follows:

1. Educational outreach
2. Debriefing and teaching methodologies
3. Faculty development
4. Simulation technology
5. Simulation instruction design and curriculum development
6. Assessment
7. Patient safety and quality improvement
8. Interprofessional Education (IPE)
9. Programme development/ Administration and Programme Management

Hanging and removal of paper board posters

Poster boards will be marked with the final abstract numbers.

**Poster mounting time:** Monday, 4 May, as of 07:30. Posters need to be mounted prior to Tuesday, 5 May at 12:30.

**Poster removal time:** Wednesday, 6 May, as of 14:00. Posters that have not been removed by 17:00 will be disposed of by the organisers.

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ID: IPSSW2015-1213

PO 060 Postgraduate Students Medical Competences Simulation Based Evaluation
Luis Moya-Barquin, PICU / Pediatrics, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala
ID: IPSSW2015-1226

PO 061 Development of Pediatric Emergencies Simulation Center in Guatemala City Public Hospital
Luis Moya-Barquin, PICU / Pediatrics, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala
ID: IPSSW2015-1225

PO 062 Pediatric Life Support Competences in Medical Students in Guatemala
Luis Moya-Barquin, PICU / Pediatrics, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala
ID: IPSSW2015-1196

PO 063 Simulation Training on Pediatric Emergency Technical Skills: Experience from Nancy and Nice
Amelie Gatin, Pediatric Emergency, CHU NANCY, Vandoeuvre les Nancy, France
ID: IPSSW2015-1141

PO 064 Mapping MEPAT Simulation Course to the Royal College of Anaesthetists UK (RCoA) Training Curriculum
Tobias Everett, The Hospital for Sick Children, Toronto, Canada
ID: IPSSW2015-1098

PO 065 Learning Together by Simulating Together – Across Departmental Boundaries
Ruth Gottstein, St Mary's Hospital, Neonatal Unit, United Kingdom
ID: IPSSW2015-1251

PO 066 Building a Culture of Patient Safety using Simulation
Manu Madhok, Emergency Medicine, Children's Hospitals and Clinics of Minnesota, Minneapolis, United States
ID: IPSSW2015-1252

PO 067 Standardized Pediatric Mock Code/In Situ Simulation Program
Sarah Maciolek, Advocate Health Care, Downers Grove, United States
ID: IPSSW2015-1077

PO 068 Curricula Design to Support a Safe Patient Opening in a Middle East Pediatric Greenfield Hospital
Elaine Sigalet, Education, Sidra Research and Medical Center, Doha, Qatar
ID: IPSSW2015-1234

PO 069 Multidisciplinary Crisis Simulation Curriculum in Pediatric Radiation Oncology
Wanda Simms, Children's Hospital of Colorado, United States
ID: IPSSW2015-1041

PO 070 Impact of Pediatric Simulation Training on the Management of Preterm Infants
Michael Wagner, Department of Pediatrics and Adolescent Medicine; Division of Neonatology, Pediatric Intensive Care and Neuropediatrics, Medical University of Vienna, Vienna, Austria
ID: IPSSW2015-1060

PO 071 New Healthcare Environments: Expose Safety Threats with In Situ Simulation
George Bender, Pediatrics, Women & Infants Hospital, Providence, United States
ID: IPSSW2015-1230
PO 072: Emergency Department Clerical Simulation Program
Nadine Alcorn, Clinical Education Centre, Sydney Children's Hospital Network, Randwick NSW 2031, Australia
ID: IPSSW2015-1104

PO 073: Assessing Barriers to the Development of a National Simulation Curriculum for General Pediatrics
Melissa Langevin, Medicine, University of Ottawa, Ottawa, Canada
ID: IPSSW2015-1129

PO 074: Welcome Parents in a Paediatric Intensive Care Unit: Pilot Study by Simulation
Thierry Lehousse, CHU ANGERS, France
ID: IPSSW2015-1203

PO 075: Simulation outside the Box: Using Simulation with Untraditional Partners
Doug Campbell, Alan Waters Family Simulation Centre, St. Michael's Hospital, Toronto, Canada
ID: IPSSW2015-1236

PO 076: Creation of a Pediatric Simulation Educational Elective
Robert Parker, Pediatrics, Maine Medical Center, Portland, United States
ID: IPSSW2015-1038

PO 077: Optimizing the Flow of Your ECMO Simulation Program
Theodora Stavroudis, Children's Hospital Los Angeles, Los Angeles, United States
ID: IPSSW2015-1125

PO 078: Simulation Strategies to Detect and Prevent Moral Distress Among Resuscitation Team Providers
Tessy Thomas, Pediatrics, Baylor College of Medicine, Houston, United States
ID: IPSSW2015-1047

PO 079: Improvement of Pediatric Resident Confidence during Low Frequency/High Risk Clinical Events
Kevin M. Overmann, M.D, Rainbow Babies and Children's Hospital, Cleveland, United States
ID: IPSSW2015-1210

PO 080: We All Want More Sim! Design and Implementation of a Longitudinal Pediatric Simulation Curriculum
Victoria Cook, University of British Columbia Pediatrics, Vancouver, Canada
ID: IPSSW2015-1227

PO 081: Resident-Led Implementation of an Interdisciplinary Multi-Year Pediatric Simulation Curriculum
Victoria Cook, Department of Pediatrics, University of British Columbia, Vancouver, Canada
ID: IPSSW2015-1228

PO 082: Development of a Simulation Curriculum for Senior Pediatric Residents
Victoria Cook, Department of Pediatrics, University of British Columbia, Vancouver, Canada
ID: IPSSW2015-1229

PO 083: Hospital Wide Plan for Improving Staff Performance in “The First Five Minutes of a Code”
Amber Youngblood, Pediatric Simulation Center, Children's of Alabama, United States
ID: IPSSW2015-1046

PO 084: Paediatric Advanced Trauma Skills (PATS): A New Advanced Trauma Course for All Grades of Staff
Ami Parikh, Paediatric Emergency Department, Royal London Hospital, Barts Health NHS Trust, London, United Kingdom
ID: IPSSW2015-1215

PO 085: Extracorporeal Membrane Oxygenation during Cardiopulmonary Arrest
Alison Boone, Pediatric Surgical Heart Unit, Advocate Children's Hospital - Oak Lawn, Oak Lawn, United States
ID: IPSSW2015-1162

PO 086: Mechanical Ventilation Simulation for Health Care Providers: A Hands-On Educational Tool
Douglas Campbell, Pediatrics, University of Toronto, Canada
ID: IPSSW2015-1190

PO 087: Enhancing General Practice Training in Paediatrics via an In-Situ Simulation Programme
James Edelman, Health Education Wessex, Southampton, United Kingdom
ID: IPSSW2015-1082

PO 088: Preparing Trainees for the Registrar Leadership Role: Evaluation of the London Simulation Programme
Mehrengise Cooper, London School of Paediatrics, London, United Kingdom  
ID: IPSSW2015-1175

**PO 089**  
Trainee and Supervisor Perceptions of a Just in Time (JIT) Room in a Pediatric Emergency Department  
Anita Thomas, Pediatric Emergency Medicine, University of Washington/Seattle Children's Hospital, United States  
ID: IPSSW2015-1191

**PO 090**  
Handheld Haptic Simulation Procedure Training Device for Peripheral Intravenous Catheter Placement  
Debra Weiner, Emergency Medicine, Boston Children's Hospital/Harvard Medical School, United States  
ID: IPSSW2015-1201

**PO 091**  
A Novel Pediatric Simulation Clerkship For Third-Year Medical Students  
Marisa Brett-Fleegler, Emergency Medicine, Boston Children's Hospital, United States  
ID: IPSSW2015-1201

**PO 092**  
Stretching the Simulated Dollar: Combining Reflective Pratice and Team-Based Learning  
Jan Drutz, Pediatrics, Baylor College of Medicine, Houston, United States  
ID: IPSSW2015-1231

**PO 093**  
Simulation in the OR with Interprofessional Teams Improving Teamwork and Increase Patient Safety.  
Gunilla Henricsson, Dept of Child Anesthesia, Karolinska University Hospital, Stockholm, Sweden  
ID: IPSSW2015-1084

**PO 094**  
Teams That Play Together Stay Together! Role of Multidisciplinary Simulation within Transport Teams  
Sundeep Sandhu, Embrace Yorkshire and Humber Infant and Children's Transport Service, Sheffield Children's Hospital NHS Foundation Trust, United Kingdom  
ID: IPSSW2015-1134

**PO 095**  
Reaching out to point of care - Mobile Simulation  
Rachel Toone, Burnley General Hospital NICU, United Kingdom  
ID: IPSSW2015-1233

**PO 096**  
Future of Innovation: Reaching Out to Remote Units Using MOBILE SIMULATIONS  
Aparajita Basu, Lancashire Women and Newborn Centre, Burnley, United Kingdom  
ID: IPSSW2015-1235

**PO 097**  
NEST Programme: Neonatal Equipment, Skills and Training programme Using Multiple Mini Simulations (MMS)  
Aparajita Basu, Lancashire Women and Newborn Centre, Burnley, United Kingdom  
ID: IPSSW2015-1235

**PO 098**  
Simulation: Injecting Humanity into Scenarios with Trained Nursing Student Patient Volunteers (PVs)  
Natalie (Lu) Sweeney, Dominican University of California, San Rafael, United States  
ID: IPSSW2015-1168

**PO 099**  
Simulation for Trainees Returning To Clinical Practice in Paediatrics – A Multi-Professional Pilot  
Mehrengise Cooper, London School of Paediatrics, United Kingdom  
ID: IPSSW2015-1188

**PO 100**  
Are You Lonesome Tonight? The Use of Simulation in the Training of After-Hours Physiotherapists  
Meg Wemys, SCHN Education Service, Sydney Children's Hospitals Network, Australia  
ID: IPSSW2015-1078

**PO 101**  
3D Printing Transforms Development of Orphan Educational Devices  
George Bender, Pediatrics, Women & Infants Hospital, Providence, United States  
ID: IPSSW2015-1074
**WS 001 - Debriefing by Design**  
*Topic: Faculty development*

**ID:** IPSSW2015-1232  
**Elaine L. Sigalet** 1, **Ella Scott** 2, **Charlene Mercer** 2, **Cindy Punter** 1, **Joanne Davies** 2

1Education, 2Simulation, Sidra Research and Medical Center, Doha, Qatar

Faculty are frequently challenged by requests to engage in Simulation but rarely afforded opportunities to develop their skill set with debriefing; enhancing potential for optimizing team and or individual learning. With the increasing demand for simulation there is a need for supporting faculty development in debriefing. Attendees will be immersed in a debriefing experience, after a brief review of debriefing learning theory. A video depicting a learner debriefing will provide context for participant engagement in the scripting and delivery of a debriefing to another attendee. Faculty will coach the attendee in the process. Lastly, faculty will share the curriculum with attendees to support their ability to design a similar initiative in their home institutions.

**Session Details:** This workshop will expert model experiential learning theory. After a brief power-point presentation to introduce the session and debriefing theory, attendees will watch a video depicting a learner debriefing. A faculty member will engage attendees in using the plus/delta approach to identify effective and ineffective debriefing behaviours, which will be recorded on a flip chart for all attendees to refer to. Then in smaller groups (10-15) attendees will proceed to execute a faculty debrief. Each group will be supported with a cognitive aid depicting the preview, observation, point of view, inquiry, curiosity approach (P-OPIC) to help them script and execute the debrief and faculty will coach this process to support attendee learning. Faculty frames will be scripted to support the attendee in the group that will role play the faculty member. Lastly, each group will share two issues that challenged them and two possible solutions with the larger group.

Attendees will be given a copy of the curriculum developed to support this immersive debriefing session. This will support them should they wish to build a similar faculty development curriculum in their home institution. We believe this workshop will optimize attendee confidence and competence with debriefing recognizing that progress is directly related to deliberate practice.

**Session Learning Objectives:**
In this session, attendees will:
1. Use the plus/delta approach to identify instructor good debriefing performance and performance gaps.
2. Engage previewing, observation, point of view, inquiry, and curiosity to explore instructor frames.
3. Engage strategies for successfully coaching attendees in the scripting and delivery of a debriefing.

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**WS 002 - Build it and They Will Train: How to Create a Simulation Instructor Course for Your Institution**  
*Topic: Programme development/ Administration and Programme Management*

**ID:** IPSSW2015-1076  
**Taylor Sawyer** 1, **Kimberly Stone** 1, **Jen Reid** 1, **Don Stephanian** 1, **Joan Roberts** 1, **Pamela Christensen** 2, **Leslie Harder** 2, **Douglas Thompson** 3

1Pediatrics, 2Nursing, 3Anesthesia, Seattle Children's Hospital, Seattle, United States

A key ingredient of a successful simulation program is the presence of a well-trained cadre of simulation instructors. Simulation instructor training at national-level courses is expensive and may not be viable for smaller simulation programs. Additionally, the training provided at national-level courses may not be directly applicable to local simulation practices. Developing an internal pediatric simulation instructor program at your institution is an excellent way to ensure the availability of trained instructors who are knowledgeable about the methods for conducting simulation within your institution, and cognizant of the resources available. In this highly-interactive workshop, faculty from the Seattle Children's Hospital Learning and Simulation Center (LSC) will share their experience developing and conducting an internal pediatric simulation instructor course. Through a series of focused interactive sessions, the LSC team will
encourage individual problem-solving regarding conducting a needs assessment and developing a course agenda that fits individual program needs. They will also work with participants on creating a blueprint for how to implement an internal pediatric simulation instructor course at their institution. Workshop participants will leave with skills, knowledge, and materials that they can apply in their own practice.

Learning Objectives:

After this workshop, participants will:

1. Understand the importance of an internal simulation training course to the success of a simulation program.
2. Be able to develop a course agenda for a pediatric simulation instructor course.
3. 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 min)
- Small Group Interactive Session #2 – Developing a Course that Fits Your Needs: Instructor Course Agenda Development (30 min)
- Small Group Interactive Session #3 – Getting it done: Instructor Course Implementation (20 min)
- Final summary and questions (15 minutes)

WS 003 – Resource Limited Setting Simulation Programming – Create, Maintain & Innovate

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

ID: IPSSW2015-1124

Mélissa Langevin1, 2, Emily Grover1, 3, Traci Robinson4

1Global Emergency Care Collaborative, Nyakibale, Uganda, 2Emergency Department, Children's Hospital of Eastern Ontario, Ottawa, Canada, 3Brigham and Women's Hospital, Boston, United States, 4Alberta Children's Hospital KidSim, Calgary, Canada

Goal: This workshop aims to provide a practical framework to improve the participant's ability to create/modify simulation programs in resource-limited settings (RLS) that are successful, high-quality, culturally contextualized, and sustainable.

By the end of the workshop, participants will be able to:

1. Understand key the components of the framework: needs assessment & curriculum, logistical considerations, instructor training, and implementation.
2. Use the framework and associated worksheet to fine-tune or brainstorm the steps to developing their simulation program in a specific RLS.
3. Receive peer & expert feedback on their proposed curriculum and collaborate with other participants also working in RLS.
Method of delivery: The workshop will be delivered through a mix of group discussion, video demonstration & analysis to introduce the framework/ worksheet, and hands on practice with the worksheet. A pre-workshop survey will be sent to pre-registered participants to identify key needs.

Intended Audience: This workshop applies to all learners (educators or clinicians (teams) working or interested in RLS, simulation program directors, and administrators), with tools provided for novice simulation users, but also advanced users looking to perfect their RLS curriculum.

Relevance to conference: Implementing effective curricula in RLS presents unique challenges. This workshop addresses these in order to create strong, sustainable programs to the benefit of both the providers and the patients in the most vulnerable settings.

Workshop Timeline:
- Introductions, workshop objectives, agenda, and sharing of pre-course survey results of learner’s experience with this topic (10 minutes)
- Main Topics: Video demo and introduction to Resource Limited Simulation curriculum design framework (20 minutes)
- Interactive session (50 minutes for small groups using worksheet to review where their simulation program idea/concept is at and devise a “to do list” for future planning (30 min) and large group presentations by country/area that RLS curriculum is projected to be implemented (20 min)]
- Final Summary & Questions (10 minutes)

WS 004 – PEARLS Debriefing - A Blended Method Approach to Debriefing
Topic: Debriefing and teaching methodologies

ID: IPSSW2015-1043
Adam Cheng* 1, Walter Eppich2, Traci Robinson3, Jonathan Duff4, Helen Catena3, Wendy Bissett3, Stuart Rose5, Gavin Burgess3, Tobias Everett6

1Pediatrics, Alberta Children’s Hospital, Calgary, Canada, 2Northwestern University, Chicago, United States, 3Alberta Children's Hospital, Calgary, 4Stollery Children's Hospital, Edmonton, 5University of Calgary, Calgary, 6The Hospital for Sick Children, Toronto, Canada

This workshop introduces attendees to a novel framework for debriefing which blends 3 existing methods of debriefing into one integrated approach. Using “Promoting Excellence through Augmented Reflective Learning in Simulation” or the PEARLS blended methods approach, facilitators will be able to appropriately select the ideal method of debriefing with decision support. The course offers the opportunity for attendees to practice the PEARLS method of debriefing with the aid of an integrated debriefing tool.

Overall Goal / Outcome: Participants will be able to effectively apply the PEARLS blended method approach to debriefing by effectively selecting and using the most appropriate method of debriefing for various situations.

Learning Objectives
1. Describe three different methods of debriefing and their associated indications for use
2. Identify how the directive feedback, plus-delta, and advocacy inquiry fit within the PEARLS framework of debriefing
3. Apply decision support tools to and the PEARLS debriefing tool to help implement the PEARLS mixed-method of debriefing

Method of Delivery: The PEARLS Debriefing Framework blends 3 methods of debriefing: (1) Plus-delta approach; (2) Directive Feedback and (3) Advocacy Inquiry into one fluid model designed to facilitate effective debriefing. To support implementation of PEARLS, the attendees will use a PEARLS debriefing tool, offering scripted language to guide facilitators in formulating questions. To help attendees effectively learn and implement PEARLS, pre-taped videos of simulated resuscitations will be used as content for attendees to practice the PEARLS methods of debriefing. Small group debriefings will be followed by instructor feedback. Attendees will have several opportunities to practice debriefing. Attendees will use the PEARLS debriefing tool to practice debriefing using the mixed-methods approach.
Intended Audience: Novice through to Advanced Simulation Educators

Relevance to the Conference: We will offer a hands-on experiential workshop for attendees, and present content that will be directly applicable to simulation educators from around the world. We have done this workshop at various other conferences worldwide with very positive feedback.

Workshop Timeline
- Welcome and Introductions – 5 minutes
- Overview of PEARLS framework and debriefing tool (lecture) – 15 minutes
- Video Exercise – Directive Feedback / Plus Delta – 20 minutes total
- Video (simulated resuscitation), Practice directive feedback in small groups, Instructor Feedback
- Video Exercise – Advocacy Inquiry – 20 minutes total
- Video (simulated resuscitation), Practice advocacy inquiry in small groups, Instructor Feedback
- Video Exercise – Putting it all Together – 20 minutes total
- Video (simulated resuscitation), Practice PEARLS in small groups, Instructor Feedback
- Summary and Evaluations – 10 minutes

References:

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WS 005 - Improving Realism of Simulator-Clinical Device Interaction to Drive Performance during Pediatric CPR

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

ID: IPSSW2015-1140

Jordan Duval-Arnould* 1,2, Elizabeth Hunt1,3

1Anesthesiology and Critical Care Medicine, 2Health Sciences Informatics, 3Pediatrics, Johns Hopkins University School of Medicine, Baltimore, United States

The improved technology of high fidelity simulators and “smart” clinical devices now allows for the automated capture of participant actions during a simulated event. This data, when extracted can ultimately be used to either describe performance or analyze it in the context of established guidelines. Objective, quantifiable information regarding performance is often not made available to participants during simulation; adherence to guidelines is less often shared in a manner that is coherent and consistent during debriefing. Data about current performance, and thus current ability, should be used during simulation debriefing, with the goal of optimizing performance in subsequent scenarios. The American Heart Association (AHA) evidence-based goals for resuscitation are specific, achievable, and measurable using technologies employed during simulation. These include:

- Beginning chest compressions rapidly,
- Maximizing chest compression fraction, and
- Providing high-quality chest compressions- appropriate: depth, rate, and ETCO2

During this workshop, participants will review PALS guidelines. Examples of data available from different types data-capture devices will be shared with participants. The faculty will share video examples of how data can be captured and used to drive focused skills training during simulation and shared with learners during debriefing. The importance of realism in the context of resuscitation performance expectations in the clinical setting and the potential limitations of patient simulators to interact with actual clinical devices will be discussed. A device to allow for anterior-posterior defibrillation in high-technology simulators, and low-technology simulators lacking this functionality, along with a hardware/software platform to generate and modify end-tidal carbon dioxide values on an actual clinical defibrillator/monitor will be presented. These two technologies were developed to overcome specific limitations linking simulation-based training and clinical performance and will be used by participants during the hands on experience.
Participants will break into smaller groups and have hands on experience with using full-body patient simulators with data feedback. Station A will allow participants to improve their own compression fraction by minimizing the number and length of pauses during cardiopulmonary resuscitation (CPR), while defibrillating a pediatric patient in the anterior-posterior position. Station B will allow them to practice how long it takes to assess pulse and begin chest compressions in a patient who is unresponsive and use end-tidal carbon dioxide to adjust chest compression quality. Station C will give each participant an opportunity to provide chest compressions with and without quality CPR adjuncts (stepstool and backboard), and assess the compression quality decay after performing several minutes of CPR.

**WS 006 – Look Before you Leap: Using Simulation to Design and Evaluate New Clinical Environments or Processes**

**Topic: Patient safety and quality improvement**

ID: IPSSW2015-1211

**Kimberly Stone**¹ ¹, David Kessler², Lennox Huang³, Marc Auerbach⁴, Jennifer Arnold⁵, Mary Patterson⁶, Jennifer Reid⁴, Vinay Nadkarni⁶, Marjorie White⁶

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Opening a new clinical space or implementing a new clinical process creates potential patient safety threats and challenges providers. Simulation can be utilized at every phase of planning to identify, prevent, prepare for and monitor latent safety threats. This workshop will provide the knowledge and tools necessary to incorporate simulation-based methodologies into planning a move to a new space or implementing a new clinical process. Concrete examples of low and high technology methods will be discussed, advocating a right tool for the job. Discussion will cover the full spectrum of applying simulation to environment and processes, starting with performing a needs assessment and ending with evaluation tools.

**Learning Objectives:**

1. Develop a simulation-based project plan for a new space or clinical process
2. Utilize structured debriefing to measure latent safety threats in an environment or system
3. Identify assessment tools and methodologies that can be used to evaluate new clinical spaces or processes

**Workshop Timeline:**

- Introductions and overview: “Before, during and after you build it….?” (10 min)
- Large group demonstration: “Planning your project” (10 min)
- Small group practice: Planning worksheets and Timelines (15 min)
- Large group demonstration: “Simulators, actors and virtual reality – Oh My!” (10 min)
- Small group practice: Choosing your simulation strategy (15 min)
- Large group demonstration: “Assessment, assessment, wherefore art thou assessment?” (10 min)
- Small group practice: Selecting a method of assessment (15 min)
- Conclusion and Wrap-up (5 min)

**Method of Delivery:** Combination of powerpoint presentations with concrete examples and small group activities.

**Intended Audience:** Simulationists planning or interested in learning how to utilize simulation for designing or evaluating new clinical spaces and/or clinical processes. Applicable to all levels of simulation experience.
Relevance to Conference: Simulation is increasingly being used for systems, environment and process design and testing. This workshop will give participants practical information about how to effectively plan for, implement and assess a simulation project for this purpose.

WS 007 – The Role of Simulation in the Objective Assessment of Human Performance in Healthcare

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

ID: IPSSW2015-1095

**Louis P. Halamek**

1Pediatrics, Stanford University, Palo Alto, United States

**Format:** Proficiency of healthcare professionals has long been determined by assessment of content knowledge; this is true even for medical subspecialties where technical and behavioral skills play critical roles in the delivery of patient care. This interactive presentation will explore this issue within the context of neonatal intensive care and will engage the participants in a discussion of the many challenges inherent in defining, achieving and documenting the proficiency of the human beings/healthcare professionals who deliver care to patients. In addition it will touch upon the use of simulation to assess the performance of the many systems and subsystems defined by human and technical components involved in delivering care to patients in hospitals and clinics. The use of simulation-based assessment methodologies will be highlighted and the pros and cons of using these methodologies to evaluate human (in terms of cognitive, technical and behavioral skills) and system performance examined in detail.

**Goal:** Raise awareness of the limitations of current assessment tools and encourage the development of novel, meaningful strategies for objective evaluation of all aspects of human and system performance.

**Objectives:**
1. List the limitations of current assessment tools.
2. Describe a simulation-based strategy for assessing each of the main areas of human performance.

**Method:** video-based demonstration, interactive discussion eliciting audience response

**Audience:** all levels

**Relevance:** While simulation has been used for years in training human beings in various skills, its use to assess human and system performance in healthcare is relatively novel.

**Timeline (minutes):**
- Introduction: 5
- Background: 10
- Interactive Session: 60
- Summary/Q&A: 15

WS 008 – Video-Enhanced Debriefing during In-Situ Simulation: Tactics, Techniques & Procedures

**Topic:** Debriefing and teaching methodologies

ID: IPSSW2015-1121

**Taylor Sawyer**

1Pediatrics, 2Nursing, 3Anesthesia, Seattle Children's Hospital, Seattle, United States

2Douglas Thompson

**Authors:** Taylor Sawyer, Don Stephanian, Jennifer Reid, Joan Roberts, Pamela Christensen, Kimberly Stone, Leslie Harder, Douglas Thompson

**Objective:** Video-enhanced debriefing as a tool for immersive in-situ simulation training and education. The use of video technology to enhance the debriefing process will be discussed, including its potential to improve the fidelity of in-situ simulation environments. The authors will share their experiences with implementing video-enhanced debriefing in various clinical settings and will discuss the potential benefits and challenges of this approach.

**Method:** Video case analysis, interactive discussion

**Audience:** simulation educators, clinicians, and simulation researchers

**Relevance:** Video-enhanced debriefing offers a new and innovative approach to enhancing the educational value of in-situ simulation. This presentation will provide valuable insights into the implementation of video-enhanced debriefing and its potential impact on patient safety and healthcare education.

**Timeline (minutes):**
- Introduction: 5
- Background: 10
- Interactive Session: 60
- Summary/Q&A: 15
Overview: Many pediatric simulation programs conduct simulation-based training in situ – e.g. in the actual clinical environment. Conducting simulation in situ entails a unique set of opportunities and challenges. A specific challenge is the ability to reliably capture simulation video in the clinical environment, and subsequently use that video during debriefing. In this highly-interactive workshop, faculty from the Seattle Children’s Hospital Learning and Simulation Center (LSC) will share their experience conducting in situ video-enhanced debriefing. Through a series of interactive sessions, the LSC team will teach the technical skills required to conduct in situ video-enhanced debriefing. Specific topics will include simulation videography, the importance of integrating learning objectives and videography, and the use of both high and low-tech solution to in situ video-enhanced debriefing. The workshop will feature the Seattle Children’s Synchronous Mobile Audio-visual Recording Technology (SMART) Cart, winner of the 2014 IPSSW 1st place award for Technology Innovation. Workshop participants will leave with skills, knowledge, and materials that they can apply in their own practice.

Learning Objectives: After this workshop, participants will:
1. Understand the use of video-enhanced debriefing for in situ simulation-based medical education
2. Demonstrate the ability to integrate learning objectives and simulation videography to capture teachable moments
3. Identify the pros and cons of both high-tech and low-tech methods for conducting in situ video-enhanced debriefing

Method of delivery: Mixture of small group and large group interactive sessions.

Intended Audience: Individuals interested in advancing their debriefing skills by learning methods to conduct in situ video-enhanced debriefing. Attendees with a general interest in debriefing methodology and/or simulation technology 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 optimize simulation debriefing is of vital interest to IPSS.

Workshop timeline:
- Introduction and Background (15 minutes)
- Large Group Interactive Session #1 – Simulation Videography: Getting the Shots You Want (10 min)
- Large Group Interactive Session #2 – Capturing Teachable Moments on Tape: Integration of Learning Objectives and Videography (10 min)
- Small Group Interactive Session #1 – High-tech Solutions to in situ Video-enhanced Debriefing: The SMART Cart (20 min)
- Small Group Interactive Session #2 – Low-tech Solutions to in situ Video-enhanced Debriefing: iPads, Laptops, Phones, etc. (20 min)
- Final summary and questions (15 minutes)
Goal: Course evaluation is a critical part of curriculum development. Its importance to simulation is highlighted in the SSH Accreditation Standards. One of the most enduring and well-documented evaluation models is the Kirkpatrick Model. In this workshop, participants will develop a four-level evaluation plan for a simulation-based education program based on this model. Participants will have the opportunity to examine the benefits as well as the challenges in developing a comprehensive evaluation plan.

Learning Objectives
1. Identify the Kirkpatrick four levels of evaluation utilized in simulation based education
2. Design an assessment strategy utilizing the four levels of evaluation for a given topic
3. State the opportunities and challenges for assessing at each of the four levels of evaluation

Method of Delivery: The educational methods include; small and large workgroup discussion. Each group will be given a selected topic with developed learning objectives. Participants will be responsible to develop an evaluation for each of the four levels. After completion of the development, they will present their evaluations to the group as a whole.

Intended Audience: Simulation Educators, specialists, or administration involved in constructing evaluations

Relevance to the Conference: This workshop topic is relevant to the intended audience because evaluation is an integral part of education that determines the quality of the program, the transfer of knowledge to behavior, and demonstrates value to the organization.

Workshop Outline:

- Introduction: Faculty introductions, verbal faculty disclosure, workshop objectives, agenda and assessment of learner’s experience with this topic Time Allotment: 15 minutes
- Main topics to be covered in chronological order
  - Background on Kirkpatrick’s model of four levels of evaluation and how this is applied to simulation based education. Time Allotment: 20 minute
  - Interactive Session: small group work teams-Each work group will be assigned a specified topic and learning objectives. They will be responsible to develop evaluations at all four levels and report out to the group. Time allotted 40 minutes
  - Final questions, conclusion and wrap-up Time Allotted 15 minutes

References:

WS 010 – Questioning Techniques: Strategic Use of Questions to Facilitate Debriefings

Topic: Faculty development

ID: IPSSW2015-1169
David L. Rodgers1,2, Roberta L. Hales3,4

1Clinical Simulation Center, Penn State Hershey Medical Center, Hershey, 2Adult Education Program, Penn State University, Harrisburg, 3Medical and Healthcare Simulation Program, Drexel University College of Medicine, 4Center for Simulation, Advanced Education, and Innovation, The Children’s Hospital of Philadelphia, Philadelphia, United States.

Goal: Questions are the fundamental tool simulation facilitators use to conduct debriefings. This faculty development session will explore the types and different uses of questions, and how to effectively integrate questions into your debriefings to create a richer experience. This interactive 90-minute workshop will include exercises on the strategic use of different types of questions.

Objectives
At the conclusion of this workshop, participants will be able to:
1. Identify at least 10 different uses of questions in a debriefing or classroom situation
2. List at least eight different types of questions
3. Practice the use of questions in a simulated debriefing

Method of Delivery: This will be an interactive workshop with multiple opportunities for learner participation. The presenters will model their questioning tactics, providing participants extensive examples of how each questioning strategy can be used. Specific activities will include: Interactive whole group discussion, small group discussion with report out, visual information with PowerPoint and associated handouts, and video review and group debriefing

Intended Audience: This workshop will target simulation faculty and educators who lead debriefing sessions or are involved in simulation faculty development.

Relevance to the Conference: Conducting a learner-centered debriefing is a critical part of a simulation exercise. This workshop is a faculty development program that builds skills in the tactical use of questions to generate deeper meaning amongst simulation participants in a debriefing.

Workshop Timeline:
- 00:00–00:07: Introductions and disclosures
- 00:07–00:21: Interactive discussion – Why ask questions?
- Individual learner-centered actions
  - Gauge comprehension
  - Gain clarity
  - Probe for deeper understanding
  - Discover the roots of the learner’s perspective
  - Customize learning by pushing the learner to new understandings
- Validate the learner’s experience
  - Group learner-centered actions
    - Build relevance by sharing experiences
    - Promote peer teaching
  - Classroom management reasons
    - Gain attention
    - Control/direct conversation
    - Engage quite participants
    - Limit involvement of overactive participants
- 00:21–00:25: Types of questions – The basics
  - Basic Question Types
    - Open/Closed
    - Overhead/Direct
- 00:25–00:45: Small group activity – Building on the basics
- 00:45–01:00: Types of questions – Advanced topics
  - Tactical Questions
  - Boomerang Questions
  - Relay Questions
  - Probing Questions
  - Reflective Questions
  - Naïve Questions
- 01:00–01:20: Large group activity – Advanced practice
- 01:20–01:30: Conclusion and your questions

References:

WS 011 – Making In Situ Surgical Simulation Happen in Your Institution

**Topic:** Programme development/ Administration and Programme Management

**ID:** IPSSW2015-1189
Lori Arsenault¹, Parson Hicks², Gi Soo Lee³, Bistra Vlassokova⁴, **Mark Volk** ³

¹Nursing, Boston Children’s Hospital, ²Simulator Program, Boston Childrens Hospital, ³Otolaryngology, ⁴Anesthesia, Boston Children’s Hospital, Boston, United States

**Goal:** Enable the participants to develop an in situ Operating Room Simulation program for teaching Crisis Resource Management (CRM) in their home institution.

**Learning Objectives:**
1. Understand the advantages and disadvantages of in situ simulation in the OR
2. Define a timeline of progression from simulation center-based to in situ OR-based simulation training in your organization.
3. Articulate three ways to obtain administrative buy-in to an in situ simulation program.
4. Discover pitfalls in initiating and maintaining an in situ program and learn ways to overcome them.

**Method of Delivery:** This workshop will utilize small group discussions, video demonstrations, role play and simulation. In order to address the individual needs of the participants, the attendance will be limited to 20 participants.

**Overview:** Want to bring simulation-based surgical CRM training to a new level in your institution? Not sure how to make the leap from simulation in your sim suite to in situ simulation in your OR? This workshop, which is appropriate for any level in simulation, will appeal to surgeons, anesthesiologists, nurses, simulation technicians and administrators who want to bring simulation into the operating room environment. Over the past 6 years the multidisciplinary facilitators have gained significant experience in
working with several surgical services to bring simulation into the Boston Children’s Hospital operating rooms.1,2 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: 15 minutes - Topics - Interactive session: 40 minutes
- The rationale of teaching CRM using native teams in native environments3 - Road map for transitioning to in situ OR simulation
- Setting the stage: Gaining buy-in within your organization
- Who, When and How?
- Using simulation to promote simulation
- Planning ahead – Time, Space, Personnel and Participants OR time and space
- Instructors/Facilitators
- Nursing, anesthesia and surgical personnel
- Unique aspects of in situ scenarios
- Simulation within a working operating room - Codes and Quality control
- Troubleshooting
- Discussion/Questions: 20 minutes
- Conclusion: 5 minutes

**References:**

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**WS 012 – Cognitive Load Theory and Simulation: Applications for Instructional Design and Research**

**Topic:** Simulation instruction design and curriculum development

**ID:** IPSSW2015-1075

Faizal A. Haji* 1, 2, Rabia Khan* 1, Jeffrey Cheung1, Catherine Walsh3, 4

1The Wilson Centre, University of Toronto, 2SickKids Learning Institute, 3SickKids Learning and Research Institutes, Hospital for Sick Children, 4Department of Pediatrics, University of Toronto, Toronto, Canada

**Overall Goal:** To demonstrate how cognitive load theory can be applied to pediatric simulation to inform instructional design and research.

**Relevance:** Theoretically-based instructional design has become a priority in healthcare simulation.1,3 In turn, interest in cognitive load theory (CLT) has grown.1,4 Based on the concept of a limited working memory, CLT contends that learning is impaired when trainees’ cognitive resources are overloaded. Thus,
simulation should be designed to limit extraneous load (information processing arising from poor instructional design), manage high intrinsic load (which arises from a learning task’s complexity), and maximize germane load (which supports learning through schema formation). In this workshop, attendees will explore the application of CLT to pediatric simulation research and its implications for educational practice. Specifically, we will address: (i) foundational concepts in CLT (limitations of human cognitive architecture, differences between intrinsic, extraneous and germane load, etc.); (ii) empirical evidence supporting CLT instructional design principles in healthcare simulation (e.g., worked examples, progressive-training sequences, and variable practice); and (iii) measurement of cognitive load. The authors will present their own research, as well as examples from the simulation literature, highlighting areas for future inquiry.

**Method of Delivery:** To operationalize these concepts, the workshop will feature an interactive presentation, during which the faculty will review how CLT design principles impact cognitive demands during simulation. Next, participants will use a structured worksheet to explore examples of simulation curricula and research where CLT may be applicable, to facilitate active application of these concepts. These examples will be developed by the faculty or from participants’ own curricular or research efforts. Participants will work individually and then in small groups, facilitated by 1-2 presenters. Finally, a selection of these examples will be presented to the larger group, to allow for further discussion and feedback.

**Learning Objectives:** At the end of this session, participants will be able to: describe key principles of CLT (including intrinsic load, extrinsic load and germane load); identify and appropriately select measures of cognitive load that are applicable to healthcare simulation; apply instructional principles derived from CLT to inform simulation curricula design; and appreciate current challenges and open areas in the CLT framework, including directions for future research.

**Intended Audience:** ‘Intermediate’ level educators and researchers (max 20 participants)

**Timeline:**
- Introduction and overview of CLT: 30 min
- Small group activity: 35 min
- Large group discussion: 25 min

**References:**
WS 013 – Debriefing the Debriefing: Strategies for Giving Feedback to Simulation Educators

Topic: Faculty development

ID: IPSSW2015-1044

Adam Cheng*, Walter Eppich2, Jonathan Duff3, Traci Robinson4, Helen Catena4, Wendy Bissett4, Stuart Rose5, Gavin Burgess4, Tobias Everett6

1Pediatrics, Alberta Children's Hospital, Calgary, Canada, 2Northwestern University, Chicago, United States, 3Stollery Children's Hospital, Edmonton, 4Alberta Children's Hospital, 5University of Calgary, Calgary, 6The Hospital for Sick Children, Toronto, Canada

Summary: With increasing demand for simulation there is a need for supporting faculty development in the critical area of simulation debriefing. Despite the recognized importance and widespread use of debriefing as part of simulation-based education, few programs offer structured feedback on debriefing performance for their simulation educators. As a result, debriefing skills remain stagnant, and simulation educators are at risk of perpetuating ineffective debriefing practices over time. The KidSIM Simulation Program has developed and implemented a framework for “debriefing the debriefer”; a faculty development tool designed to promote feedback for simulation educators in a structured manner with the goal of enhancing debriefing skills.

Overall Goal / Outcome: Participants will be able to apply a structured framework for providing peer feedback for debriefing with the aid of a faculty development tool

Learning Objectives:

At the end of the session Participants will be able to:

1. Describe the elements of debriefing performance which can be explored when providing feedback on the quality of debriefing sessions.
2. Apply a faculty development tool designed to help “debrief the debriefer”
3. Describe and implement a strategy for effective faculty development in a simulation program

Method of Delivery: In this workshop, participants will be introduced to a novel framework which provides guidance on how to “debrief the debriefer”. Following this, participants will use a faculty development tool to help implement the new framework. After watching several trigger videos, participants will engage in role-play exercises with our faculty to practice giving feedback to a colleague on a debriefing they just observed. Participants will be instructed to focus on commonly identified issues in debriefing, including: debriefing structure, content, flow, transitions, learner-centeredness, and closing performance gaps. Following each exercise, participants will receive feedback.

Intended Audience: Novice through to Expert Educators

Relevance to the Conference: Ongoing and longitudinal opportunities for faculty development are often not described in the simulation literature. Our sessions provides attendees with tools to develop their faculty through peer feedback and debriefing.

Workshop Timeline

- Welcome and Introductions (10 min) – Large Group
- 2. Debriefing the debriefer (20 min) - Lecture: What should be debriefed? How to debrief the debriefer? Faculty development tool
- Role Play Exercises x 2 (50 min) – Small Group, Role Play, Faculty provide feedback (2 videos)
- Summary and Take Home Messages (10 min) – Large Group
WS 014 – New Paradigm in ECMO Education: Incorporating Simulation in ECMO Training

**Topic:** Simulation instruction design and curriculum development

**ID:** IPSSW2015-1115

**Mark F. Weems***, Theodora Stavroudis, Lindsay Johnston, Anne Ades, Lillian Su, Gary Oldenburg

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In recent years, Extracorporeal Membrane Oxygenation (ECMO) programs have been increasingly incorporating simulation training methods as adjuncts to the training modalities recommended by the Extracorporeal Life Support Organization (ELSO) for initial and continuing education that have traditionally included didactic teaching, water-drills, written exams, animal labs and bedside training. Nevertheless, ECMO simulation training programs remain in their infancy as the majority of programs have been in existence for less than 5 years.

Through the recreation of common and rare clinical scenarios, ECMO simulation training can offer healthcare providers and teams repetitive, hands-on opportunities to master the cognitive, technical and behavioral skills necessary to ensure the safe and effective delivery of this low-volume, high-risk therapy. In this way, ECMO simulation programs allow institutions to boost operational performance, reduce medical errors, and improve system and patient outcomes. Further work is needed to standardize ECMO simulation training and to identify teaching modalities best suited for assessing and evaluating the skill sets necessary to safely manage ECMO therapy. A multi-organizational and multidisciplinary approach is key to this mission.

This workshop will review training modalities currently used at ECMO training programs and the ways in which these programs have incorporated simulation into their education curricula. In addition, through small focus group work, these training strategies will be reviewed and explored to delineate the best practices for teaching and evaluating the cognitive, behavioral, and technical skills needed to ensure competency among ECMO teams and individual providers.

The workshop faculty will create a competency assessment matrix tool which will be used by the participants in small groups to identify which training modalities are best suited to assess and evaluate the various cognitive, behavioral, and technical skills necessary when managing ECMO patients.

Small groups will then be asked to present their work, and faculty will summarize key take home points to assist participants with utilizing these methods in ECMO curricula at their home institutions. Participants will have the opportunity to form an ECMO educator network to continue discussions and collaborations after the completion of the workshop.

Objectives of this workshop are to describe the current state of simulation integration into ECMO training practices; explore how simulation can be incorporated into existing ECMO education paradigms to enhance competency assessments, team performance, and patient safety and outcomes; and identify opportunities for growth and improvement in ECMO education through the establishment of a multi-organizational, multi-institutional, and multidisciplinary collaborative network.

**References:**


WS 015 – Curriculum Design: A Practical Approach in 6 Easy Steps

*Topic: Simulation instruction design and curriculum development*

**ID:** IPSSW2015-1143

**JoDee M. Anderson**¹, **Deepak Manhas**², **Michael Seropian**³, **Nikki Wiggins**¹

¹Neonatal Intensive Care, Oregon Health & Science University, Portland, United States, ²Neonatal Intensive Care, University of British Columbia, Vancouver, Canada, ³Anesthesia, Oregon Health & Science University, Portland, United States

**Goal:** Understanding learner performance requires more than identifying learning gaps; as educators we must consider how our instructional design can be improved to better meet the needs of our learners.

**Learning Objectives:**

1. Utilize a structured gap analysis tool to develop instructional improvement strategies
2. Analyze learner outcomes to identify weaknesses in instructional design
3. Analyze instructor performance to identify opportunities for improvement

**Course Content:** Understanding learner performance requires more than identifying learning gaps; often learner performance reflects issues in instructional design. Using simulation to meet our educational needs in healthcare requires a comprehensive understanding of curricular development that many medical educators have not been trained in. We intend to review: How to determine whether you are effectively addressing learning needs, whether your selected learning objectives are measurable, how to choose the most appropriate educational strategies to achieve your learning objectives, common pitfalls in implementing simulation-based curricula, and interpreting learner performance as it pertains to the effectiveness of your instruction.

The session offers a systematic approach to identifying instructional gaps in simulation-based education. By using an interactive format, the participants will discuss common and particular instructional gaps, which result in suboptimal learner outcomes. Through video analysis of both learner and instructor performance, the participants will have an opportunity to utilize a novel, structured tool based on the 6-step model of curricular design to identify these instructional gaps and develop improvement strategies.

**Method of Delivery:** The participants will work through a modified 6-steps of instructional gap analysis using trigger videos, and group process. Ideally, by the end of this course, each participant will have a framework for addressing their instructional challenges and a resource at their disposal in order to successfully implement their curriculum. Specific resources include trigger videos, flip charts, facilitated discussion, and the use of a 6-step tool (handed out at the session)

**Intended Audience:** All level educators
Timeline:
- Introduction of Session and Faculty
- Verbal Faculty Disclosure of Vested Interest
- Main topics to be covered in chronological order:
  - Introduction: 5 min
  - Disclosures: 2 min
  - Educational Theory: 15 min
  - Group-based interactive approach using trigger-videos and examples to step learners through a systematic approach to the identification, categorization, and understanding of instructional gaps: 60 min
- Conclusion/Summary: 8 min

Relevance: We offer a systematic approach to identifying instructional gaps in simulation-based education. This course has been offered previously with excellent learner evaluation of the course content, presentation, and educational strategy.

References:

WS 016a – IMPROVing Your Character: Theater Techniques to Play a Better Patient or Confederate

Topic: Faculty development

ID: IPSSW2015-1079

Ryan Eling∗

1SimGHOSTS, Portland, United States

Successful healthcare simulation requires a commitment to realism in multiple realms: moulage, hospital procedures, physiology, etc. Failure to create a realistic environment for a scenario can threaten buy-in and
suspension of disbelief for our learners. In pediatric scenarios, a parent or family member is often desired to add urgent and realism to the environment, but often preparation for this confederate actor is last on the list of priorities for planning the case. Actors in a scenario have the power to influence how the scenario proceeds and succeeds: we could help our learners suspend disbelief by creating true-to-life, three-dimensional characters within simulation scenarios.

With a lifetime of experience on stage as well as in front of and behind the camera, Ryan Eling has spent his career adding the theatrical and cinematic viewpoint to healthcare simulation education. Many basic techniques and exercises can help anyone portray a patient, family member or healthcare professional with confidence, variety and conviction. This workshop will be an opportunity to explore these techniques and how to integrate them into your simulation center's workflow.

During this workshop, attendees will participate in a number of games and activities to engage their body and mind in the creation of characters. After a basic outline of Mr. Eling's experience and how he has brought it to bear within simulation, we will begin with warm-ups to properly prepare body and voice for performance. This will be followed by some fundamental improvisational games that will help to discover and create characters. The group will then work on portraying physiological conditions accurately. We will discuss focusing to remain in character and modifying your performance based on your role. Finally, we will discuss and play with using a voice-only performance to its fullest.

Expect some laughs, the chance to challenge yourself and an opportunity to grow as a simulation educator.

**WS 016b – Cinematography 101: Hands-On Production Techniques for Simulation Video Projects**

*Topic: Multimedia, e-learning and computer-based instruction*

**ID:** IPSSW2015-1088

**Lance Baily**¹,²,³

¹SimGHOSTS.Org, ²HealthySimulation.com, ³Konsiderate.com, Las Vegas, United States

Lights. Camera. Action! Medical simulation entrepreneur and film-maker Lance Baily is excited to provide a hands on workshop to get you behind the camera and directing your first big picture! This course will introduce the basic fundamentals of storyboarding, digital cinematography, lighting, and basic audio recording. Use these basic video production techniques to create Sim Lab orientations, promotional material or training tutorials. “If a picture is worth a thousand words, a video is worth a million!”

Forrester Research reports that 75% percent of executives told Forbes that they watch work-related videos on business websites at least once a week. The results breakdown further that 65% visit the marketer’s website after viewing a video. What this means is that video can quickly increase marketing content for your simulation program for both prospective students and/or external business clients. Back in 2009 Lance produced a promotional video for the LA Harbor College Nursing program where Lance worked as a Simulation Technician which has since been watched more than 24,000 times - saving the program staff from countless hours of sim lab tours.

Lance brings almost twenty years of video production experience to your day, ranging from small wedding videography to editing television pilots with Tom Hanks. Learn Lance’s hard-earned production secrets through hands-on exercises accomplished by small groups. We’ll use provided cameras for hands-on practice to show you how easy and rewarding video production can be.

**References:** SimGHOSTS.org
WS 016c – Enhanced Realism – Moulage and Interactive Systems

*Topic: Faculty development*

ID: IPSSW2015-1186

**Caroline Box***, 1, **Sam Lyons**

1Simulation Centre, Bristol Simulation Centre, Bristol, United Kingdom

**Outcome:** This workshop will enable participants to gain practical knowledge of moulage and create interactive systems to enhance realism for learners.

**Learning Objectives**

The learner will:

1. Observe a live demonstration and have the opportunity to create a burn and a laceration.
2. Observe the making/use of props, including IV cannulation lines and bleed back arterial lines.

**Method of delivery**

- Familiarisation of moulage equipment and resources.
- Live demonstrations of how to create a burn and a laceration.
- 60 minute practical session for participants to create a burn and a laceration.
- Demonstration of the construction of bleed back lines and IV cannula.
- 4 mannequins required for the practical session.

**Intended audience:** Technicians and Educators

**Relevance to conference:** Realism in simulation is an essential part of the simulation experience. Being able to perform tasks such as line access and wound assessment helps the learner to suspend disbelief and immerse themselves in the scenario. This workshop will appeal to anyone who has an interest in increasing the level of fidelity in their simulation practice.

**Timetable**

- Introduction and workshop objectives 5 mins
- Demonstration and practice 60 mins
- Line and cannula demonstration 20 mins
- Workshop close and questions 5 mins

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WS 017 – Turning Simulation Experts into Agents of Organizational Change

*Topic: Patient safety and quality improvement*

ID: IPSSW2015-1086

**Kevin Roy***, 1, **Jennifer Arnold**2, **Cara Doughty**3, **Julia Lawrence**1, **Kerry Sembera**4

1Critical Care Medicine, Texas Children's Hospital, 2 Neonatology, 3 Emergency Medicine, Texas Childrens Hospital, 4 Pediatric Cardiology, Texas Children's Hospital, Houston, United States

**Overall goal/outcome:** Participants will understand methods for simulation experts to utilize skill sets learned in simulation to improve their organization through debriefing clinical events

**Learning Objectives**

1. Participants will be able to articulate the benefits of simulation specialists debriefing in the clinical environment
2. Participants will be able to compare different methods of debriefing application in the clinical environment.
3. Participants will leave the workshop with a written plan for implementing debriefing in their own clinical environment, including triggers, timing, debriefing techniques and checklist, and means for feedback.

**Method of delivery:** This workshop will utilize a priming video to facilitate reflective observation and abstract conceptualization regarding debriefing emergencies. We will then utilize interactive small group exercises to identify skills that simulation experts can utilize when debriefing clinical events. Last, the workshop will utilize an action plan to develop an implementation plan and measurable outcomes.

**Intended audience:** Simulation-based medical educators who practice in clinical environments, with a range of levels of expertise

**Relevance to the conference:** Experts in simulation-based medical education are increasingly called upon to translate their skills in simulation into the clinical environment. Debriefing after clinical events offers similar benefits in education, patient safety, and communication as debriefing in simulation, but is used much less frequently.

Simulation experts can translate their knowledge in debriefing and Crisis Resource Management to use in the clinical environment, and establish programs for systematic debriefing of critical events in their clinical environment

**Workshop timeline**
- Priming video of emergency followed by introductions of faculty, participants, workshop objectives, and assessment of learner’s experience with the topic (10 minutes)
- Background-Presentation of 4 different clinical event debriefing methods used in one large children’s hospital, including EC, ICU, floor, and delivery room (15 minutes)
- Small group sessions- participants will use planning worksheets to identify methods of utilizing simulation experts in debriefing, including; event triggers, debriefing methodology, systems-based approach, team-based vs. individual, debriefing review plan (25 minutes)
- Large Group Reporting (5 minutes)
- Small groups will then develop a debriefing checklist, implementation plan, and outcomes to measure (20 minutes)
- Final summary, conclusions, questions (15 minutes)

**WS 018 – Developing and Delivering Patient- and Family-Centered Care Using Simulation**

**Topic:** Patient safety and quality improvement

ID: IPSSW2015-1242

*Maria Carmen G. Diaz*1, Jennifer Arnold2, Traci Robinson3, Heather Sobolewski1

1Nemours/Alfred I duPont Hospital for Children, Wilmington, DE, 2Texas Children's Hospital, Houston, TX, United States, 3Alberta Children's Hospital, Calgary, Canada

**Proposed Format:** Patients/families are discharged home with an expectation that discharge education provides necessary skills and knowledge to effectively manage medical needs outside acute care settings. This is especially true of high-risk medical conditions. The concept of using simulation to support patient education is novel and relevant for many patient conditions. This workshop will provide opportunities for participants to develop and deliver a simulation-based curriculum to meet needs of patients discharged...
from acute care settings. Course faculty will discuss special considerations when developing simulation for non-healthcare providers.

**Learning Objectives:**

1. Participants will identify key concepts that must be considered when developing simulations for patients and caregivers.
2. Participants will design a scenario for patient education to meet specific caregiver needs based on scripted cases (seizures, diabetes, anaphylaxis, tracheostomies, CPR)
3. 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 min)**
  - Feedback
  - Faculty success/challenges
  - Summary

**References:**

RT 001 – Interprofessional Clinicians’ Recognition of Emotions during Difficult Healthcare Conversations

Topic: Innovation/ Future Direction and Outreach Simulation

ID: IPSSW2015-1202

Elaine C. Meyer* 1, Natalia Mazzola2, Donna Luff2, Elliott Martin2, Jessica Brandano2

1Boston Children's Hospital, Institute for Professionalism and Ethical Practice, 2Institute for Professionalism and Ethical Practice, Boston Children's Hospital, Boston, United States

Background: Clinicians can be at the mercy of their emotions during difficult healthcare conversations, yet there is sparse literature on how well clinicians recognize, manage or therapeutically utilize their emotions.

Research Questions: What emotions do clinicians experience during difficult healthcare conversations, how frequently, and do such emotions affect the care they provide? How well do clinicians recognize, reflect on and manage emotions?

Methodology: Prior to simulation-based Program to Enhance Relational and Communication Skills (PERCS) workshops, participants completed self-report questionnaires including: 1) Likert scale items about recognition, reflection, frequency and management of emotions and 2) qualitative questions about most commonly experienced emotions and personal management strategies.

Results: 152 interprofessional participants completed questionnaires, with a mean age of 37 years (range 22-67) and mean experience level of 9.9 years (range 0-36). Most common frequently experienced emotions included anxiety (66%), sadness (53%), empathy (39%), frustration (19%) and insecurity/inadequacy (14%). Regarding the impact on clinical care, of those who reported anxiety 61% indicated that their emotions affected care, and for sadness 53%, empathy 77%, frustration 59%, and insecurity/inadequacy 36%. Overall, clinicians acknowledged moderate recognition of emotions 2.74 (on 5-point scale), 2.54 reflection on emotions, and 2.7 management of personal emotions.

Discussion/Conclusions: Clinicians acknowledge a range of emotions that impact their ability to effectively initiate and hold challenging healthcare conversations including anxiety, sadness, empathy, frustration and insecurity/inadequacy. They report both positive and negative impact of emotions, and many find their emotional state can influence the quality of the care delivery. Simulation-based education and its associated deliberative practice holds the promise of increasing clinicians’ recognition of, reflection on, and management of emotion that might be helpful in improving their ability to navigate difficult healthcare conversations. Interventions aimed at anxiety management are particularly needed and could well be integrated into simulation education sessions on a broad scale.

Keywords: Communication, Interpersonal Skills, Professionalism

References:
3. Dyche L. Interpersonal skill in medicine: The essential partner in verbal communication. JGIM 2007; 1035-1039.
RT 002 – Improving CPR Quality and Cost Effectiveness with a New CPR Training Curriculum

Topic: Simulation for procedural and psychomotor skills

ID: IPSSW2015-1048
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1Community Health Science, University of Calgary, Calgary, Canada, 2Children's Hospital of Philadelphia, Philadelphia, United States, 3British Columbia Children's Hospital, Vancouver, 4Alberta Children's Hospital, Calgary, Canada

Background: The quality of CPR directly impacts hemodynamics, survival, and neurologic outcome following cardiac arrest. Each year, health care system spent millions of dollars to offer Basic Life Support training to healthcare providers (HCP). However, HCPs still struggle to master and retain effective CPR skills after BLS training. Several promising innovations have demonstrated promise in helping to improve the quality of CPR during simulated and/or real events: (1) longitudinal CPR skills training (ie. rolling refreshers); (2) real-time automated CPR feedback during training; (3) structured post-cardiac arrest debriefings.

Research Question: We propose to develop a self-directed CPR training curriculum that engages HCPs in longitudinal CPR training while integrating real-time feedback and structured debriefing for each practice event. We ask: (1) Does new curriculum have better learning outcomes compared to annual BLS training? (2) Is it more cost-effective to adopt new curriculum in comparison to traditional BLS training?

Approach: We will conduct a randomized controlled trial to enrol paediatric HCPs at Alberta Children’s Hospital into one of two arms: (1) longitudinal training with real-time feedback and structured debriefing (intervention); or (2) Annual BLS recertification (control). At baseline, both groups will undergo BLS recertification training followed by a baseline assessment of CPR competency. HCPs allocated to the intervention arm will practice CPR with real time feedback for 2 minutes while on clinical duties, when assigned to work in the trauma room. A quantitative summary of CPR metrics will be provided after each session. Participants randomized to the control arm will not have the opportunity to practice CPR. CPR performance data will be collected from participants in both groups at 3, 6, 9, and 12 months. For the control group, a second recertification course will be conducted at 12 months, after which CPR performance will be assessed.

Outcome measures: (1) Educational outcomes: CPR quality (depth, rate, and residual leaning force) will be captured for all assessment sessions. "Excellent CPR", which is a composite dichotomous variable based on all metrics of CPR quality, will be used as primary outcome. (2) Cost outcomes: Cost of both arms will be identified in 3 components: mean direct cost of the program, productivity loss (hours of work lost) and cost of remediation if training is unsuccessful.

Analysis: All educational outcomes at 12 months in the intervention group will be compared with post-course performance at 12 months in the control group. Cost-effectiveness can be expressed as the cost per increased CPR excellence according to the incremental cost-effectiveness ratio (ICER). A one-way sensitivity analysis and a probabilistic sensitivity analysis will be used to deal with uncertainty in cost and effect.

Questions for discussion: What are the potential threats to internal validity and possible solutions?
RT 003 – Teaching Pediatric Procedures in the Simulated Setting – Checklists, Protocols, Tricks and Tips

Topic: Simulation for procedural and psychomotor skills

ID: IPSSW2015-1119

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Introduction/Rationale: Despite increasing mandates from accreditation bodies to ensure procedural competence, validated measures to assess procedural competence are not widely available. This workshop will provide participants with hands-on experience with partial task trainers to test currently available procedural checklists with the ultimate goal of developing strategies to facilitate procedural competency for target learners.

Format of Workshop: This workshop is designed to introduce participants to direct observation of invasive procedures using available checklists and will allow participants to leave the workshop with strategies for implementing procedural training for invasive procedures at their own institutions.

Interactivity: In this workshop, presenters will highlight the options for invasive procedure evaluation in a dynamic, highly interactive way. After introductory remarks on development and assessment of competency and validation of procedural checklists, the key components of procedural checklists published to date will be reviewed. Participants will then break down into groups of 4-5 with one team member performing a procedure and the others reviewing and critiquing a procedural checklist. Group discussion will emphasize the advantages and disadvantages of each checklist and the key components necessary for establishing competency.

Workshop outline

• Introduction of Session and Faculty (5min)
• Review of competency (5min)
• Review of current checklists/INSPIRE Procedures research project (10 min)
• Break into small groups to perform procedures using checklists (20 minutes)
• Small group discussion of checklists (10 minutes)
• Large group report of small group findings/Wrap-up/ Charge (10 minutes).

Target audience: Simulation professionals interested in teaching procedures using task trainers.

Aims and Learning Outcomes

1. Understand key concepts of development of procedural competency
2. Participate in modified delphi group to review currently available checklists for pediatric procedural competency
3. Apply currently available checklists to simulated pediatric procedures to include lumbar puncture, intubation, and central venous catheter placement or others

References:


RT 004 – Haphazard to Harmony: Combining Simulation Modalities for Effective, Efficient Curriculum Development

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1037

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Goal: Learn the strengths and limitations of different simulation modalities for developing effective, resource efficient simulation training curricula.

Learning objectives:

1. Experience and discuss relative strengths of different simulation modalities including tabletop exercises, screen-based virtual reality, and live drills, and how to combine them to create a simulation curriculum for a specific goal and/or topic.
2. Learn curriculum building for disaster/multiple casualty incident preparedness and response training using multimodality simulation.
3. Outline a multimodality simulation-based teaching curriculum for a topic and/or goal of participant’s choice.

Tabletop exercises, screen-based simulation and live simulation, as well as classroom/screen-based didactics offer different opportunities for simulation training. Combining modalities tailored to situation, environment, target audience and resources can optimize effectiveness and efficiency of training. Participants will experience and discuss best uses of each modality to create a training curriculum that may be used for disaster preparedness and response, as well as other large scale situations.

Participants will then team in 1 of 3 breakout groups, each with a different simulation training goal:

1. Team building and communication
2. High signal knowledge and/or skills training
3. Environment or systems testing for an event or new facility

The groups will develop a curriculum for a topic they choose that will achieve their goals by incorporating various types of simulation and classroom/screen-based didactics. Groups will present their curriculum to all participants for feedback. The curriculum developed by each group will be made available to all participants for use in their institution.

Method of delivery: Small group participation in tabletop exercise, screen-based virtual reality, live simulation, and expert-led working groups to develop simulation curriculum.

Intended audience: Simulation instructors, novice to expert; emergency managers, preparedness faculty.

Relevance to the conference: Aligned with the IPSSW 2015 theme of reaching out to the future, this workshop reaches out to and actively engages simulation instructors to enhance understanding and
experience that can set standards of excellence for building effective, resource efficient simulation curriculum by combining state of the art simulation modalities.

Workshop timeline:
- Introduction (5 minutes)
- Classroom and screen-based didactics (10 minutes)
- Tabletop exercise (15 minutes)
- Screen-based virtual reality simulation (15 minutes)
- Live drill (15 min)
- Small group curriculum development (30 min)
  - Team building, communication
  - High signal
  - Environment, systems testing
- Group presentations, summary (15 min)

References:

RT 005 - Simulation by Design to Identify and Manage Pediatric Pain

**Topic: Simulation instruction design and curriculum development**

ID: IPSSW2015-1080  
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Is simulation-based learning effective for improving nurses’ ability to identify and effectively manage pediatric pain?

**Background:** Published studies conducted on examining nurses’ knowledge and attitudes towards pediatric pain management suggest that despite the abundance of literature, nurses today are still challenged in identifying and effectively managing pediatric pain. Mean scores examining knowledge from studies conducted between 2000 and 2014 range from 38.2% to 78.0%, with minimal increases evident following educational initiatives. Key findings indicate that knowledge gaps are highest in pharmacology, that nurses lack the knowledge to accurately assess pediatric pain, and that non-pharmacological interventions are not utilized effectively.

**Educational Goal:** Develop, deliver and assess the impact of a simulation based pain curriculum on nurses’ knowledge of and attitudes to pediatric pain management in clinical practice.

**Proposed Approach:** Develop, deliver and assess the effect of a simulation based pediatric pain curriculum for improving the identification and management of pain in acute, chronic and procedural situations. Learning objectives would inform scenario development and provide the framework for debriefing learner actions and patient outcomes. The use of standardized evaluation tools (pre- and post-questionnaires on
knowledge, performance checklists) in addition to video capture will provide important information on the efficacy of the simulation based approach.

**Difficulties Anticipated:** Lack of realism at manikin level may prevent active learner engagement. However, this may be addressed through meticulous preparation, rehearsal and familiarization to the simulation environment. The utilization of a confederate role in the script will also enhance the fidelity.

**Question for Discussion:** How can this proposed program contribute to addressing the lack of knowledge and skills identified, and how can this relate to patient outcome measures in clinical practice?

**References:**

RT 006 – Crisis Resource Management in the Delivery Room

Topic: Crisis Resource Management/Human factors and Teamwork

ID: IPSSW2015-1062

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Background: Resuscitation of the critically ill neonate requires not only medical knowledge and clinical skills, but also important non-medical skills such as crisis resource management (CRM). CRM refers to leadership, problem solving, situational awareness and communication skills in high-stress environments. CRM has been shown to be effective for airline pilots, anesthesiologists, and pediatricians, among others; and thus would serve a valuable role in the neonatal intensive care unit (NICU) and delivery room. Despite the clear importance of CRM, few pediatric residency and fellowship programs incorporate CRM into their NICU curricula. The aim of this project is to measure the effect of CRM training on trainee performance and stress levels in simulated neonatal resuscitation scenarios.

Methods: This is a prospective randomized control study. All pediatric residents and NICU fellows will be eligible to participate. Subjects will be randomized into two stratified groups: 1. Those who receive 1-hr CRM instruction (CRM group) or 2. no CRM training (control group). A 1-hr didactic Neonatal Resuscitation Program (NRP) review session will be given to both groups. Each participant will assume the role of team leader for one neonatal delivery room emergency scenario. Video recordings will be taken of the participants during their scenarios in order to score the performance for delay in treatment & deviation from NRP. Reviewers will also rate the participants on their non-technical performance using the Ottawa Global Rating Scale for crisis management, which rates the subject’s performance in five key areas of CRM. Blinded raters will score the video recordings. In addition, salivary swabs will be performed on each participant before and after the scenario to measure salivary alpha-amylase, a marker of stress. All participants will also complete the State-Trait Anxiety Inventory forms. To assess for skill retention, video recordings and scorings will be performed three months after the initial scenario.

Conclusion/ Anticipated results: Our hypothesis is that those participants who undergo training in CRM will have improved clinical as well as CRM performance in simulated neonatal resuscitation scenarios. We also hypothesize that those participants who undergo CRM teaching prior to the simulated neonatal resuscitation scenarios will have decreased stress response, as measured by salivary alpha-amylase, and a decreased perception of stress, as measured by the State-Trait Anxiety Inventory form.

To our knowledge this is one of the first projects to look at the importance of CRM in neonatal resuscitation. Positive results from this project would support the need for more extensive CRM teaching to be an integral part of residency and fellowship training in the NICU setting where trainees frequently encounter crisis situations in the delivery room.

References:


RT 007 – NICU Multidisciplinary CRM Seminars in Graduate Education: Delivery of Difficult Information

Topic: Crisis Resource Management/Human factors and Teamwork

ID: IPSSW2015-1144

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Background: Death of a child may be the single most traumatic event in medicine.1 Anticipated or unexpected it leaves a lasting impression on the family and the multidisciplinary health care team (MDHCT). Experienced clinician or novice, the effect is profound. The Neonatal Intensive Care Unit (NICU) at Boston Children’s Hospital (BCH) is a 24 bed Level IV ECMO-ready tertiary referral center with >500 admissions/ year. The NICU accepts infants from the United States and internationally for second opinions with complex diagnoses. Multidisciplinary health care providers (HCPs) with diverse training and experiential knowledge coordinate care to these infants. Despite their efforts, some do not survive. With impending death, comes the responsibility of informing the parents, providing ongoing medical and psychological support, and demonstrating empathy and compassion. Conveying grave information is difficult for HCPs and requires education and training. The ABCDE model (Advance preparation; Building a therapeutic relationship; Communicating well; Dealing with patient and family reactions; Encouraging/validating emotions) can be utilized.2 Death of an infant has a devastating effect and will be remembered. How information is communicated can improve long-term well-being of family and demonstrate that the infant’s life was valued.3

Research Question: Does utilization of a NICU End-of-Life Tool Kit for delivery of difficult information during a NICU multidisciplinary, high fidelity simulation (HFS) scenario improve 1)HCP self-reported comfort/confidence in ability to deliver difficult information; 2)HCP ability to complete steps in ABCDE model by comparison of scores on pre and post-course questionnaires?

Conundrum: Unified teams capitalize on effective, coordinated technical/behavioral skills of communication, leadership, decision-making, and task assignment for daily plans of care and crisis events. The BCH NICU Staff Needs Assessment identified an educational practice gap: HCPs reported feeling inadequately prepared to deal with aspects of death both personally and professionally. This CRM scenario may deter effective communication in the MDHCP team and between the MDHCT and family.

Proposed Approach: The BCH NICU CRM course provides HCPs with technical/behavioral skills to improve communication and teamwork which will extend to future clinical practice. Course content:

- Didactic: CRM principles and ABCDE model for relay of difficult information
• Scenario Part 1: HFS Infant code with parent actors. Debriefing by NICU Simulation Team and PERCs (Program to Enhance Relational and Communication Skills) facilitators
• Scenario Part 2: MDHCT relay difficult information to parent actors using ABCDE model
• Scenario Part 3: MDHCT caring for infant and family, performs withdrawal of life support

Discussion Question: Does the ABCDE model and participant-developed Tool-Kit for relaying difficult information improve HCPs ability to deliver difficult information?

References:

RT 008 – Parent/ Caregiver Simulation Program for Safe Discharge to Home

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

ID: IPSSW2015-1151

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Background: The SIMPeds Network Team at Boston Children’s Hospital (BCH) is creating a program for parents and caregivers (CGs) as they prepare for discharge home with their child. The concept stemmed from the BCH Family Advisory Council. The platform lends itself to options- from discharge of the infant with few medical issues to one with complex needs. A Video Teaching Module (VTM) for parents will be developed to complement each Parent Simulation Program as deemed appropriate. Experiential learning models, such as Kolb’s Learning Cycle coupled with simulation have recently been proposed as an effective way to promote learning for health care providers. Experiential, simulation based learning allows for application of skills, feedback and reflection, with correction of errors and gaps before skills are applied in real world setting. Application of this type of learning to parents during discharge has not been applied and tested. After any necessary changes, the course would launch with continued support from the Boston Children’s Hospital Simulator Program. We found no published Parent/ CG Safe Discharge to Home Programs as extensive as ours. To pilot our program, we are developing our first course: Parent Simulation for Discharge Home of the NICU Patient with GT.

Educational Question: Does the implementation of pre-discharge simulation training for parents of NICU infants with GTs improve the performance of GT care via standardized observational measures at discharge and at 8 weeks post-discharge as compared to current discharge teaching?

Design: This is a 3 arm, non- randomized controlled study. All eligible parents will be enrolled into one of the 3 groups: 1) Discharge current; 2) Discharge with VTM tool; 3) Discharge with VTM tool and participation in Parent/ Caregiver Simulation Program. Participants will be tested before the discharge and 2 months after discharge on their ability to perform the skills in a real-life setting (efficacy measures). In addition, clinical outcomes will be reported on GT dislodgement and infections (safety measures). Finally,
the participants will complete a survey addressing their reactions to the methodology used (quality measures). All quantitative data will be reviewed using analyses of variance to determine the most effective method for preparing parents for discharge.

**Primary Efficacy Outcomes**
- **Parent education as assessed by:** Parent Knowledge-based Survey and GT Observational Checklist
- **Program evaluation via mixed process and outcomes methodology**

**Primary Quality and Safety Outcomes**
1. Parent satisfaction and anxiety
2. Readmission for GT-related dx
3. Adverse events
4. Cost analysis

**Discussion points:**
1. Scenario design
2. Validated tools
3. Lessons learned

**References:**

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**RT 009 – Development of a Regional Paediatric Simulation Network: Challenges and Solutions**

**Topic: Programme development/ Administration and Programme Management**

**ID: IPSSW2015-1216**

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**Background:** The KSS Children’s Simulation Centre was established as a regional centre with the aim of collaboration in the field of Technology Enhanced Learning in paediatrics through active co-operation and networking between a number of NHS and other public sector organisations in primary care, education and secondary care. We set out to draw on the priorities and principles outlined in the guidance from the regional LETB (Local Education and Training Board) and the Department of Health, in developing a multi-professional program of simulation across KSS. The aim was to collaborate within Kent Surrey and Sussex to develop a network of organisations and professionals engaged in simulation activities in paediatrics.

**Educational Goal:** To capitalise on the resources of the KSS Paediatric Simulation Networks, to develop a long-standing program of Technology Enhanced Learning activity which is inherently collaborative and multi-professional, and delivers a continuum of training activities for healthcare professionals across Kent Surrey and Sussex.

**Proposed approach to addressing the question or goal:** We decided to approach this in a truly multi-professional fashion. We plan to include all healthcare professionals along a patient’s journey from primary care, to secondary care, and back to the community, maintaining the focus on the benefit to the patient in all educational activities we undertake. A multipronged approach to education will help us maximise on the
use of technology in learning, and allow us to deliver learning to professionals and patients, thereby setting the stage for better patient care to be delivered.

**Conundrum or difficulty encountered:**
1. Initiating contact with a plethora of individuals and organisations interested in simulation, from diverse professional backgrounds and experiences.
2. Achieving good attendance at meetings of the Steering Group from participants spread over a large geographical area.
3. Developing shared streams for course and content development, by co-ordinating and harnessing the expertise of a diverse group of professionals.

**Questions for discussion:**
1. What experience do the members have of setting up a regional network in paediatric simulation?
2. How do we go about the task of developing the course and content for the delivery of paediatric simulation to a truly multi-professional audience?
3. What kind of time scale should we be advising to our commissioners, for the development and delivery of multi-professional paediatric simulation programme?

**References:**
1. A regional simulation center partnership: collaboration to improve staff and student competency.
4. PMID:19263927
5. EXPRESS—Examining Pediatric Resuscitation Education Using Simulation and Scripting: The Birth of an International Pediatric Simulation Research Collaborative—From Concept to Reality
6. Cheng, Adam MD; Hunt, Elizabeth A. MD; Donoghue, Aaron MD; Nelson, Kristen MD; Leflore, Judy PhD; Anderson, JoDee MD; Eppich, Walter MD; Simon, Robert EdD; Rudolph, Jenny PhD; Nadkarni, Vinay MD; for the EXPRESS Pediatric Simulation Research Investigators
7. Simulation in Healthcare: The Journal of the Society for Simulation in Healthcare:

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**RT 010 – Immersive Simulation: A Truly 'Safe' Learning Environment?**

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

ID: IPSSW2015-1132

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**Background:** Simulation-based education in healthcare is promoted as a safe learning environment where knowledge, skills and attitudes can be developed without the risk of patient harm. However, debate exists regarding how safe immersive simulation should be for participants who underperform. Doctors have a professional obligation to put patient safety first at all times. Both the General Medical Council (GMC) and the National Association of Clinical Tutors (NACT) UK advocate the early identification of potential doctors in difficulty and intervention to avoid adverse consequences for patients, colleagues and the doctor concerned. Whilst simulation has been employed to formally assess performance of doctors deemed to be in difficulty, it has not conventionally been used to identify and escalate trainee underperformance. However, according to both the GMC and NACT UK guidance, the professional obligation to raise performance concerns extends to educators, which in modern healthcare includes simulation.
**Research Question/Educational Goal:** Having experienced trainee underperformance associated with significant patient safety concerns in immersive simulation in our centre we sought to explore the attitudes of paediatric Consultants within Yorkshire and the Humber. An electronic survey was circulated to 297 paediatric Consultants. The survey was anonymous and Consultants were invited to respond over one month. Free text boxes were incorporated to allow expression of opinion.

**Results:** The survey elicited a 33% response rate. 37% reported considerable experience in simulation, which ranged from being instructors on resuscitation courses to development of local and regional simulation programmes. Overall, 63% of Consultants agreed or strongly agreed that underperformance of paediatric trainees in immersive simulated environments should be escalated. Escalation consideration was more likely after underperformance in more than one scenario. Whilst only 9% considered there to be appropriate guidance, the majority of Consultants would escalate concerns to clinical and educational supervisors. However, many felt that debriefing should be able to address to majority of minor concerns.

**Potential Challenges:** It is widely acknowledged that doctors in difficulty should be identified early to enable timely intervention. As simulation-based medical education becomes increasingly integrated into healthcare education and training, educators are increasingly likely to face the dilemma of underperformance and patient safety concerns, which need to be recognised and appropriately dealt with. The challenge is how to achieve this without losing the benefits of formative assessment and debriefing. Our survey has highlighted the attitudes of paediatric Consultants within our region, who feel that escalation may be warranted but do not feel supported by current guidance. This controversial area within immersive simulation needs to be explored further.

**References:**

**RT 011 – An Assessment Scale for Infection Control, Medication Administration & Blood Transfusion Safety**

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

**ID:** IPSSW2015-1176

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**Background:** Simulation-based training have been reported for risks prevention: infection control (1), medication administration (2,3) and blood transfusion safety (4). A checklist has been developed for “the 5 rights” of medication administration in pediatrics (2). Similarly, a Medication Administration Safety Assessment Tool was developed (3). Patient care is global and nursing integrates all the safety measures. But to date, there is no performance assessment scale for global nursing care including identity control (ID), infection control (IC), medication administration (MAS), and blood transfusion safety (BTS).

**Research question:** How to design and validate a global nursing performance assessment scale with respect of ID, IC, MAS and BTS that can be used in adults and children?
Proposed methods: IRB approval from the University of Poitiers, France. Single-center study. Informed consent for all participants. The validation process of the performance assessment scale will follow the Downing’s 5-source framework (5). Content: Designed with the experts of risk prevention (ID, IC, MAS, BTS) from the Regional Institute of Health, and a nurse instructor using the national registry of nursing acts. Each item of the scale is related to ≥ 1 specific task of nurse curriculum. The scale is made of 103 items of which only those dealing with the scenario will be highlighted (for example, PO medications will not be highlighted if the medication has to be given IV). Each item has 3 checking boxes: 1) correctly done; 2) incorrectly done (delayed, partially done...); 3) not done. Response process: A cohort of 18 nurse instructors will be included to perform on a scenario about all safety measures. The scenario will be a sickle-cell diseased-child requiring usual aseptic care, pain assessment, use of a morphine drip, and blood transfusion. Mannequin will be SimJunior®, Laerdal®. Scores will be assessed by 2 independent observers. The pre-scale will be modified in order to avoid redundancy among items while providing > 90% concordance rate between observers. Internal structure: Further steps will include Cronbach alpha (internal consistency) and intra-class coefficient (reliability) calculations as well as linear regression (R2) between scores of observer 1 and 2. Relationship to other variables: It will rely on the comparison of scores of 20 novices (1st year of nursing school) and 20 competent trainees (3rd year). Consequences: There will be no consequence on the trainee’s curriculum.

Difficulty encountered: Designing scenarios with balanced evaluation of risks prevention. Should we focus on a risk (BTS) (a scenario with only a blood transfusion) and assess precisely the 2 others (IC & MAS) for assessing gaps in performance? Or should we consider designing a scenario including the 3 major safety measures like in the proposed scenario?

Questions for discussion: How to identify specific gaps in performance? Should we include subscoring?

References:
2. Apply specific teaching techniques and theories to facilitate and enhance knowledge acquisition and retention during simulation-based education sessions.

3. Construct simulation sessions which are informed by tenets of adult learning theories.

Knowledge of adult learning theory, and practical implications of these concepts can optimize learning from simulation sessions. This session introduces key concepts in adult learning theory (ALT) that can be practically applied to simulation-based medical education (SBE).

A. First, we will introduce different 'lenses' of how adults learn, each of which having potential benefits and applications to simulation-based education. Several prominent learning theories will be reviewed: 1) Andragogy; 2) Humanism; 3) Constructivism; 4) Behaviorism; 5) Social Cognitivism

B. Participants will take part in a small group activity designed to demonstrate how educators can practically implement ALT into their SBE activities. Participants will be assigned to utilize tenets from a specific learning theory to develop an educational session on a particular topic of their choosing.

C. During debriefing, a learner is able to reflect and learn. In this section we will discuss, from an ALT perspective, what is cognitively occurring during this critical time of the simulation experience, and how to optimize learning effectiveness.

D. David Kolb’s experiential learning theory is based on belief that learning is acquisition of concepts and the application of those concepts in a range of situations. New experiences allow for the development of new concepts. Learning occurs when an experience is transformed into knowledge through a cycle of four stages.

In the final portion of this workshop, attendees will have a chance to apply principles of ALT, specifically Kolb’s experiential learning, towards the design of simulation based curriculum or scenario. Participants will be assigned a 4 small group – 1) Concrete experience, 2) reflective observation, 3) abstract conceptualization, and 4) active experimentation- and will work together to create a portion of a learning activity.

When all the groups are done, each group will present their portion of the learning activity to the larger group.

**Timeline**
- Introduction (5 min)
- Overview of Adult Learning Theory (20 min)
  - Juxtaposed Video of effective vs. ineffective instructional methods
  - Didactic: Elaboration on various schools of thought of ALT
- Small group activity #1 (20 min)
  - Design a Simulation Incorporating Key ALT Components
- Interactive Didactic on Kolb's Experiential Learning & Debriefing (10 min)
- Small group activity #2 (30 min)
  - Design educational session based upon a phase of Kolb’s Experiential Learning cycle
- Wrap-Up/ Questions (5 min)

**References:**
RT 013 – Rapid Cycle Deliberate Practice: Structure and Practical Application to Resuscitation Scenarios

Topic: Debriefing and teaching methodologies

ID: IPSSW2015-1237
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Goal: Learners will teach each other resuscitation using Rapid Cycle Deliberate Practice techniques in order to learn its practical aspects.

Learning Objectives:
1. Define RCDP and contrast it with traditional simulation, highlighting specific methods and educational content best suited for this technique.
2. Outline key components of an RCDP teaching sequence, focusing on how learner practice integrates with directed feedback.
3. Apply RCDP techniques while teaching resuscitation to a group of learners.

Method of Delivery:
This workshop will focus on the practical aspects of RCDP. As a panel, we will discuss how to divide a resuscitation case into smaller pieces. We will discuss the development of a list of skills that must be performed correctly before participants can move to a more difficult scenario, praise points for desirable behaviors, and develop choreography for the dance of resuscitation.

The instructors will distribute RCDP lesson plans. We will review techniques we have found helpful. We will share sequences that range from low to high complexity. We will discuss how to use lists of required and desirable behaviors.

Volunteers who are most comfortable with pediatric resuscitation will teach volunteer participants most comfortable with neonatal resuscitation and vice-versa. Those who do not want to teach can observe the groups. Instructors of workshop will provide ongoing instruction to volunteers.

We will end by summarizing key points and distribute electronic resources.

Intended Audience: Experienced Educators

Relevance to the conference:
Traditionally, debriefing sessions have followed completion of simulation scenarios, allowing learners to participate in reflective practice to find their own reasons for why they did what they did during the preceding scenario.

A feature of simulation-based education that has been shown to improve learner performance is deliberate practice that requires ample opportunities to perform a specific skill combined with rapid expert feedback.1 Trials of mastery learning as a method for teaching procedural skills show its cost effectiveness.2 Students in basic life support classes demonstrate increased skills with increased time spent practicing.3

As described by Elizabeth Hunt, an alternative to traditional debriefing called Rapid Cycle Deliberate Practice applies deliberate practice to a resuscitation team. In RCDP, less time is spent figuring out the underlying frame of reference of participants, and instead they practice.

This workshop is an opportunity for learners to experience this method of teaching by each other using predesigned curricula for adult and pediatric resuscitation.
**Timeline**

- 5 min  Welcome
- 15 min Building RCDP Sequences from Traditional Scenario
- 10 min Introduction to scenarios
- 50 min Teaching Session
- 10 min Wrap up

**References:**


**RT 014 – Linking Simulation and Safety: How to Do It and Why You Should**

*Topic: Patient safety and quality improvement*

**ID:** IPSSW2015-1094  
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**Format:** The current state of healthcare safety culture in the United States can arguably be described as reactive and superficial. If healthcare is to ever become “highly reliable” it must change in fundamental ways. While that may sound daunting, it is something that can be accomplished. In order to do this we must focus on several key tasks:

- Make the delivery of safe, effective and efficient care our primary mission.
- Establish objective and easily measurable markers for safety, effectiveness and efficiency.
- Establish minimum standards for safety, effectiveness and efficiency.

Simulation is a learning and assessment methodology that is applied to individuals, groups and systems in many high-risk industries. As a tool for improving patient safety it holds tremendous potential to enhance the delivery of modern healthcare. In order to link simulation and safety within one’s organization one must follow several general principles for creating an effective simulation-based safety program and then undertake a series of discrete steps designed to align the goals of that program with the patient safety goals of your institution. This workshop will lead the attendees through these steps in order to allow them to effectively link their simulation programs with safety initiatives at their home institutions.

**Goal:** Raise awareness in the audience of the necessity of focusing on patient safety as the ultimate goal of any simulation program in healthcare and provide them with specific effective strategies to allow them to make this happen at their home institution.

**Objectives:**

1. Explain the current state of healthcare safety culture.
2. Name the key principles for creating an effective simulation-based safety program.
3. List the key steps in linking your simulation program to safety initiatives at your hospital, clinic or school.

**Method:** interactive case-based discussion eliciting audience response
Audience: all levels

Relevance: Improving patient care should be the main goal of any effort in healthcare simulation. Thus linking simulation to safety should be an explicit or implicit goal of all healthcare simulation programs.

Timeline (minutes):
- Introduction: 5
- Background: 10
- Interactive Session: 60
- Summary/Q&A: 1

RT 015 – Promoting Awareness and Understanding of the Role of the RT in Pediatric and Neonatal Simulation

Topic: Patient safety and quality improvement

ID: IPSSW2015-1164
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Background: In 2014, in preparation for the opening of Sidra Medical and Research Center, simulation scenarios have been developed targeting an international audience of health care professionals. New staff will be orientated through an intense program prior to the commencement of clinical duties. The simulated scenarios will be piloted and validated as the process moves forward. Recently three respiratory scenarios have been rehearsed: an infant with bronchiolitis, a newborn with meconium aspiration syndrome and a child with asthma. Whilst collaborating with interested future faculty members it was identified that the role of the Respiratory Therapist (RT) was poorly understood by clinicians. Many clinicians had not previously been exposed to working alongside respiratory therapists and were unfamiliar with the scope of practice within this role. This element was also identified in a post ‘pilot’ simulation feedback comment process.

Discussant: There is little understanding of the Respiratory Therapist role and their clinical remit.

Research Question/Educational Goal: How can Inter-professional simulation based education involving medical, nursing, and respiratory therapists contribute to a greater understanding of the respiratory therapist role?

Proposed Approach to Addressing the Question or Goal: We propose in the pre commissioning phase of the Sidra Medical and Research Center that the Respiratory Therapist’s role is clarified, rehearsed and simulated with contextualized scenarios to ensure a clear understanding amongst RT’s as well as other clinical staff regarding what the scope of practice at this hospital is.

Conundrum or Difficulties Encountered
1. Human Resources: the lack of Respiratory Therapists in Simulation Educational Roles. There is currently one on staff with the Respiratory Therapy department recruiting for approximately 80 clinical Respiratory Therapy positions.
2. Promotion, Marketing and Awareness: required to improve patient safety,
3. Lack of clearly defined scope at a national level.
Towards Scaling-Up Pediatric Simulation in Malawi: A Demonstration of Simulation Pedagogy

**OP 001** - **Towards Scaling-Up Pediatric Simulation in Malawi: a Demonstration of Simulation Pedagogy**  
**Topic:** Educational Outreach (including remote, rural and international simulation education)

**ID:** IPSSW2015-1073  
**Faizal A. Haji** 1, 2, Rabia Khan 2, Elaine Sigalet 3, Ian Wishart 4, Peter Weinstock 5, Adam Dubrowski 6, Shannon Manzi 7, David Grant 8, Norman Lufesi 9

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**Context:** There is growing interest in scaling-up simulation in low-income countries. In fact, the World Health Organization now strongly recommends the use of simulation to support health professions education and training, even in resource-constrained settings. 1 In Malawi, simulation exists in pediatric training programs like Emergency Triage Assessment and Treatment (ETAT). However, a recent evaluation demonstrated the need for faculty development to increase capacity in pediatric simulation. 2 Thus, we developed a ‘simulation demonstration’ to clarify stakeholders’ faculty development needs.

**Description:** We created a simulation scenario based on ETAT content, 3 that we demonstrated twice in June, 2014 for educators from Malawi’s health professional training colleges and central and district hospitals. The demo introduced simulation ‘essentials’ (setting learning objectives, designing the curriculum, etc.) followed by the scenario (including pre-brief, scenario, and de-brief) of a healthcare team managing a 3-month old child with respiratory distress. During the subsequent large group discussion, faculty highlighted the demo’s educational features (e.g. setting a fiction contract, adapting the scenario to learners’ actions, and structuring debriefing), while participants asked questions and compared our approach to their understanding of simulation pedagogy. Finally, participants completed a written evaluation.

**Evaluation:** Based on mean ratings (1=strongly disagree to 5=strongly agree), participants agreed that the demo increased their knowledge about simulation (4.6) and that incorporating simulation into ETAT would improve participant learning (4.8) and teamwork (4.7). All participants agreed that bringing simulation to Malawi should be a priority (4.7), but only half agreed that Malawi possesses the resources and expertise to apply it effectively (3.5). In open-ended responses, participants commented on the utility of modeling a structured approach to designing learning objectives, running scenarios, and conducting learner-centered debriefing, but suggested that ‘hands-on’ practice (particularly with debriefing) would also be helpful. Participants also emphasized that teamwork and inter-professional education is needed at the pre-service level, which should be coupled with in-service refresher training. However, lack of time, equipment and human resources (i.e. faculty training) were cited as barriers to achieving these goals.

**Discussion:** Our demo was well received by stakeholders in Malawi. The experience highlighted how objectives, scenarios, and debriefing can be aligned to address clinical and inter-professional learning goals. Future faculty training on applying pedagogical concepts (e.g. debriefing) is essential for building simulation capacity in Malawi. However the context of healthcare delivery (particularly constraints on time and resources) should be carefully weighed when developing training curricula.
References:

OP 002 – Simulation-based medical education in Neonatology in Laos and Vietnam
Topic: Educational Outreach (Including remote, rural and international simulation education)

ID: IPSSW2015-1127
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Background: Neonatal mortality in Laos is high at currently 50-70/1000 live births, less pronounced in Vietnam, according to WHO sources.

Aim: To reduce neonatal mortality and comply with the Millennium Developmental Goals (MDG) 2015 of reduced child mortality.

Methods: Two level teaching has been introduced at the university level (‘teach the teachers’) and at the provincial hospital level. Simulation-based medical education was used at the university level, whereas practical teaching at the provincial hospital level was performed by the use of conventional mannequins. Additionally health care personnel involved in the care of newborn babies has been invited from the district hospitals. The five province hospitals have been chosen due to their high rates of neonatal mortality. These provinces are: Luangnamtha, Oudomxai, Houaphan, Xiengkhoang and Borikhamxay. Teaching is currently planned for a three year period and takes place once or twice a year at each provincial hospital. Participants are from all professional groups involved in the care of the newborn infant, i.e. pediatricians, obstetricians, midwives, skilled birth attendants, pediatric and obstetric nurses. Teaching itself consists of theoretical lessons and very practical exercises related to the immediate perinatal scenario. In addition, barriers to implementation and the use of available knowledge and technical equipment were analyzed during clinical ward rounds.

Perspective: Teaching started in May 2013 with an opening workshop ‘Update in Neonatology’, which was held in Vientiane, Laos from May 13-17. Simulation-based medical education was newly introduced within this project to medical professionals in Laos. Loss of face and other features of Southeast Asian mentality need to be taken into account during debriefing. Training sessions will extend well into 2016 and are currently performed by a group of dedicated European neonatologists. Impact on hospital mortality rates will be evaluated.
OP 003 – Time Critical Transfer Training – In-Situ Simulation Targeting an Area of Need

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

**ID:** IPSSW2015-1139

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**Context:** Development of paediatric and neonatal transport services in the United Kingdom (UK) means that the majority of inter-hospital transfers of critically ill patients are now carried out by specialist teams. In addition many paediatric services such as intensive care, tertiary neonatal care and surgery have been centralised raising concerns that referring hospital staff have become de-skilled in the acute management of critically ill children¹,². However all hospitals admitting neonates and children must be able to resuscitate and stabilise prior to retrieval and occasionally undertake a ‘time critical transfer’ (TCT) themselves³,⁴. TCTs are relatively infrequent events in paediatric and neonatal acute care. It has been suggested that intensive care networks need to develop robust contingency plans for TCTs particularly since referring hospitals with the least experience in transporting critically ill children will be expected to undertake the most urgent transfers⁵.

Embrace Yorkshire & Humber Infant & Children’s Transport Service (Embrace) is the first combined neonatal and paediatric transport service in the UK. There are 15 acute NHS trusts in the region and Embrace is actively involved with providing outreach education at all hospitals in this area. Training in TCTs has been consistently highlighted to Embrace as an educational need.

**Description:** An online survey was sent to determine confidence levels and training needs of staff that would be expected to perform a paediatric or neonatal TCT. 258 responses were received; 76% doctors, 22% nurses and 2% allied health professionals from paediatric, neonatal, emergency and anaesthetic backgrounds. On a 10 point Likert scale current confidence levels were less than 3 in 67% (158/236) for neonatal TCTs and 46% (109/236) for paediatric TCTs. 82% of respondents felt that a multidisciplinary course providing teaching on TCTs would be useful for their practice.

The survey results, in conjunction with information from Embrace audits and case reviews, were used to develop a one-day TCT simulation course. The multidisciplinary course consists of two initial interactive lectures and four simulations which are designed to be delivered in-situ at the hospital.

**Observation:** The first course had 17 candidates of which 12 completed pre and post course questionnaires. Overall confidence in managing TCTs improved from 3.9 to 6.1 on a 10 point scale. Four further pilot courses are planned to assess content and delivery and will be extended to the other hospitals if successful.

**Discussion:** Referring hospital staff must be prepared to transfer children of all ages in time critical emergencies. Specialist transport teams and intensive care networks have an important role in outreach education and supporting staff to acquire and maintain the skills to do this safely. We hope that the introduction of an outreach TCT course in this region will fulfil this need and ultimately improve the care of critically ill children.

**References:**

1. Raffles, A. Impact of specialised paediatric retrieval teams. Intensive care provided by local hospitals should be improved. BMJ 1996; 312: 120; author reply 121

**OP 004 – Don’t Poke a Sleeping Crocodile and Other Lessons from Simulation Delivery in Regional Australia**

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

ID: IPSSW2015-1179

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**Context:** Simulation Training on Resuscitation of Kids is an outreach program run by Children’s Health Queensland, aiming to promote and deliver simulation-based education in paediatric critical care throughout the state of Queensland.

**Description:** Our “Recognition and Management of the Deteriorating Paediatric Patient” (RMDPP) course incorporates eLearning, case based discussion, practical skills sessions using part task trainers and immersive scenarios which can be run in high or low fidelity based on the resources of the host facility. It is designed to be adaptable to ensure relevance in all clinical environments across the state from the tertiary paediatric centre to nurse-led rural facilities. Based at the Lady Cilento Children’s Hospital, Brisbane our team of a paediatric emergency physician, a nurse educator, two clinical fellows and four simulation co-ordinators travel throughout Queensland delivering a paediatric basic life support course on a train-the-trainer basis.

By May 2015 we will have delivered train-the-trainer courses in over 20 facilities around the state, training over 200 instructors in the process. These instructors are from both medical and nursing backgrounds and cover a variety of specialties.

**Observation/Evaluation:** Each participant in both the train-the-trainer course and the RMDPP course itself fills out a 2-page evaluation form incorporating both Likert type ratings and free text responses. We debrief each train-the-trainer course within our group evolving this course in response to both formal and informal feedback, while broader curriculum development is overseen by a steering group, which is composed of clinicians and educators from across the state. On a program level we monitor the frequency and quality of courses delivered at all sites with both participant feedback and regular team presence at externally delivered courses.

**Discussion:** Obstacles to be negotiated include high staff turnover, wide variations in local faculty experience in both paediatrics and simulation, differences in simulation equipment availability as well as the logistical and political challenges posed by the enormous geographical area of our state with it’s isolated population centres.

We will describe the most significant challenges we have faced, discuss the approaches we have taken to overcome these challenges and share lessons we have learned and would consider relevant to those considering similar programs elsewhere.
These lessons will be presented as a series of lighthearted tips for survival in regional Australia each illustrating a serious learning point and backed by a brief example from our own experience.

All Authors are employees of Children’s Health Queensland but have no other financial conflict of interest. IRB review was not applicable to this project.

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**OP 005 – Life on a Knife Edge: Using Simulation to Engage Young People in Issues Surrounding Knife Crime**

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

**ID:** IPSSW2015-1102

Laura Coates\(^1\), Sharon Weldon\(^1\), Ana Rita C. Rodrigues\(^1\), Howard Tribe\(^1\), Fernando Bello\(^1\), Roger Kneebone\(^1\)

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**Introduction:** Knife crime is a growing problem, especially amongst young people, with serious injuries and deaths on the increase\(^1\); in London alone, 6 teenagers have been fatally stabbed this year to date, with a total of 107 knife-related teenage murders in the last 10 years\(^2\). Yet young people at risk of knife crime are a notoriously difficult-to-reach population. We have developed a customised sequential simulation (SqS), aiming to create a safe environment to explore and learn about knife crime and its consequences.

**Objectives:** To evaluate the use of simulation to engage young people at risk of knife crime.

**Methods:** Over several years, we have developed a simulated knife crime scenario. Using our group’s concepts of sequential and distributed simulation, the scenario follows the trajectory of a young man stabbed in the abdomen. After initial assessment by police teams and paramedics, the audience sees the surgical team carrying out an emergency laparotomy. The scenario concludes with a discussion between the surgeon, the teenage victim (who has required an intestinal stoma) and his mother. This prompts wider discussion around knife crime, its causes and its effects, involving healthcare professionals, the police and community youth workers. Participants also learn about action to take in case of a stabbing. The scenario was piloted with a range of at-risk young people, both in a school and a public park in London.

**Results:** Sixty schoolchildren from eight schools took part in this preliminary study. Initial findings suggest that our approach provides a safe space where healthcare professionals, police, stab victims and high-risk groups or target populations can jointly explore issues surrounding knife crime. Analysis suggests that SqS opens new opportunities for discussing pressing and emotive social issues. Our approach encourages dialogue, fostering what we term *reciprocal illumination* – in this case, increased understanding by police and healthcare professionals about the needs and vulnerabilities of a particular group of young people.

**Conclusions:** Simulation has already been shown to be effective in engaging young people. Our approach enables difficult-to-reach groups to take part in discussion, working collaboratively towards shared solutions. Further developments are in progress.

**References:**

OP 006 – Paediatric Faculty Development Training Programme – Setting Up a Culture of Facilitation

Topic: Faculty development

ID: IPSSW2015-1105

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Context: The London Specialty School of Paediatrics Simulation Network has supported training through simulation for the multiprofessional team working in London. It reaches 35 hospitals, 900 paediatric doctors in training and a child health population of 3 million. This has been achieved through the creation of an ST3 (3rd year paediatric trainee) programme and a Faculty Development Programme. In order to develop and sustain training, a culture of facilitation is essential. Faculty require the necessary skill-set to deliver simulation training for the multiprofessional paediatric team.

The London School of Paediatrics Simulation Faculty Development Programme (PSFDP) commenced in April 2011 with the fourth cohort due to start in November 2014. Candidates from multiprofessional paediatric backgrounds apply competitively to take part and are allocated to the established paediatric simulation centres, and for mentorship.

Description: Our PSFDP takes candidates through a series of modules to develop skills which will enable them to undertake team simulation training. The modules have been aligned to the Healthcare Leadership Model, the Professional Development Framework for Health Education London, and the Professional Standards of the Academy of Medical Educators.

The modules are:
1. Launch event
2. Training the Trainer course
3. Simulation facilitation practices on Paediatric ST3 courses
4. Simulation facilitation at local hospitals
5. Patient safety, latent errors and latent strengths
6. Ongoing reflection, appraisal, feedback

All candidates are able to attend Action Learning Sets at regular intervals which provides peer-mentor support.

Observation/Evaluation: The first three cohorts comprised 79 candidates from multi-professional backgrounds.

The majority of candidates have set up programmes including “in situ” simulation training in paediatrics units and in Neonatal transport.

The PSFDP has been assessed by a team from Queen Mary University, London. They have shown the programme to be well-structured and flexible. Candidates were positive about training, and felt that it had wider benefits beyond learning to facilitate simulations. Organising “in situ” team training presented logistical challenges, especially when set up in a new context. Candidates found that local support came once training had commenced, and that latent errors were being identified and mitigated. There were hidden benefits from the programme including developing mentorship skills, and using the skills acquired in different aspects of their working and personal lives.
Discussion: Candidates who have completed / undertaking the PSFDP are now working in paediatric units in London, and other parts of the UK, to deliver simulation training – both in dedicated simulation centres and “in-situ” – for the multiprofessional paediatric team. The experience of the PSFDP have enabled them to become leaders of education and mentoring and key professionals supporting safe and sustainable paediatric care.

OP 007 – Debriefing Development for Clinical Educators

Topic: Faculty development

ID: IPSSW2015-1142
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With the demand for simulation education growing in all areas of healthcare it is becoming imperative to educate more clinical staff in the science of simulation and debriefing but time constraints and clinical work demands don’t allow much time for clinical staff development. We created a course that is targeted in simulation knowledge and debriefing skill development as it is specifically related to the clinical educator role. It is an overview of adult learning theories, scenario development and debriefing theories with practical application in a 4 hour time frame. This course is structured to expand the clinical educators’ foundational knowledge of working with adult learners and allow them the opportunity to conduct and debrief simulations with immediate feedback and coaching from our simulation center staff.

In our institution clinical educators are the primary people responsible for nursing and ancillary staff education. Many of the educator’s have entered the role as senior nurses/staff with an interest in education but very few have formal training in education and educational theories. Our challenge was to create a course that was able to deliver content effectively within a very limited available time frame. We focused on educating participants on how they can identify areas of their existing education that could become more interactive and using those examples throughout the course to keep the material meaningful to the participants. We also prepared scenarios of standard patients for each care community (admissions, discharges, deteriorating patients) and had the course participants spend the majority of the time learning to orchestrate, run and debrief the scenarios while receiving coaching and feedback from the simulation center staff. All participants were required to schedule a simulation based educational activity on their unit within 2 months of completing the course where simulation center staff attended and provided more coaching and feedback.

This presentation will walk participants through how we determined our educational gap within the clinical educator population, the design of objectives to ensure that the course was relevant to the clinical educator role, and how we created evaluative measures to demonstrate the impact of the course on the clinical educator’s role.

References:
OP 008 – Educational Scholarship in Simulation: An Introduction to MedED Portal

*Topic: Faculty development*

**ID:** IPSSW2015-1155

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**Overview:** It is important for academic faculty to demonstrate educational scholarship which may include the creation of high quality, peer-reviewed educational resources, with clear objectives and evidence of dissemination/impact. The American Association of Medical Colleges (AAMC) created MedED Portal, a no cost, online resource to help educators disseminate their work and share curricula. With an editorial structure similar to a traditional print-based journal, publications follow a peer review policy that mirrors established biomedical journals. Through a series of didactic sessions, large group discussions and small group break-out sessions, we will introduce MedED Portal, describe the submission process, discuss common pitfalls on the road to publication and review examples of successfully published simulation based educational resources. Workshop participants will leave with knowledge and educational scholarship guidelines that they can use to develop and submit their own simulation-based curricula.

**Learning Objectives:**

*After this workshop, participants will:*

1. Understand MedED Portal: for both educational resources that they can access as well as a submission site for educational scholarship
2. Describe elements of a high-quality educational resource
3. Identify common pitfalls in MedED Portal submissions and how to avoid them
4. Identify strengths and opportunities for improvement in potential MedED Portal submissions

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

**Intended Audience:** Individuals who would like to submit simulation based educational resources for publication.

**Relevance to the Conference:** This workshop is designed to support faculty who develop simulation based educational resources and are seeking to disseminate high-quality resources to a wider audience.

**Workshop timeline:**

- Introduction and Background (15 minutes)
- Small Group Interactive Session #1 – Brainstorming an Idea for submission (5 min)
- Didactic- Components of high quality submission (5 min)
- Small Group Interactive Session #2 – Developing an idea into a submission (15 min)
- Didactic – Pitfalls of submissions (5 min)
- Large Group Interactive Session – Identifying common pitfalls and mitigation strategies (10 min)
- Didactic- Demystifying the review process (5 min)
- Small Group Interactive Session #3- Review “submissions” with reviewer guidelines (15 min)
- Final summary and questions (15 minutes)
OP 009 – Develop a Simulation Educator Pathway: Steps to Move Beyond Train the Trainer

**Topic: Faculty development**

ID: IPSSW2015-1163

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**Context:** Effective simulation instruction and course development requires a skilled educator. There is a need to create educational programs for simulation instructors that will cover the unique aspects of simulation education. This presentation will review strategies to develop an effective simulation educator pathway. Pediatric simulation education is such a valuable tool to provide critical training in low volume-high risk events, it is important that educators have an adequate background in simulation methods to be able to maximize the effectiveness of this education modality.

**Description:** Piecemeal teacher development policies, not connected by a common vision, are roadblocks to teaching and learning (Darling-Hammond, 2000). Current methods of educator training rely heavily on train the trainer models, or the "see one, do one, teach one" methodology that is dismissed as ineffective by simulation proponents (Damazo, R. and Fox, S, 2014). Vendors provide simulation education to schools and hospitals, but they place a heavy emphasis on product technology. Educating faculty in the skills of teaching using simulation methods is becoming increasingly important. The National Council of State Boards of Nursing's landmark study highlighted the importance of educator training (NCSBN, 2014). The presentation will showcase an educator pathway applicable across the healthcare simulation education continuum appropriate for both service and education settings.

Experiential education is the keystone of simulation, the presentation will review the modules of an established simulation educator pathway and describe how pediatric simulation programs such as NRP and PALS can be enriched through educator training. The rational for establishing a pathway and provide insight into the necessary policies that support a simulation educator program will be reviewed.

**Observation/Evaluation:** The table below shows rankings for content information and objectives in courses offered as part of an educator pathway at the Rural SimCenter. Instructors comment positively on the course information, objectives and overall content of the course.

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<tr>
<th>2014 Simulation Educator Course Evaluation</th>
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<td>Poor</td>
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**Discussion:** The development of an educator pathway resulted from the need to provide quality educational sessions that presented the Standards of Simulation Education (INACSL, 2014) and the elements necessary for Certification for Healthcare Simulation Educators (CHSE) through the Society for Simulation in Healthcare. Simulation education is an important commitment for clinical educators alongside duties of patient care, research and continuing professional development. The realization that clinical expertise does not necessarily translate to expertise in the simulation theater has led to the notion that educators would benefit from standardized formal training. This presentation will showcase an established educator pathway.

**References:**


**OP 010 – Building a Simulation: A New Way to Learn**

**Faculty development**

ID: IPSSW2015-1240

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**Background/Rationale:** A recent study found that clinicians reported a lack of training in providing culturally sensitive care to immigrant families in pediatric rehabilitation, and identified language and communication issues as important barriers. Consequently, enhancing the knowledge, skills and attitudes in culturally sensitive care & communication should be an important goal in rehabilitation professions training and development, and may be addressed through simulation-based healthcare education. Little is known about the value of having experienced professionals partake in building & participating in a simulation.

**Research Question:** How may the combined process of building and participating in a simulation help develop culturally sensitive communication among rehabilitation professionals?

**Methods & Analyses:** We used descriptive, qualitative approach to understand the in-depth experience of rehabilitation professionals who built simulations in facilitated small groups over two sessions, and subsequently partook in a ‘live simulation’ designed by their colleagues. Thirteen participants were recruited via email and website advertisement, all with a minimum of 1 year experience in working with children with cerebral palsy (CP) and their families. Professionals from 5 different disciplines were recruited and divided into 3 groups purposefully to ensure a mix of interdisciplinary backgrounds with a variety of perspectives. The majority of sessions were also attended by a patient facilitator, and the second of two ‘build’ sessions were attended by standardized patients. Baseline demographics were collected, and an orientation provided on how to build simulations. All participants completed written journal entries. Focus groups were completed at end of study, and continued until no new data emerged, providing saturation. All attended the build sessions, 9 attended a ‘live simulation’ session and 10 completed the focus groups. Data was analyzed inductively (open coding) through an iterative process to identify major themes.

**Results:** Three scenarios with specific learning objectives related to culturally sensitive communication were created around working with families of children with CP. Participants identified that the process of building and participating in a simulation provided: 1) an opportunity for professionals to reflect on their practice; 2) a venue for professionals, standardized patients and the patient facilitator to co-create authentic clinical scenarios; and 3) a safe environment for learning that is supported by organizational values.
**Conclusion:** The results of this study suggest that training in culturally sensitive care can take place through the combination of building & participating a simulation.

**Relevance:** This educational activity may be used as a tool for faculty development of experienced & seasoned rehabilitation professionals. Future study would include health professions’ trainees.

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**OP 011 - ETAT Train the Trainer Course in Malawi Fuels Stakeholder Ownership and Simulation Based Learning**

**Topic: Faculty development**

ID: IPSSW2015-1106

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**Context:** Specific themes from a needs assessment completed in Malawi¹ over the past two years on the potential value of augmenting simulation in the current Emergency Triage Assessment and Treatment (ETAT) course² have evolved. These include 1) the potential for introducing Interprofessional education (IPE) alongside simulation based learning (SBL) within an ETAT train the Trainer course, 2) the recognition that for any educational initiative to be sustainable there must be commitment for ongoing support from the local collaborating organization and 3) the course design must be a collaborative effort between the consulting subject matter experts and local stakeholders.

**Description:** The Train the Trainer Course currently in draft is built around the above themes. The aim is to enhance facilitator knowledge and application of Interprofessional simulation based learning to positively impact patient outcomes. To meet local stakeholder needs, an additional goal to reduce the current 4 day course to 2.5 days was identified. This is important to sustainability and patient care as practice settings are resource-constrained and operate using minimal staff. Thus, obtaining coverage for trainers to attend courses may have significant impact on service delivery.

The proposed course will involve local Inter-professional ETAT faculty. The course design will use Kern’s Six Step approach to guide local stakeholders in the redesign and integration of simulation based learning in ETAT. Content will focus on the principles of experimental learning theory, skill development, and simulation based learning (essential components for optimizing simulation as a learning modality). Delivery will include expert modelling, small group work, and simulation. Faculty will provide an example engaging principles of simulation based learning in a redesign of Airway and Breathing and then work with participant groups to redesign the remaining modules (Circulation, Coma and Convulsions, Dehydration, Triage, and Case Management).

**Evaluation:** Each group will redesign the ETAT content relevant to their assigned module, design appropriate scenarios supporting skill development and team work, deliver it to another participant group and receive feedback from participants and faculty. This will provide one source of information on the effectiveness of the course design. Additionally facilitators and participants will complete a course evaluation questionnaire.
**Discussion:** How can we manage the TTT without taking people away from clinical duties for too long? How can we provide mentoring and support beyond the course to ensure the concepts are being used? How do we support local stakeholders in securing funding and buy in? What are the next steps in moving this initiative forward?

**References:**

**OP 012 – Using Simulation for Physical and Occupational Therapists in the Pediatric Hospital Setting**

**Topic: Simulation instruction design and curriculum development**

**ID:** IPSSW2015-1096

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**Context:** Simulation has been shown to be effective in the education of physical therapy and occupational therapy (PT/OT) students; however, very little documentation exists describing the use of simulation in the pediatric hospital setting. Pediatric experience and exposure to medical equipment used with this population may be limited in some programs. The PT/OT staff at our facility approached the simulation center to explore the possibility of using simulation to educate staff. Simulation educators worked collaboratively with PT/OT supervisors to develop cases that exposed staff to a variety of patient ages, developmental phases, and pediatric medical equipment.

**Description:** Four rooms with high-fidelity manikins were set up as inpatient rooms, and one case was developed for each room. The first scenario was a 16 year old with MRSA sepsis with a prolonged and complicated hospital stay. The second scenario was a neonate who was intubated and ventilated and had agitation with desaturation and bradycardia during range of motion. The third scenario involved a 5 year old patient in Halo traction for congenital cervical malformation who needed to ambulate. The final scenario was a 15 year old with closed head injury, chest and abdominal trauma in PICU. This patient had increased agitation and needed to be suctioned during range of motion. There was an embedded simulation participant in the role of patient nurse for each scenario. The therapists cared for each of the patients in teams. Each session lasted 1 ½ to 2 hours which included all four scenarios. Plus/delta debriefing occurred after each simulation and different equipment (e.g., oxygen devices, pulse oximeter, endotracheal tube, ventilator, chest tube, foley catheter, feeding tubes, temperature probe, umbilical venous catheter, central venous line, nasogastric tube, wound drains, extraventricular drain, arterial line, tracheostomy) were discussed.

**Observation/ Evaluation:** Each staff member filled out an evaluation after participating in the simulation. Twelve PT/OT staff have participated in this course over the past year. Evaluation responses have been overwhelmingly positive. 100% of the participants agreed the experience was applicable to their practice/profession and the simulation was a valuable learning experience. 100% of the participants also agreed the simulation experience would improve their performance in the actual clinical setting. 80% of the written responses mentioned the benefit of working with actual pediatric medical equipment.
**Discussion:** This course has proven to be one of the most successful newly implemented courses in our center. In addition to the course being well-received, one participant suggested that the simulation become a permanent part of the PT/OT onboarding process in our facility. Future plans include incorporating nurses from inpatient units to facilitate collaboration and teamwork among members who work together in patient care.

**References:**


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**OP 013 – Train the Neonatal Transport Team - Stat!**

**Topic:** Simulation instruction design and curriculum development

**ID:** IPSSW2015-1146

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**Workshop Format:** 1) Present needs of a level III tertiary care hospital requesting Neonatal Transport Team training for new team roles on an aggressive timeline via slides, 2)Discussion of curriculum planning based on gaps - including what the audience might do for this or similar issues, 3) Curriculum planning exercise utilizing curriculum planning form, including an analysis of course logistics challenges, 4) Hands-on scenario based training experience, including introduction to neonatal transporter video clip and experience with airway management, vascular access, and medication skills. 5) Closing remarks

**Overall goal of workshop:** Consider curriculum planning for request that has a short time line with high stakes.

**Learner objectives:**

1. Utilize a curriculum development form to address gap analysis presented
2. Offer solutions to course logistics analysis
3. Experience hands-on neonatal training sessions considering activities that could meet objectives of any curriculum plan.

**Method of delivery:** Powerpoint, discussion around gaps and problem solving, video clip, hands-on skills utilizing high fidelity manikins.

**Intended audience:** This course is intended for simulation professionals who develop curriculum and deliver courses to practicing health care professionals. This is for a basic to intermediate level of simulation curriculum knowledge.

**Relevance to conference:** The pediatric and neonatal simulation community is looking for ways to train practicing professionals now and into the future. This is an innovative training curriculum that is delivered in a short time frame and has gotten excellent reviews and gone through three years of course revisions.
**Workshop timeline:** 1) Introduction/background 10 minutes 2) Curriculum development and logistics analysis 20 minutes 3) Scenario-based hands-on training session 50 minutes 4) Closing/wrap up 10 minutes

**References:**

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**OP 014 – It’s A Kind of Magic**

**Topic: Simulation instruction design and curriculum development**

**ID:** IPSSW2015-1239

**Louise Selby**¹, Helen Bailie², Rosalie Campbell²

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**Context:** There is concern amongst UK paediatric trainees and trainers that the European Working Time Directive means doctors are responsible for initiation and delivery of out of hours care with limited supervision or experience¹. In addition, nursing staff have less funding for study limiting courses they can attend. The managing critically ill children (MAGIC) course was developed in Cambridge, England for general paediatric trainees (and shortly nursing staff). MAGIC encompasses principles of initial assessment of an unwell child and clinical management of paediatric emergencies.

**Description:** MAGIC began in 2011 to increase trainee’s exposure to simulation and runs six times a year with eight candidates. Delegates have varied experience imitating real-life clinical work. The day includes topics of human factors, good teamwork and team building followed by a tour of the simulation suite. The focus of the day is providing each candidate the chance to ‘lead’ assessment and management of a critically unwell child using high fidelity manikins and actors. Senior paediatricians and emergency medicine clinicians act as faculty who allocate scenarios, for example trauma, DKA or a neonatal emergency based on candidate’s experience. The scenario is run with a trained nurse and another candidate as an assistant. Detailed, structured feedback centred on human factors and clinical learning is given using video and group discussion.

**Observation and Evaluation:** With constant evaluation and feedback the course has evolved over three years. We have tailored scenarios covering RCPCH curriculum² and areas trainees feel they have limited experience of.

Feedback from delegates has been very positive with 86-100% in 2012-2013 feeling better prepared to manage the clinical scenarios delivered. Quotes from candidates have included MAGIC is ‘an innovative approach to teaching’ and candidates valued opportunities to ‘make mistakes in a supportive environment with experienced faculty’.

Trainees have reported the learning experience to be ‘invaluable’ and requested their scenarios are used as RCPCH portfolio assessments.

**Discussion:** Development of MAGIC is ongoing and more scenarios with appropriate learning are being added. Each MAGIC scenario covers learning objectives in the RCPCH curriculum and will continue to evolve with the curriculum.
MAGIC educates paediatricians in management of clinical scenarios they may not otherwise experience in the safe learning environment of simulation. There is potential to make this course national due to the drive to develop simulation as a learning and assessment tool within the RCPCH. In the future the course could be further improved to include emergency medicine and nursing delegates to promote multidisciplinary learning.

In future, with more faculty trained we are looking to recruit district general paediatricians to bring their experience to managing these scenarios outside a tertiary centre and extend the audience of MAGIC.

References:

OP 015 – Hybrid Simulation of Clinical Breast Examination: A Culturally Sensitive Tool

ID: IPSSW2015-1109
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Clinical Breast Examination (CBE) is traditionally taught to medicine III students in a lecture, followed by practice on a low-fidelity breast model. The opportunity to clinically practice CBE depends on patient availability and her willingness to be examined by students. This is further limited by some Lebanese women’s cultural and religious beliefs. Little is known about the effect of patient cultural practices on the efficacy of CBE. Our goal in this study is to investigate an effective educational tool for teaching CBE to medical students. Our hybrid simulation model consists of a lecture and a video (Bates’ Visual Guide, LWW) explaining the CBE, and a video about cross-cultural communication during physical exam (UMichDent@YouTube). Interview of a standardized patient (SP) wearing a silicone breast model jacket (limbsandthings®) follows.

We hypothesize that the use of this hybrid tool, as compared to the traditional teaching method, will result in a more complete CBE, better lesion detection and improved culturally sensitive communication skills. In our study, medicine III students are randomized into 2 groups: an intervention group with the hybrid simulation method and a traditional teaching group. Next, all students are assessed in an Objective Structured Clinical Examination (OSCE) that includes 3 simulation stations. Each SP is trained to act according to a specified cultural background: a liberal young woman with a benign breast lesion, a veiled young conservative woman with a benign breast lesion and a middle-aged woman with breast cancer. Our primary outcome is to meet the learning objectives of CBE completeness and lesion detection. Student attitude and cultural competency will be assessed during secondary analysis. Forty students have been recruited so far. Primary results from the interim analysis are presented in table 1. Overall, students are better at identifying the malignant lesion in the middle-aged patient than benign lesions in younger women. Controversially, their CBE was less complete with this patient. Students felt less at ease during the encounter with the liberal patient, whose behavior possibly interfered with their ability to identify a lesion despite a more complete CBE.

The limitations and problems identified so far are:
1. In each station, the SP gave similar grades to most students regardless of how well they scored on the objective lesion identification score and regardless of which teaching method they had received. The grading could be biased. Also, low inter-rater variability cannot be assumed. Hence the need to validate the grading skills of SPs.

2. The liberal SP was acting too flirtatious. We need to remind the SPs of the cultural requirements for their role at every OSCE.

3. Design of the study does not specifically test for the secondary outcome: distracting effect of cultural background i.e. whether religiousness or flirtatiousness interfere with the ability to detect the same lesion in different patients.

References:

OP 016 – Creating a Neonatal Simulation Curriculum - A 2 Part Series

ID: IPSSW2015-1178
Deepak Manhas* 1, JoDee M. Anderston* 2, Nikki Wiggins* 2, Lindsay Johnson* 3, Taylor Sawyer* 4

Proposed Format: This would work best as a pre-conference half day dedicated to Neonatal Simulation or alternatively, as a 2-part interactive workshop. Either way, the session will begin with an introduction to Neonatal Simulation. Basics of curriculum design, cognitive/technical/behavioral skills, available equipment, pre-briefing/de-briefing, and assessment will be discussed. Groups will identify a need in their
center, develop a mini-curriculum to address this need, and to circumvent problems or issues that they are having in their own centers.

**Goal:** The goal is to provide individuals with the basic tools to begin a neonatal simulation curriculum and to assist these individuals in circumventing the barriers that they face in their home institutions.

**Learning Objectives:**
1. To describe the steps of curriculum and simulation development.
2. To apply the steps of simulation development in order to address an identified learning need.
3. To identify potential solutions to barriers of neonatal simulation development at one’s own institution.

**Method of Delivery:** The initial phase of this series will be lecture-based to introduce basic concepts. The participants will then break into groups to create a simulation based on the design tools described to them. A discussion regarding skills assessments with a focus on procedural assessment and behavioral assessment in the NICU will follow. Equipment, pre-briefing and de-briefing for these assessments will be reviewed. The participants will again break into groups to practice assessing both procedural and behavioral skills.

**Intended Audience:** Basic-Intermediate Neonatal Educators

**Relevance:** IPSSW is dedicated to Pediatric and Perinatal Simulation. This sessions are targeted to establishing high quality Neonatal Simulation Curriculum Development in order to fulfill the IPSSW mandate to provide safe and effective care to infants. Neonatal simulation differs significantly from both obstetric and pediatric simulation and would benefit from a comprehensive afternoon dedicated to the newborn patient. The concept of a standardized Neonatal Simulation Fellowship Program will be addressed.

**Timeline:**
- Introduction of Session and Faculty: 3 min
- Verbal Faculty Disclosure of Vested Interest: 2 min
- Core Content:
  - Introduction to Curricular Design: 25 min
  - Introduction to Scenario Design: 20 min
  - Break-out Session to Design Scenario in Groups: 30 min
- Wrap-up: 10 min
- Introduction of Session and Faculty: 3 min
- Verbal Faculty Disclosure of Vested Interest: 2 min
- Core Content:
  - Review of Available Neonatal Simulators: 10 min
  - Setting up Equipment for Neonatal Simulation: 10 min
  - Procedural Skills in the Neonatology: 20 min
  - Behavioral Skills in the Neonatology: 20 min
  - Break-Out Session Practicing Simulation Set-up and Skills Assessment
- Wrap-Up: 10 min

**References:**


OP 017 – Learning Styles and Impact on Training Effectiveness among PICU Bootcamp Participants

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1113
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¹Simulation Center, Children's Hospital of Philadelphia, Philadelphia, 2Pediatric Critical Care Medicine and Anesthesiology, 3Simulation Center, Children's Hospital of Philadelphia, Philadelphia, 4Anesthesiology and Critical Care Medicine, Johns Hopkins Children's Center, Baltimore, United States

Background: The Kolb Learning Style Inventory (LSI) is designed to help individuals identify the way they learn from experience.¹ Simulation based medical education (SBME) is a widely used method of teaching for trainees across many medical specialties. SBME draws on experiential learning as a theoretical foundation for its utility and efficacy in pragmatic and kinesthetic learning. While it is believed that a student’s learning style may impact knowledge gains in SBME, this has not been extensively studied. Prior studies have shown that SBME is an effective teaching methodology for nursing students with most types of learning styles.² Other studies have examined LSI profiles amongst medical students, allied health students and resident trainees and their impact on learning outcomes.³⁻¹⁰ However, the types of learning styles of pediatric critical care medicine (PCCM) fellows, and their impact on educational effectiveness in SBME are unknown.

Research Question: We hypothesize that: 1. Accommodating and converging learning styles are more common among PCCM fellows, and 2. Perceived training effectiveness varies among participants with different learning styles.

Methodology: A pre-course questionnaire with LSI was administered to first year PCCM fellows before the 2.5-day multi-institutional simulation-based orientation bootcamp. 6-month follow-up surveys were sent to all participants to evaluate perceived training effectiveness with 7-point Likert scale (1: least, 7: most). Perceived training effectiveness was averaged across training modules (airway, vascular access, resuscitation, sepsis, trauma). Each participant was categorized into 4 groups using LSI (assimilating, accommodating, diverging, and converging) and evaluated against training effectiveness. Kruskal-Wallis test was used to assess difference among groups. P<0.05 was considered significant.

Results: Ninety-two first year PCCM fellows over 4 years responded to both pre-course and follow-up questionnaires from 2010 to 2013 (response rate 38%). Median age was 31 (IQR: 29.5-33.5) with female
58%. Among PCCM fellows, Converging (37%) and Accommodating (35%) are the common learning styles followed by Assimilating (17%), and Diverging (11%). Overall bootcamp training was perceived very effective (median: 5.8, IQR 5-6.2). Perceived effectiveness was not significantly different among fellows with different learning styles (p=0.36).

Discussion/Conclusion: Converging and accommodating learning styles were the most common amongst PCCM fellows. Simulation-based orientation bootcamp was perceived effective regardless of their preferred learning styles based on Kolb LSI. Our future research should evaluate this finding with more robust outcome measures such as performance evaluation in simulation and clinical environments.

References:
5. Mammen JM, Fischer DR, Anderson A, James LE, Nussbaum MS, Bower RH, Pritts TA. Learning styles vary among general surgery residents: analysis of 12 years of data.

OP 018 – Engaging Non-Clinical Staff in Transport Simulations – Are They Part of the Team?

Topic: Crisis Resource Management/Human factors and Teamwork

ID: IPSSW2015-1118

Ray Trent1,2, Claire Howard3

1Embrace Transport Service, Sheffield Children's Hospital, Barnsley, 2Critical Care Directorate, Sheffield Children's Hospital, Sheffield, 3Embrace Transport Service, Sheffield Childrens Hospital, Barnsley, United Kingdom

Context: Call Handlers are not clinically trained. It was observed that by encouraging non-clinical staff to participate in simulation training, it would increase their situational awareness in the critical care transport setting and increase their understanding of medical terminology.
**Description:** Embrace, Yorkshire & Humber Infant and Children’s Transport Service is the UK’s first combined neonatal and paediatric transport service, transporting critically ill children by road or air, triaged through a single call centre.

The call handlers play an important role in the transport process, by receiving demographic and basic clinical information and passing the referrer onto a clinical specialist. Call handlers can be left in the building “lone working”, so have to have a good understanding of critical priorities, referral pathways and means of enabling communication between referral, advice and transport clinical specialists.

**Aims:**
- To involve non-clinical staff in simulation training, role playing distressed parents, to give them the opportunity to observe the clinical teams working with the patient and relatives.
- To increase the non-clinical staff situational awareness of the pressures involved in transferring critically ill infants and children.
- To enable non-clinical staff to engage in Basic Life Support simulation training.
- To enable non-clinical staff to identify clinical equipment and advanced medical terminology.
- To give non-clinical staff confidence in effecting and maintaining communications in times of great stress.
- To develop interprofessional team working.

**Evaluation:**
- 80% of non-clinical staff have participated in at least one simulation.
- 70% of non-clinical staff have attended Basic Life Support simulation training.
- Feedback from the simulation training demonstrated 80% believed the training gave a greater understanding of the transport of critically ill infants and children.
- 75% said they felt their role contributed value to the team.
- 100% said they wanted to attend more simulation training.

**Discussion:** The success of the simulation training has demonstrated that this form of training should be an annual event in conjunction with the education team.

Non-clinical staff should be asked to provide ideas for simulation training.

Clinical incidents would suggest future scenarios.

**References:**

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**OP 019 – Critical Lessons Learned: Using Simulation in the Operating Room to Improve Emergency Response**

**Topic: Crisis Resource Management/Human factors and Teamwork**

**ID:** IPSSW2015-1160

**Douglas Thompson**1, Jennifer Reid2, Joan Roberts2, Kimberly Stone2, Taylor Sawyer2, Don Stephanian3

1Anesthesiology, 2Pediatrics, 3Simulation, Seattle Children's Hospital, Seattle, United States
**Introduction:** In the operating room (OR) and outlying anesthetizing locations, effectively responding to emergencies presents several challenges unique to these settings, requiring teamwork and collaboration among multiple disciplines and specialties. As a quality improvement initiative we instituted a simulation program in which participants work together in their accustomed setting and role and experience a simulated emergency.

**Methods:** Scenario content was derived from previously experienced OR emergencies or known complications. Simulations took place in the operating room/outlying anesthetizing locations utilizing personnel and equipment that would normally be found there. Each session included a scenario, debrief, a second similar scenario (though not identical) and second debrief. All sessions were videotaped and retrospectively reviewed to examine the impact of the simulations. Following the simulation sessions, participants were invited to complete a post session questionnaire.

**Results:** We identified several safety risks in our ability to respond to emergencies in the OR and other anesthetizing locations. Firstly the physical confines of the operating room can quickly be overwhelmed by having the large team of hospital wide code respondents enter the OR. Therefore a smaller subset of respondents may be more appropriate. Secondly the tendency for the anesthesiologist to remain at the head of the bed and continue to perform patient care-related task served as a distraction to effective team management. Third, simulated massive operative blood loss lead to the discovery that there was no standard location for vascular clamps that may be life saving in such an event.

The majority of participants felt their role was valued during the simulation and found the simulations met their expectations. Review of recorded sessions demonstrate a statistically significant reduction in time-to-recognition of an event (e.g. a non-perfusing rhythm) and initiation of a code response.

**Conclusions:** We have been successful in implementing simulations of operating room/peri-anesthetic emergencies with multidisciplinary participation. We have seen that such simulations can improve response time for critical interventions and are viewed by participants as a valuable learning tool. Analysis of our simulations has engendered several critical observations and practice changes.

**Table 1.** Mean times for CPR, Code call, first epinephrine dose per and post debriefing. All times in seconds.

<table>
<thead>
<tr>
<th></th>
<th>Pre-debrief Mean 95% CI</th>
<th>Post-debrief Mean 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Code activated*</td>
<td>55 (40-70)</td>
<td>19 (9-30)</td>
</tr>
<tr>
<td>CPR Initiation time</td>
<td>50 (26-75)</td>
<td>40 (27-53)</td>
</tr>
<tr>
<td>Time for first epinephrine dose</td>
<td>107 (45-169)</td>
<td>71 (42-98)</td>
</tr>
</tbody>
</table>

Analysis using Wilcoxon paired test. * Significant

**References:**


OP 020 – Implementation of Human Factors and Teamwork Training in a Large Paediatric Intensive Care Unit

**Topic:** Crisis Resource Management/Human factors and Teamwork

**ID:** IPSSW2015-1180

**Samantha Lyons** 1, Paul Sampson 2, Caroline Box 1, Patricia Weir 3, Beverley Cejer 4, William Marriage 3, Christina Linton 5, David Grant 1

1Bristol Medical Simulation Centre, Bristol Royal Hospital for Children, Bristol, 2Anaesthetics, Royal Cornwall Hospital, Truro, 3Paediatric Intensive Care, 4Faculty of Children’s Nurse Education, 5Physiotherapy, Bristol Royal Hospital for Children, Bristol, United Kingdom

**Context:** Paediatric Intensive Care (PIC) is recognized as being a busy and often high-pressure environment involving multiple teams. Observations have shown that invariably mistakes do occur, sometimes with catastrophic consequences 1,2. Until recently Human Factors and Teamwork (HFT) training had not been integrated into the PIC multi-disciplinary team’s (MDT) training curriculum. We have developed a novel implementation plan that consists of a 4 hour interactive tutorial and simulation event, followed by the delivery of monthly 1 hour point of care simulation events managed by the native team. To our knowledge, such an approach aimed at achieving transference to clinical practice has yet to be described in the literature.

**Description:** The multi-professional 4 hour interactive tutorial and simulation event was incorporated into the nursing summer study days. Over a 3 month period (August-October 2014), 120 members of the PIC MDT attended the session.

Learning objectives include an introduction to and understanding of the goals of HFT and their importance when applied to working in PIC.

Using a didactic approach the theory of HFT is initially explained. The session progresses to an interactive lecture where we draw on practical experiences and staff reflections to achieve an understanding of HFT as applied to daily activities and management of emergencies in PIC. Discussions are based around:

- What makes a good team and leader
- Communication and causes of communication failure
- Situational awareness and factors effecting it
- Problem solving and decision making

Candidates then participate in a high fidelity simulation scenario based on a real life patient. He develops pulseless VT and members of the MDT are expected to recognize deterioration, call for help and escalate care pathways. This is followed by a debrief focusing on an appreciation of the different elements of HFT.

**Observation and Evaluation:** Participants are required to complete a pre- and post-course questionnaire adapted from a validated teamwork and safety questionnaire. It explores their knowledge and attitudes...
towards quality and effectiveness of teamwork, approaches to management, decision making, leadership, prioritization and errors in PIC. We hypothesize that there will be a shift in scores as awareness and understanding of principles improve. Results pending.

Discussion: This interactive tutorial and simulation event allows participants to explore, experience and reflect on the impact of HFT in their workplace and daily practice. The intervention has heightened awareness of HFT amongst participants; generated an impetus to improving current systems in PIC, and developed an appetite for further teaching and training, specifically, with the use of simulation. We aim to consolidate practice through delivery of monthly 1 hour point of care simulation events with a goal to achieve transference of teamwork skills to clinical practice with the effect of reduced incidence of adverse events.

References:

OP 021 – Designing and Implementing an In-Situ IPE Team Training Program Involving Anesthesiologists

Topic: Interprofessional Education (IPE)

ID: IPSSW2015-1156

Tobias Everett1,2, Teresa Skelton1

1Anesthesia, The Hospital for Sick Children, 2Anesthesia, University of Toronto, Toronto, Canada

Format and Method of Delivery: Breakout room with tables and chairs.

Introduction: principles of curriculum design (in brief); Several episodes of small group brainstorming and discussion informing iterative generation of a toolkit for curriculum design and implementation. Sample images and video excerpts complement the discussion.

Target Audience: Clinicians, Educators, Managers

Level: Intermediate to advanced

Learning objectives:
By the end of this workshop a participant will be able to:
1. Describe the complete process of interprofessional team training program design;
2. Explain how the process is customized with the anesthesiologist in mind;
3. List the barriers and enablers to successful implementation at their home institution

Description: Anesthesiologists are invariably part of a team. Their clinical activities facilitate those of other medical or surgical services and at certain points they require trained assistance. Consequently pediatric anesthesiologists function exclusively in interprofessional teams in a variety of contexts. Research tells us that adverse outcomes in high-acuity team-based crises are frequently due to a breakdown in those non-technical human factors on which teamwork relies.

Simulation-based courses for anesthesiologists tend to focus on anesthesiologists only, in Operating Room scenarios, with confederates playing the roles of the other team members.
This does not take advantage of the potential for professional development of multiple health care providers in a collaborative program representative of the real team. We have designed and implemented just such an in-situ, simulation-based interprofessional team-training program at our institution. In this highly interactive workshop we (faculty and audience) collectively construct a toolkit for creating an IPE program.

Relevance to the Conference: Delegates will be familiar with the potential for interprofessional education but may not know where to start when it comes to initiation and design of a program.

Workshop timeline:
- Faculty and Participant introductions (5 mins)
- Faculty disclosure and didactic introduction to principle of curriculum design (10 mins)
- 1st activity – brainstorming the requirements, desirables, barriers and solutions in the inception/planning phase (10 mins)
- Debrief and amalgamate 1st activity (10 mins)
- 2nd activity – brainstorming the requirements, desirables, barriers and solutions in the implementation phase (10 mins)
- Debrief and amalgamate 2nd activity (10 mins)
- 3rd activity – brainstorming the requirements, desirables, barriers and solutions in the evaluation phase (10 mins)
- Debrief and amalgamate 3rd activity (10 mins)
- On-ground-solutions: open dialogue with demonstrations of innovative solutions (either generated from the audience or faculty – videos and images are included here) (10 mins)
- Summary and close (5 mins)

OP 022 – Spatio-Temporal Analysis of CPR in Children: New Criteria for Quality of Simulated MDT Management

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

ID: IPSSW2015-1172
Louise Lavillauroy, Aiham Ghazali, Michel Scépi, Denis Oriot

University Hospital of Poitiers, Poitiers, France

Background: Pediatric cardiac arrest (CA) constitutes 1.7% of pre-hospital cardiopulmonary resuscitation (CPR) (1). Pediatric recommendations emphasize the importance of role clarity and distribution of tasks (2-4); their absence could impair performance (5-7). CPR on a child is singularly stressful (8). Management of in-hospital emergencies sets the leader at the feet of the child, while 5 or 6 team members are assigned specific tasks (9,10). A French Emergency Medical System team has 4 providers: 1 emergency physician (EP), 1 junior doctor (GPy), 1 nurse (RN), and 1 ambulance driver (AD). CPR can be particularly difficult in confined spaces (small room, ambulance) (11). Recommendations specify neither who performs an action, nor how that practitioner is positioned in relation to the patient. Do there exist ideal action positions that could reduce performance impairment? The aim of this study was to design criteria for spatio-temporal analysis of simulated child CPR.

Methods: IRB approval from the University Hospital of Poitiers, France, and INSERM-CIC 1402 (Research Institute). Single-center RCT. The preliminary phase is reported here.

Primary objective was to design criteria for CPR spatio-temporal analysis (member/position/task/time). Secondary objective was to evaluate videos of simulated CPR according to predefined criteria. Criteria content was designed by 2 experts and sent to the French Society of Emergency Medicine mailing list
(questionnaire). 8 videos of CPR were studied: 32 participants from 8 teams, SimNewB, Laerdal* mannequin. The scenario involved a 3 m.o. infant having a tamponnade on a port-a-cath*. Possible negative outcomes were: 1) Lack of action/non-respect of algorithm; 2) Inappropriate actions; 3) Inadequate distribution of tasks; 4) Poor spatial distribution of team members.

**Results:** Experts designed criteria for spatio-temporal analysis of pre-hospital pediatric CPR (non-shockable) with a 4-person team. Feedback (8.8%) from the mailing list was consistent with the criteria, except for 2 steps: 1) Preparation of intraosseous access and tracheal intubation could be done interchangeably by RN or AD; 2) Securing the endotracheal tube was more often described as done by the EP rather than the RN. 5/8 videos showed impaired CPR spatio-temporal organization: 9 lack of action/non-respect of algorithm; 1 delayed injection of epinephrine; 5 inadequate distributions of tasks; 3 poor spatial distribution: competition for the same action at the same time; inadequate positions: chest compressions at the head whereas BMV on the side. In 3 videos there was no impairment of CPR performance related to mismatch on spatio-temporal criteria.

**Discussion/Conclusion:** To our knowledge spatio-temporal analysis of CPR has never been reported. This preliminary study shows some improvisation in the positions of care providers during CPR. Further study should focus on broad validation of the criteria and completion of the analysis on more videos.

**References:**


**OP 023 – CAB versus ABC: Impact on Efficiency of Pediatric Resuscitation in Simulation Based Scenarios**

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

**ID:** IPSW2015-1090

**Yasaman Shayan**1, Laurence Alix-Séguin2, Jocelyn Gravel2, Olivier Jamoulle2, Arielle Levy2

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Background: In 2010, the American Heart Association (AHA) published guidelines recommending a new algorithm, Circulation-Airway-Breathing (CAB), as a more suitable alternative to the traditional Airway-Breathing-Circulation (ABC) protocol for patients presenting in cardiac arrest. CAB is now included in the curriculum of the Pediatric Advanced Life Support (PALS) course. The aim of this modification was to facilitate rapid recognition of cardiac arrest and timely initiation of chest compressions and other major components of resuscitation. A recent study by Lubrano et al., showed that the CAB sequence allows for earlier recognition of respiratory and cardiac arrest by basic life support providers. No study has examined the impact of CAB versus ABC on time to epinephrine administration and time to defibrillation.

Research question: We aim to compare performances of pediatric residents during simulated resuscitation scenarios after being taught the CAB versus the ABC sequence during a PALS course.

Methods: A single-center study was conducted in the simulation lab of a tertiary care pediatric hospital using a pre/post experimental design. All first and third year pediatric residents were invited to participate in simulation sessions shortly after taking a PALS course taught according to 2010 AHA guidelines emphasizing the circulation-airway-breathing (CAB) sequence. A total of twenty-three residents acted as team leader in two videotaped, simulated resuscitation scenarios: pulseless non-shockable arrest and pulseless shockable arrest. Their performance was compared to those of 24 residents who participated in a previous study and were trained according to the 2005 AHA guidelines emphasizing the airway-breathing-circulation (ABC) sequence. Two raters evaluated the residents’ performance on 5 critical tasks: time to pulse check, cardiopulmonary resuscitation (CPR), bag-valve-mask ventilation, epinephrine request and defibrillation.

Results: Residents who were taught the CAB sequence performed significantly better on time to pulse check (median delays of 10 versus 31 seconds (p value <0.01)) and CPR (median 20 versus 46 seconds (p value <0.01)). Time to ventilation was significantly delayed for the CAB group (33 versus 19 seconds; p-value <0.01). No significant difference was noted in the two groups for time to epinephrine request (p value 0.11) and defibrillation (p value 0.64).

Conclusion: CAB training was associated with shorter time to pulse check and CPR initiation, but at the cost of delayed ventilation. Moreover, epinephrine request and defibrillation were not performed more rapidly in either group.

References:

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OP 024 – Quantitative Performance Assessment of Simulated Pediatric Cardiopulmonary Resuscitation

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

**ID:** IPSSW2015-1128

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**Background:** Methods for quantitatively measuring performance during resuscitative care are lacking in published literature. Members of our investigative team have previously published psychometric analyses of task-based scoring instruments used in educational research in pediatric resuscitation. These published investigations used instruments that were designed for specific cases in pediatric resuscitation, rather than for a more generalizable application. We hypothesize that a methodologically similar scoring instrument will reliably assess clinical performance during simulated cardiac arrest.

**Methods:** This study was conducted at 11 pediatric centers in Canada and the US. Teams of pediatric healthcare providers performed a simulated cardiac arrest scenario involving 12 minutes of pulselessness (asystole for 6 minutes, VF for 6 minutes). A task-based scoring instrument was designed by investigator consensus using a 0, 1, or 2 point scoring system to rate performance during cardiac arrest. The items were chosen according to the essential steps in the pulseless arrest algorithm of the American Heart Association Pediatric Advanced Life Support course and include CPR performance parameters (chest compression rate, depth, release, number and duration of pauses), defibrillation (dose in J/kg, timing), and epinephrine administration (dose, timing). Multiple raters reviewed and scored a set of simulations. Overall interrater reliability was measured; a fully-crossed generalizability study with team and rater as facets was performed to determine the variance in scores ascribable to each facet; a decision study was done to determine the effect of additional raters and scenarios on the G coefficient.

**Results:** Three raters scored four videos. Overall scores ranged from 53/90 (59%) to 73/90 (81%) possible points. Intraclass correlation coefficient was 0.77 (F 3,8 = 4.46, p = 0.04). Variance components were 21% for rater, 57% for scenario. G coefficient was 0.80; by D study this increased to 0.91 and 0.93 with 8 and 10 raters, respectively.

**Conclusions:** A novel scoring instrument for quantifying performance during pediatric cardiac arrest showed modest reliability and generalizability. Future studies should examine the effect of a larger number of raters and/or scenarios on generalizability, as well as the utility of the instrument in assessing real clinical performance.

OP 025 – Behavioral Assessment Tool (BAT): Promoting Good Behavior During Times of Crisis

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

**ID:** IPSSW2015-1145

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**Format:** This interactive session combines the theory and evidence of effective behaviors during Crisis Resource Management (CRM) with the practicality of identifying and promoting these crucial behaviors.

Instructional formats for this session will include a brief didactic lecture to introduce some basic background information regarding behavioral assessment. The bulk of the session involves the active engagement of the participants in critical analysis and scoring of the scenarios. Each behavior will have several scenarios that the learners will evaluate and engage in group discussion. After each discussion, there will be time to answer any questions.

At the end of the session, there will be a larger, more in-depth, scenario that will allow the learners the opportunity to tie everything together. This simulation scenario will challenge the students by allowing them the opportunity to score all 10 behaviors.

**Outcomes:** Using the Behavioral Assessment Tool (BAT), participants will identify 10 behavioral factors that improve outcome during crisis. Educators can learn to identify and evaluate these behaviors for trainees to improve both individual and team performance.

**Learning Objective:**
1. Distinguish between 10 behavioral aspects of CRM.
2. Assess communication tools to escalate and/or communicate concern.
3. Measure the individual behaviors that contribute to teamwork using a Dreyfus scale, identify opportunities for improvement.

**Audience:** Intermediate-Advanced Educators

**Content:** The workshop will review the 10 behaviors of CRM: knowledge of the environment, anticipation and planning, leadership/followership, communication, workload distribution, attention allocation, utilization of information, utilization of resources, calling for help, and professionalism. Concrete examples of each will be given, in addition to tools to help distinguish novice, competent and expert skills for each behavior using the BAT.

**Relevance:** We hope to encourage assessment of behaviors during crisis events, and not merely cognitive or technical skills. The discussion and analysis of behaviors during the debriefing is critical to enforcing positive behaviors and changing less effective behaviors. We would like to see behavioral assessment become a standard part of debriefing.

**Timeline:**
- Introduction: 3 min
- Introduction and Disclosures of the Speakers: 5 min
- Discussion of goals of the participants: 7 min
- Introduction to the BAT Lecture: 15 min
- Knowledge of the environment scenarios: 5 min
- Anticipation and planning scenarios: 5 min
- Leadership/followership scenarios: 5 min
- Communication scenarios: 10 min
- Workload distribution scenarios: 5 min
- Attention allocation scenarios: 5 min
- Utilization of information scenarios: 5 min
- Utilization of resources scenarios: 5 min
- Calling for help scenarios: 5 min
- Professionalism scenarios: 5 min
- Putting it all together scenario: 15 min
References:


OP 026 – Effect of Repetitive Immersive Simulation Sessions on Subjective Stress Response of MDTs

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

ID: IPSSW2015-1171

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Background: Stress is inherent to emergency medicine and related to exceptional interventions, sometimes causing posttrauma (1). Simulation-based training (SBT) in immersion can reproduce situations with evidence of stress (2). Despite published studies on stress/performance (3), to our knowledge no research has studied the effect of repetitive SBT sessions on subjective stress response and the risk of post-traumatic stress disorder (PTSD).

Methods: IRB approval by the University Hospital of Poitiers, France, and INSERM-CIC 1402 (Research Institute). Single-center RCT.

Objectives: 1) To study the effect of repetitive immersive simulations on subjective stress; 2) To measure stress parameters change during a session; 3) To analyze status effect.

Twelve multidisciplinary teams (MDTs) were recruited, with 4 participants in each: an emergency physician (EP), a resident (GPY), a nurse and an ambulance driver (composition of SAMU team – French Emergency
Medical Service). Six MDTs were randomized to receive 9 immersive simulations over 1 year (group A) and 6 MDTs to receive only 3 (group B). The theme was “emergency management of an infant in shock”. A SimNewB (Laerdal*) mannequin was used. Scenarios included: hypovolemia, congestive heart failure, adrenal insufficiency, burns, trauma, malaria, supraventricular tachycardia, tamponnade, and purpura fulminans.

Self-assessment of subjective stress was performed (scales): STAI (4), IES-R (5), PCLS (6), and Stress-O-Meter (SOM) (7). STAI was carried out on pre-simulation day (T0), just before simulation (T1), after it was associated with SOM (T1 & T2), and finally after debriefing (T3). IES-R was used at 7 days (T4). PCLS was used at 30 days (T5). Parameter evolution during a session was analyzed by ANOVA for repetitive variables, and status effect by ANOVA or by Kruskal-Wallis test.

Results: 48 participants were included (72 immersive simulations). STAI score decreased with repetition of sessions (group A), after the 4th session at T3 (p<0.0001) and the 6th session at T1 (p=0.03). STAI score remained unchanged during the 3 sessions of group B. One participant developed a PTSD and was referred to a psychiatrist. During the sessions, STAI increased from T0 to T1 (p<0.0001), T1 to T2 (p<0.0001) and decreased from T2 to T3 (p<0.0001) for all the participants. SOM score increased from T1 to T2 (p<0.0001). STAI scores were higher in EPs and PGYs at T0 (p=0.0036) and T3 (p=0.013). IES-R was 6.44±1.94 and PCLS 21.78±5.70, without status effect.

Discussion/Conclusion: SBT sessions represented stressful situations for all the participants. However, repetition over 4-6 sessions/year was associated with a decrease in stress parameters. PTSD occurred only once. Self-perceived stress increased before and after simulation, and decreased after debriefing. Our results suggest that repetition of simulations could decrease subjective stress (3). Future studies should investigate objective stress parameters with regard to performance.

References:

OP 027 – Promoting Exploratory Discourse within Post-Simulation Debriefs
Topic: Debriefing and teaching methodologies
ID: IPSSW2015-1257
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Background: Simulation-based education is a complex and challenging pedagogy. Several researchers have noted that the post-scenario reflective discussion/debrief is the key to experiential learning within this type of education. Exploratory talk has been used as a marker for collaborative or peer-group learning within school children. Barnes identified key words or phrases which indicated the use of exploratory talk (1). We are conducting a qualitative research study to determine if simple educational interventions can promote exploratory talk and peer-group learning within post-simulation debrief sessions.

Methodology: A ethnographical qualitative study, using an action research methodology(2), with the researcher positioned as a participant-observer. Using a combination of methods including observation, semi-structured interviews, sociocultural discourse analysis and thematic content analysis pre and post intervention debriefs will be studied to identify episodes of exploratory discourse between participants. Semi-structured interviews will be conducted with participants to explore their experiences of simulation debriefs to identify challenges to learning.

Results: We will present our study results based on quantitative and qualitative analysis of the data focusing on: incidence of exploratory words / phrases; peer-peer interaction; peer-facilitator interaction; evidence of exploratory discourse as a maker of collaborative learning; use of identifiable episodes of exploratory discourse as an marker of collaborative learning; overview of participant experiences of simulation-based debrief sessions

Potential Impact: We aim to demonstrate that simple educational interventions can produce significant alterations in the structure and dynamic flow of discourse in post-simulation debriefs. By providing participants with basic ground rules, along with observation scripts, our research aims are to promote the occurrence of peer-peer discussion and exploratory talk within reflective feedback / debrief sessions. We will use exploratory discourse as a marker of deeper learning which potentially leads to transformational learning in the clinical workplace.

References:

OP 028 – Introducing a Simulation Program into a Paediatric New Graduate Registered Nurse Transition Program

Topic: Programme development/ Administration and Programme Management

ID: IPSSW2015-1070

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With limited paediatric exposure and clinical experience during undergraduate studies, evidence suggests that new graduate registered nurses (RN) often lack the knowledge and ability to interpret signs of patient deterioration once working in the clinical setting (1, 2). With clinical deterioration and arrest less common in the paediatric population, new graduate RNs pose a risk to patient safety due to lack of exposure to sentinel events. It was identified that there was a need to give new graduate RNs commencing at the Children’s Hospital at Westmead (CHW) additional opportunities to develop skills and expertise in recognizing and managing the deteriorating paediatric patient. By utilising simulation, the new graduate RNs are given an opportunity to develop their skills in a realistic, safe and supported learning environment. With limited evidence on the use of simulation based education for paediatric new graduate
RNs, there was also an opportunity to determine its appropriateness within a new graduate RN transition program.

A pilot simulation program was incorporated into the 2014 CHW First Year RN Transition Program. Immersive simulated scenarios were developed and facilitated by ward clinical nurse educators and transition program educators, with objectives targeting the recognition and initial management of the deteriorating paediatric patient in a ward setting. Both experiential and vicarious learning opportunities were incorporated into the program, with new graduate RNs participating in immersive scenarios and observing their peers. All 42 participants of the CHW First Year RN Transition Program participated in a centre-based, 4-hour simulation program.

Post program evaluation was conducted using a Likert scale, with the evaluation focusing on knowledge and skills, communication and teamwork, and attitudes towards shared learning. As this was a pilot program, the evaluation also focused on relevancy of the program to the scope of practice for a paediatric new graduate RN. A two month follow up evaluation is also planned to determine knowledge, skills and attitudes of the new graduate RNs in recognising and managing the deteriorating paediatric patient.

The initial program evaluation was positive in regards to its relevance for the new graduate RNs with 83% of participants agreeing that the scenarios were a valuable learning experience and 88% agreeing that shared learning was an effective learning experience. The follow up evaluation will be aimed at assessing changes in knowledge, skills and attitudes of the new graduate RN in recognising and managing the deteriorating paediatric patient. Results from this pilot indicate that the implementation of a new graduate RN simulation program on recognising and managing the deteriorating paediatric patient, with the potential to not only improve a new graduate RNs clinical practice, but also improve patient safety within the paediatric hospital setting.

References:

OP 029 - Simulation: A Head Start

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Context: Despite simulation being recognised as a vital source of experiential learning in medical education, it is still not a widespread feature of undergraduate training curricula in the UK. With simulation being utilised in continuing medical education in the workplace, introduction to its concepts and structure early would breed familiarity for participation later in training. The Royal College of Paediatrics and Child Health are advocating integration among inter-professionals. At the undergraduate level, different professions train separately and this often continues at a postgraduate level and even in the workplace. We aimed to expose nursing and medical students to simulation early on in their training.

Methodology: Our aims were to give medical and nursing students undergoing paediatric placements at Leeds Children’s Hospital first hand experience with high fidelity simulation in the simulation centre. Simulation scenarios were mapped to both undergraduate curricula to emphasize different learning points.
The program was developed with input from nursing and medical undergraduate leads with support of simulation trained faculty. Each session lasted 45 minutes, which began with an introduction to simulation followed by 2 acute scenarios both debriefing of clinical and non-clinical learning outcomes.

**Results / outcome:** Students were asked to complete feedback before and after the session and rated statements on a 5-point Likert scale. 25 students participated over 3 sessions. The session helped students to integrate theory and practise (4.9). They learnt clinical and non-clinical management of the acutely ill child (4.7 and 4.5 respectively). Exposure to concept of human factors led to an increased understanding of its relevance in healthcare (+0.4). The perceived value of interprofessional training also increased (+0.2).

**Potential impact:** This type of multidisciplinary simulation teaching provides a platform for undergraduates to examine and manage the acutely unwell child in a safe and structured environment without risking patient safety.

**Image:**

![Image](image-url)

**References:**


OP 030 – Interprofessional Learning in Simulation-Based Workshops on Difficult Conversations

**Topic: Interprofessional Education (IPE)**

ID: IPSSW2015-1072

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**Context:** Strong interprofessional (IP) communication is central to quality of care [1]. Although contemporary care involves complex interactions among IP providers, opportunities to learn together are still relatively few. The Program to Enhance Relational and Communication Skills (PERCS) teaches communication and relational skills focusing on difficult conversations in a variety of clinical settings. In PERCS, interprofessional clinicians learn together with family faculty using live enactments with professional improvisational actors [2, 3]. We reviewed 3.5 years of IP workshops to assess participants’ views about the educational value of interprofessional learning.

**Description:** Between 2010-2013, 783 interprofessional participants were enrolled in 46 PERCS workshops. Participants received pre, post and 3-month follow-up questionnaires with quantitative and qualitative questions. We used SPSS software, V21.0 for statistical analysis, and chi-square test to compare participant groups. Responses to open-ended questions were coded according to the standard principles of content-analysis. A code manual was developed by 2 members of the study team. Areas of disagreement were discussed by in the study team until consensus was achieved.

**Evaluation:** 722 (92%) participants completed surveys: 40% physicians, 31% nurses, 15% psychosocial practitioners (PP), 7% medical interpreters (MI) and 8% others. Prior IP learning was reported by 62% of respondents, but the majority (68%) reported <30% of their education included other professions. Physicians and providers with <6yrs work experience were least likely to have prior IP learning experience (p<0.001, p=0.004 respect.), while MI and PP were most likely to report prior IP learning (each p<0.001).

For nearly all (93%) participants IP colleagues contributed “quite” or “very much” to their learning. Asked specifically, participants described 1) gaining new insights [“They (the doctors) have more compassion and understanding than I thought,”] and 2) intent to change behaviors (“Plan to huddle with IP colleagues before family meetings”) After 3 months, 64% of respondents stated that the workshop positively affected their views about, or interactions with, IP colleagues.

**Discussion:** Interprofessional learning was highly valued by nearly all participants, even those with prior IP learning experience. Enhanced attitudes about IP collaboration were maintained for 3 months following the workshop. Physicians and HPs with <6 years of experience may more likely lack IP learning opportunities. A workshop using live enactments with professional actors offers unique insights and opportunities for reflection for healthcare professionals from different disciplines. Bringing interprofessional clinicians together to learn from each other in a safe learning environment can provide them with both new insights as well as specific behavior changes for enhanced interprofessional collaboration and care.

**References:**

OP 031 – Describing Team Dynamics in Real Teams Using In-Situ Interprofessional Simulations

*Topic: Interprofessional Education (IPE)*

ID: IPSSW2015-1159

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**Background:** Effective teamwork is a fundamental factor for ensuring patient safety.1 Much scholarly work in this field has focused on single disciplines of practitioners, been limited to trainees or confined to a single location.2 However, teaching hospitals have trainees and permanent staff contributing to the complex team dynamics and unpredictability of level of expertise. The care may be delivered in multiple locations around the hospital, for planned or emergent care. The team may not be familiar with each other or the particular clinical care area. Factors which contribute to effective team function can be considered in terms of the specific environment and the personnel involved.

**Research question:** We are investigating determinants of team function using team-training exercises in multiple clinical areas. Our objective is to discover if certain practice patterns confer greater efficacy and thus can be promoted in order to improve service delivery and patient safety.

**Methods:** Our interprofessional planning committee designed and implemented an in-situ simulation-based interprofessional team-training program. For each session the whole interprofessional team is assembled and, with REB approval, the scenarios are videoed. We are currently analyzing the videos using the Clinical Teamwork Scale. We will then use sequential explanatory mixed-methodology to identify a meaningful sample of participants who will be subjected to a structured interview. Transcribed interviews will undergo thematic analysis based in Grounded Theory. Further qualitative methods will then be used to allow us to describe the environmental and practitioner-related determinants of interprofessional team function.

**Results:** In the first year since its inception, we have conducted eighteen sessions in eight separate locations for a total of over 160 learners. Participants have included, but are not limited to all grades of doctors, nurses, technicians, respiratory therapists, anesthesia assistants etc. Learner evaluation data has demonstrated high levels of engagement, satisfaction and perceived value for practice. Open-ended learner feedback has influenced refinement of the structured interview script for the qualitative phase of this work in progress. Quantitative analysis of teamwork performance is underway and results will be available at time of IPSSW2015.

**Discussion/Implications:** We have demonstrated high rates of engagement, acceptability and feasibility in our in-situ interprofessional team exercises. The scholarly aspect of our work will allow us to define and describe determinants of interprofessional team function. Our results will direct the design of novel team training exercises customized to address the factors identified. More broadly, our results will contribute to our understanding of interprofessional team dynamics and inform the evolution of interprofessional education.

**References:**

OP 032 - The Design and Implementation of a Simulation Based Study for Newly Qualified Paediatric Nurses

*Topic: Interprofessional Education (IPE)*

**ID:** IPSSW2015-1187

**Caroline Box**<sup>1</sup>

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**Context:** Bristol Royal Children’s Hospital leadership recognised the requirement for early support and training of newly qualified Paediatric nurses joining the University Hospitals Bristol NHS Foundation Trust. In light of this they commissioned an educational intervention aiming to achieve familiarisation with hospital administrative systems and improved assessment of the deteriorating child.

**Description:** Collaboration was formed between the Bristol Paediatric Simulation Programme, Paediatric Clinical Skills and the Faculty of Nursing to support a multi-faceted learning opportunity.

A 3 day course was developed; the first 2 days of which covered clinical skills, assessment and paperwork as well as hospital procedures and senior staff introductions. The third day was simulation based and incorporated a one hour human factors lecture and skills stations.

The simulation day learning objectives included consolidation of the ABCDE assessment, escalation of care and the use of SBAR communication.

The scenarios were:

- Child with Bronchiolitis and respiratory distress requiring Optiflow support
- Child with hypovolemic shock
- Child with blocked tracheostomy

The skill stations were:

- Anaphylaxis and SBAR communication
- Blood sugar and cannula assessment

**Observation and Evaluation:** The simulation element of the course has run twice this year with a further 3 sessions scheduled over the next 3 months. A total of 50 newly qualified nurses will have completed the training.

The participants completed an evaluation questionnaire. The feedback showed that the day was successful in helping improve knowledge, skills and recognition of the deteriorating child. The participants valued support from experienced nurses as well as their peers.

Participants commented that the “scenarios were very good and realistic” and that the day offered “support and a positive learning environment”. The simulation day allowed the nurses to complete appropriate parts of their competency documentation. Their skills and learning flowed through to their daily clinical practice and ongoing development with support from their clinical supervisors.

**Discussion:** The simulation scenarios and subsequent debriefs allowed the participants to explore and reflect on the issues surrounding being a newly qualified nurse. There was discussion around the importance of familiarisation with emergency equipment. The effective use of SBAR communication with senior colleagues was a recurring theme. The training emphasised the importance of anticipation of potential problems and proactivity.

We have changed the course structure to allow for smaller groups and in light of this we will be considering ways of recruiting faculty due to the high number required.
The course has been well evaluated and the Hospital is committed to continuing such training sessions. These sessions offer both education and support for staff and it is hoped that they will improve our recruitment and retention.

OP 033 – Simulation for Infectious Disease Disaster Preparedness

**Topic: Interprofessional Education (IPE)**

ID: IPSSW2015-1244

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**Goal:** Participants gain knowledge and tools to develop an infectious disease outbreak management preparedness plan.

**Learning Objectives:**

1. The learners will be able to evaluate the infectious outbreak with available scientific information regarding means of transmission and appropriate containment/treatment.
2. The learners will be able to understand stepwise approach to infectious outbreak using SBAR and utilize multi-disciplinary approach for hospital preparedness.
3. The learners will be able to practice skills using a simulated exercise and take home lessons learnt from simulation and case studies.

**Method of delivery:** Powerpoint presentations, video reviews of simulation, exercise based on a hypothetical infectious outbreak case. Video demonstration of guidelines for PPE donning and doffing.

**Intended Audience:** Clinical educators, administrators, physicians in leadership roles, and Simulation staff. Workshop is appropriate for any level.

**Relevance to the Conference:** The workshop will address a multi-disciplinary approach to assessing and managing infectious outbreak. In light of Ebola outbreak, it will present perspectives from Infectious disease, pre-hospital care, Hospital care, especially in acute care setting and CDC guidelines. It will also present lessons learnt from hospital based simulations for Ebola preparedness and data from actual case studies. Personal Protective Equipment demonstration will be reviewed using video clips and new guidelines will be discussed.

**Workshop timeline:**

- **Total time of the workshop:** 90 minutes
- Introduction: Faculty and participant introductions, verbal faculty disclosure, workshop objectives, agenda and assessment of learner’s experience with this topic (10 minutes)
- Background and Assessment of Infectious outbreak using SBAR, Perspectives from Infectious disease, Pre-hospital setting, Emergency Department. Share template for EMS dispatch guidelines, EMS job action sheet, ED triage guidelines, PPE checklist using visual diagram, ED and ICU physician and nurse tasks sheet, Infection prevention and Lab tasks sheet and Institutional response plan diagram. (30 minutes)
- Interactive session with exercise using a hypothetical infectious outbreak (35 minutes)
- Lessons learnt from hospital wide simulations and case studies, final summary and questions (15 minutes)
References:
1. CDC infection prevention and control recommendations for hospitalized patients with known or suspected Ebola Virus disease in US Hospitals. www.cdc.gov/vhf/ebola
2. CDC checklist for patients being evaluated for Ebola Virus Disease in United States. www.cdc.gov/vhf/ebola

OP 034 - The Role of Neonatal Simulation in Training Inter-Professional Teams - Analysis of Learning Outcomes

Topic: Interprofessional Education (IPE)

ID: IPSSW2015-1254
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Context: Neonatal code teams comprise of individuals from different professional groups. Each individual has their own skills-set and level of experience, but must work collaboratively within the team in order to ensure delivery of good medical care. However, challenges of teaching an inter-professional team (IPT) include ensuring participant engagement, pitching the session optimally in order to ensure relevance of all aspects of the session for each individual from each of the different professional groups and ensuring that the learning objectives have been achieved.

Simulation can be a useful tool for training. Participants have the opportunity to practise skills required in real-life scenarios, within a safe learning environment. The debrief at the end of a simulation session also provides useful learning points on clinical and technical skills and human factors in team-working.

A regular In-Situ Simulation programme was developed on a tertiary NICU for junior doctors and nurses. Weekly sessions with usually 4 participants – two doctors and nurses each. Scenarios included common newborn delivery room and intensive care situations. These simulation sessions have had excellent subjective feedback, however, deep learning has not been assessed.

Description: The aim was to assess the individual perceived benefit of the simulation training session and to categorize the learning themes identified by the participants. At the end of each session, participants were asked to provide 3 learning points which they propose to use in their clinical practice. These were discussed at the end of the debrief. For analysis the learning points were categorised as described below: CLINICAL (Practical technique, Clinical assessment, Resuscitation management and Equipment) and HUMAN FACTORS (Communication, Team working and Situational Awareness).

Observation/Evaluation: In 27 simulation sessions learning points were collected from, 46 nurses (including 2 student nurses and 1 midwife), and 63 doctors. There were 368 learning points, 195 (53%) from nurses and 173 (47%) from doctors.

Discussion: Each participant identified at least 3 learning points indicating that learning occurs in all professionals following an inter-professional simulation experience.

There were some differences however in learning points generated by the two groups. The most notable difference in clinical learning points was a higher proportion of doctors identified practical techniques (13% vs 5%) and assessment & management (32% vs 11%) as ‘take-home learning points’.

The most notable difference in human factors learning points was that nurses focused more on communication (35% vs 16%).
The data we present indicates that targeted learning occurs in participants following an inter-professional simulation experience. The focus of learning points by the individuals within different professional groups was varied.

**OP 035 – Improving Diagnostic Accuracy and Efficiency by Optimization of Bedside Data Display**

*Topic: Patient safety and quality improvement*

ID: IPSSW2015-1049

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**Background:** Current methods of bedside data display in intensive care units require healthcare professionals to assimilate multiple sources of data located in separate physical and virtual locations in order to respond to time sensitive changes in clinical status. Such a system fails to facilitate pattern recognition essential for the trainee learning experience; thus it is suboptimal for both ensuring patient safety and enhancing skill acquisition. Other high-risk industries have developed strategies to address these safety and human performance issues. In the commercial aviation industry, flight cockpits are designed to facilitate expedient assimilation of time sensitive data (“the glass cockpit”) and their implementation has been shown to reduce crew mental workload, prevent accidents/errors and enhance cost savings. Such a strategy may yield similar results when applied in healthcare.

**Aims:** To evaluate if simultaneous data display (patient problem list, vital sign trends/current vital signs, pertinent laboratory results, and most recent radiographs) at the patient bedside improves diagnostic accuracy and efficiency in a simulated neonatal intensive care environment.

**Methods:** Eighteen healthcare professionals (pediatric residents, neonatology fellows, neonatal hospitalists and neonatal nurse practitioners) with a current NRP card were recruited. Utilizing a prospective randomized matched pairs design, subjects interacted with the simultaneous or conventional data display (simulated patient, bedside monitor, mobile computer) during a realistic clinical scenario for a maximum of 10 minutes and then crossed over to the other display, each subject serving as their own control. Subjects were asked to list the patient’s problems (max 12) as rapidly as possible and completed a subjective questionnaire giving feedback on the displays.

**Results:** 71% of subjects identified more diagnoses in the simultaneous display, regardless of the scenario. Diagnoses were made more rapidly in the simultaneous display in 44% of subjects (avg: 181 sec); 33% took the maximum amount of time allowed. Both scenarios were of similar complexity (conventional: 60 & 61% of diagnoses identified; simultaneous: 65% & 68%). On a Likert scale assessing potential clinical value, the simultaneous display was rated on average 4.6/5 with 5 indicating “very valuable.”

**Conclusions:** This study yields the first objective data on optimal methods of data display at the bedside. Based on the current results to date (subject recruitment and data analysis is ongoing), this configuration for simultaneous display of data yields more accurate and potentially more efficient diagnoses, decreasing the time for physicians to recognize and act on a patient’s changing clinical status. Thus, a relatively simple alteration of the clinical environment is capable of improving patient safety and accelerating the process of transitioning from a novice learner to an expert clinician.

**References:**

OP 036 – The Effect of a CPR Feedback Device on Provider Workload during a Simulated Pediatric Cardiac Arrest
Topic: Patient safety and quality improvement

ID: IPSSW2015-1054

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Background: The NASA Task Load index (TLX) is a well-validated multi-dimensional workload scoring tool that includes six subscales: mental demand, physical demand, temporal demand, performance, effort and frustration. It has been used to assess the perceived workload of healthcare providers in a variety of settings. High quality CPR is a critical factor in pediatric survival from cardiac arrest. CPR feedback devices have been shown to improve the quality of CPR. Little is known, however, about the workload of healthcare providers during pediatric resuscitations or the potential impact of a CPR feedback device on this workload.

Research Question: We aimed to describe the differences in workload reported by team leaders and team members during a simulated pediatric cardiac arrest and to evaluate the impact of a CPR feedback device on reported workload.

Methodology: We conducted an analysis of data from a prospective, multicenter, randomized trial evaluating a real-time visual CPR feedback device (VisF). CPR-certified healthcare providers, including 54 team leaders and 108 team members in the control and VisF groups, completed TLX surveys after completion of the scenario. TLX scores are reported on a 0-100 scale for each domain, with scores of <40 considered low and >60 considered high.

Results: The mean workload scores for team leaders (control 56.10, VisF 53.86, p= 0.46) and team members (control 58.10, VisF 60.54, p=0.33) were similar between the control group and the group utilizing the CPR feedback device (VisF). Overall, team leaders had higher mental workloads (mean diff: 12.82, 95%CI: 6.79 – 18.85) [YL1] and lower physical workloads than team members (mean diff: 60.56, 95%CI: 54.95 – 66.18). [YL2]

Conclusions: Healthcare providers reported high workloads during a simulated pediatric cardiac arrest. Physical and mental workloads differed based on provider role. A CPR feedback device did not change the mean workload reported. Further study is required to evaluate the impact of workload on provider performance during pediatric cardiac arrest.

References:

OP 037 – Blending Simulation and Lean Six Sigma methodology to improve safety in a clinical environment

**Topic:** Patient safety and quality improvement

**ID:** IPSSW2015-1123

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**Goal:** To demonstrate how use of industry-standard Lean-Six Sigma methodology can enhance the power of simulation to address hazardous clinical environments and improve efficiency.

**Learning objectives:**
At the end of the workshop the participants will be able to:
1. Identify hazardous environments and processes that would benefit from the blending of simulation and Lean Six Sigma methodology to improve provider and patient safety and efficiency.
2. Become familiar with select tools from the Lean Six Sigma methodology that are effectively paired with Simulation and identify specific tools to be used in participant’s identified hazard mitigation or process improvement project. The actual tools that will be taught are: process mapping, fish bone (cause and effect) diagrams, and standard work.
3. Create a project plan for hazard mitigation or process improvement using Simulation and Lean Six Sigma to be implemented in participant’s home institution.

**Methods:** The workshop methodology will include the use of didactic material, concurrent small group work utilizing templates and with faculty feedback, video clips, and sharing of project proposals created during small group work for feedback.

**Audience:** Clinicians, safety and quality experts and educators.

**Relevance:** This workshop will appeal to individuals who want to expand their use of simulation beyond education to improve hazardous environments or processes. The interactive nature of the session will allow the participants to leave with a work plan to be instituted in their home institutions.

**Work time line:**
- Introduction- Faculty and participants introductions, verbal disclosures, previous experiences of participants on the topic -15 min
- Background- 15 min- Faculty will provide rationale for the workshop. An example of a project blending Simulation and Lean-Six Sigma methodology (evaluation of new anesthesia induction room workflow for MRI area) will be presented to illustrate the major workshop concepts. Lean Six-Sigma tools will be introduced.
- Interactive session: participants will work in groups of 4-6 individuals to design their own simulation based project, applying Lean Six Sigma tools to improve environmental safety in their home institutions. - 45 min
  - Brainstorm a problematic environment and/or process in your home institution for remediation using simulation (worksheet 1)– 10 min.
Identify Lean Six Sigma tool appropriate for use in the specific participant’s problem (worksheet 2) - 15 min
Create a project plan for implementation in the participant’s home institution (worksheet 3) - 10 min
Report back problems identified and plan of action to the group – 5 min
• Finally summary and questions – 15 min.

References:
1. The Emerging Role of Simulation Education to Achieve Patient Safety, Pediatric Clinics of North America
2. Volume 59, Issue 6, Pages 1329-1340, December 2012
6. Using Simulation to Identify and Resolve Threats to Patient Safety, William R. Hamman, MD, PhD; Beth M. Beaudin-Seiler, MPA; Jeffrey M. Beaubien, PhD; Amy M. Gullickson, MDiv; Krystyna Orizondo-Korotko, MS; Amy C. Gross, MS; R. Wayne Fuqua, PhD; and Richard L. Lammers, MD, AJMC Published Online: June 04, 2010
7. Using inductiral processes to improve patient care, Terry Young; Sally Brailsford; Con Connell, Ruth Davies; Paul harper; Jonathan H. Klein, BMJ volume 328 17 January 2004

OP 038 – Achieving External Accreditation – Challenges for the Education Team
Topic: Patient safety and quality improvement

ID: IPSSW2015-1136
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Context: Embrace Yorkshire & Humber Infant & Children’s Transport Service (Embrace) is the first combined neonatal and paediatric transport programme in the UK. Simulation training and educational delivery are an important part of the service, allowing staff to maintain essential skills and knowledge in the stabilisation and transfer of critically unwell patients.

In July 2014, Embrace was awarded full accreditation for critical care ground, fixed wing and rotary wing transport by the Commission on Accreditation of Medical Transport Systems (CAMTS)1. For a service to be accredited by CAMTS they must go through a rigorous review and site survey which includes assessment in 164 standards of which 16 are specific to educational planning and delivery. CAMTS have a process for pre-approving transport service simulator programmes allowing them to submit their simulator experiences as an adjunct or substitute for ongoing clinical experiences2. We review the challenges that the education team had to overcome to meet these targets and how these standards are now being maintained.
Description: The Embrace education team are responsible for organising, delivering and documenting educational output. The team consists of 2 nurse educators, a lead consultant and an air transport lead nurse. Since February 2014 Embrace has also had the support of a medical trainee position focussed on simulation. All clinical staff are expected to attend 2 days of annual update training including crisis resource management and take part in simulation and clinical skills training. Monitoring of compliance includes important targets for low frequency high risk procedures including intubation.

Observation: Gap analysis of the CAMTS education standards revealed deficiencies in 8 areas. Although much of the training was already taking place this was not always being documented. The process for recording teaching was evaluated and a database was developed. Time scales were agreed so that staff would have to demonstrate compliance within a given period. This was important for low-frequency events such as use of the Nitric Oxide delivery system or chest drain insertion. The Embrace education plan was reviewed and simulation training has been extended to include ambulance drivers and communication specialists.

Discussion: Reviewing the educational processes at Embrace for CAMTS accreditation has resulted in several improvements. Educational was recognised as an area of particular strength during the accreditation process including the innovative use of a low cost simulated helicopter environment and we hope to maintain these standards to provide high quality care and improve patient safety. Progress reports required for maintaining CAMTS accreditation include strategies to mitigate the risk of relatively low numbers of fixed wing flights and an in-aircraft simulation event has been designed and delivered. Further innovation will be required to continue on the path of quality improvement.

References:
3. Creating a low cost air ambulance environment for high-fidelity simulation training. Round table presentation, IPSSW2014

OP 039 – Maximizing the Impact of Simulation on Patient Safety through Systems Integration

Topic: Patient safety and quality improvement

ID: IPSSW2015-1209

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Simulation is a natural partner for patient safety activities at the individual healthcare provider, team and systems levels. At the individual level simulation is widely used to improve knowledge and skills and increasingly, to assess competency. Team training using simulation has been shown to be successful in teaching teamwork and communication skills. More and more, simulation is also being used at the systems level to impact patient safety such as with the use of in-situ simulation to identify latent safety threats and environmental testing to evaluate new clinical spaces. In addition, simulation is being incorporated even earlier into the design phase of new spaces and clinical processes.

This workshop will explore how simulationists can partner with established patient safety, risk management and quality improvement programs to proactively and retroactively address patient safety.
Participants will be presented with a patient safety event (e.g., medication error) and details surrounding the event (e.g., new intern not understanding new computer system; staff nurse concerned that dose was wrong but didn’t raise the concern) or asked to address one of their own. They will then design a simulation endeavor in response to or in anticipation of the patient safety event with a focus on the individual, team or systems level.

**Session learning objectives:**

1. Define key patient safety terms
2. Describe a simulation activity targeted at healthcare providers to address a patient safety concern
3. Identify a systems-level simulation activity to address a patient safety concern

**Workshop Timeline:**

- Introduction: Faculty and participant introductions and review of workshop objectives (10 min)
- Overview of patient safety and examples of simulation and patient safety integration at the individual / team and systems-level (20 min)
- Small Group Activity (30 min)
- Small groups (3-4 participants) will be address specific patient safety case vignettes and work collaboratively to design a simulation activity targeting the event
- Groups will be assigned the healthcare provider, team or system as the focus of the simulation activity
- Large group presentation and discussion of simulation activities (20 min)
- Wrap-up (10 min)

**Method of delivery:** Combination of powerpoint presentation for overview, small group discussion of cases and large group discussion

**Intended Audience:** Simulationists interested in patient safety. Applicable to all levels of experience.

**Relevance to the Conference:** This workshop is designed to support simulation faculty who seek to enhance the impact of their simulation activities on patient safety.

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**OP 040 – In and Out of the Magnet: Building an MRI Safety Program Using High Fidelity Simulation**

**Topic: Patient safety and quality improvement**

ID: IPSSW2015-1223

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**Background:** The Magnetic Resonance Imaging environment represents a unique high risk setting in which significant risks to patients and providers exist related to the ferromagnetic field. Maintenance of a safe MRI environment requires specific staff education about ferromagnetic risk as well as implementation of appropriate screening protocols. Following implementation of Joint Commission and American College of Radiology Standards using traditional educational modalities, adverse events and near misses related to magnet safety were significantly reduced but not eliminated in our institution. Root cause and common cause analyses revealed that failure of existing screening protocols and communication challenges were significant factors in these events. To augment traditional educational modalities, simulation was introduced as part of the MRI safety program.
Methods: A multidisciplinary team (safety and simulation experts, physicians, nurses, radiology technicians) developed a 3 phase plan to improve MRI safety using simulation. Phase I: evaluation of a new MRI environment for latent safety threats, equipment problems, and emergency response systems through simulations prior to clinical use of the MRI. Phase II: testing and refinement of a new workflow for patient and staff screening from patient arrival to anesthetic induction to magnet entry through iterative simulations. Phase III: training of the full native team using in situ simulation to address knowledge gaps related to magnet safety, train around new protocols, and introduce Crisis Resource Management concepts with emphasis on communication skills and speaking up against an authority gradient.

Results: Phase I identified significant safety threats related to missing (5), MRI unsafe (1), or suboptimally placed (3) medical equipment, inadequate safety response protocols (3), facilities concerns (2), and knowledge gaps (2). Phase I data were used to adjust staffing, inform safety check lists/protocols, and drive facility modifications. Phase II generated significant changes to order and number of steps in protocol (3), personnel roles (2), and induction room equipment concerns (1) with changes under evaluation through iterative simulations. Full team training in a single pilot MRI site has been successfully implemented.

Discussion: Unique safety threats exist in the MRI environment that have previously been inadequately addressed through implementation of protocols, checklists, and conventional educational tools alone. A comprehensive series of simulation-based interventions was used to evaluate environments and systems and to address educational needs. Ongoing challenges include the need to implement and maintain simulation-based full team training across all 11 magnets at the home institution and satellite facilities to ensure uniform education. Follow-up is needed to ascertain the success of the program over time in reducing the number and frequency of adverse events and near misses.

References:

OP 041 – Caregiver Emergency Preparedness: A Tracheostomy Simulation Course

ID: IPSSW2015-1218
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Context: More caregivers are caring for technology dependent infants at home[i]. Mortality directly associated with tracheostomies in infants nationally ranges from 0.5% and 3% most resulting from airway emergencies [ii]. As the population of medically complex pediatric patients grows, challenges are met with educating caregivers for airway emergencies. Retrospective review in our institution, showed that 37% of readmissions in the first week and 2/3 of deaths in the first year after discharge from were related to airway emergencies. As a result, a tracheostomy simulation course of airway emergencies for caregivers was introduced.
Description: Our three aims were to 1) improve caregiver preparedness to manage airway emergencies after discharge 2) improve caregiver confidence and self-efficacy and 3) decrease adverse events after discharge in this patient population.

Four high risk airway emergencies were identified as priorities for education: water in the ventilator tubing, tracheostomy tube obstruction, accidental tube decannulation, and power failure resulting in cardiopulmonary arrest. Collaboration for curriculum development included input from NICU nursing and physician educators, NICU discharge coordinators, respiratory therapists, NICU caregivers, and simulation center educators. Participation in and feedback on content, realism, and relevance of all scenarios was given by NICU caregivers who had children discharged home with tracheostomies. The simulation environment and equipment mirrored a home with a crib and storage bin for home equipment and supplies. An infant simulator was modified to have a tracheostomy based on the same size/age as the patient. Each simulation used a standardized checklist and video recordings for debriefings.

Observation/Evaluation: Effectiveness of the curriculum was evaluated in the pilot phase of the program using: 1) assessment of primary caregiver self-efficacy, related to discharge of high-risk infants, using a pre and post survey 2) caregiver satisfaction via a survey immediately post simulation and 3) adverse event rates for these patients after discharge. Ratings of primary caregiver self-efficacy were high both pre and post simulation except for significant improvement in providing CPR, assessing respiratory rate, and troubleshooting the ventilator. Results of satisfaction survey indicated that 100% of caregivers felt the course helped them prepare for emergencies and would recommend it to other caregivers. Compared to our retrospective data where 60% (3/5) of readmissions in ventilator dependent patients were airway emergencies, prospective follow up of patient care outcomes post discharge showed no readmissions related to airway emergencies within the 1st week.

Discussion: Simulation is an innovative approach to improve caregivers’ ability to manage emergencies at home in patients. Applications could be endless to improving home care for all patients and families.

References:

OP 042 – Using Sequential Simulation to Demonstrate the Concept of Integrated Care
Topic: Innovation/ Future Direction and Outreach Simulation

ID: IPSSW2015-1246
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Context: Connecting Care for Children partnership has developed several General Practice Child Health hubs where children, parents and the healthcare professionals who care for them can come together to provide better, more joined up care for children. One of the three main components of the GP hub model is public and patient engagement and our project focussed on this element. We wanted to use the story of a patient as a way to illustrate concepts about integrated care; showing what might happen for the same patient in two separate scenarios; one where the care is not joined up and one where it is. We decided to do this using sequential simulation.

Description: Sequential Simulation refers to simulating key elements in a patient’s care pathway rather than focusing on a single element of care (such as a consultation or operation). It has been used with much success in the past as a visual way of engaging the public and professionals to think about complex
issues surrounding healthcare through simulating patient experiences (Kneebone, Bello & team, Imperial College London)

**Observation/Evaluation:** We wanted patients to help develop the simulation scenarios in order to create something engaging and authentic that had been created using the experiences of real patients. We ran a pilot of the scenarios for a group of practice champions who then helped us to improve them before joining us as part of a larger public performance. The public were given green and red cards in order to vote on certain aspects of the scenarios and also engaged in discussion after the first scenario to ask how the patient’s care could have been improved. The second scenario then incorporated some of their suggestions. We gathered feedback in written form and in structured interviews.

**Discussion:** The simulation was very well received, with all respondents rating the event as good or excellent. The involvement of the audience in feeding back about how care could be improved was felt to be particularly positive “I enjoyed that you would stop to explain what was going on and ask people for their opinions” and people found the sequential simulation engaging “Very entertaining and engaging”, Seems real, excellent event”.

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**OP 043 - Getting the Most out of an ECMO Simulation Program: Beyond Education & Training**

**Topic:** Innovation/ Future Direction and Outreach Simulation

**ID:** IPSSW2015-1040

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Aside from the typical educational goals of ECMO simulation, there are many other potential uses for this training that will benefit an institutional ECMO team. During this workshop, participants will explore how ECMO simulation can be utilized in novel ways to fulfill existing needs.

Following this workshop, participants will be able to:

1. Describe multiple potential roles for an institutional ECMO simulation program, including initial/ maintenance ECMO education, quality improvement, team training, device training & implementation, workflow analysis, simulation-based research, and assessment/ credentialing.
2. Analyze existing/ developing ECMO simulation programs to determine how to optimize efficiency to gain institutional buy-in/ budgetary support, enhance patient safety efforts, and improve educational practices.
3. Identify potential opportunities for multi-institutional/ multi-organizational collaboration to improve ECMO simulation practices through the development of validated educational tools and participation in simulation-based ECMO research studies.

First, faculty will share examples from their home institutions to demonstrate various functions that can be fulfilled by an ECMO simulation program. Some of these topics include: 1) Initial and maintenance ECMO education; 2) Team Training; 3) Device Training & Implementation; 4) Workflow Analysis; 5) Research; 6) Assessment & Credentialing. To increase engagement, we will utilize multi-modal learning methods, such as video clips of example scenarios and real-life case examples. During the session, audience participation will be encouraged through use of the Audience Response System, and we will solicit additional ideas for innovation and encourage further collaboration amongst the attendees in each category being discussed. A small group activity will be conducted to have participants identify additional ways ECMO simulation could address a need at their institution, and design a scenario to address this.
**Intended Audience:** Physicians & Educators at an intermediate or advanced level

**Relevance to the Conference:** Although this workshop is specific to ECMO simulation, the ideas posed will be helpful to broaden the usefulness of all simulation training in achieving goals outside the traditional boundaries of education and training.

**Timeline:**
- 10 min: Introductions of faculty, overview of workshop timeline
- 25 min: Overview of faculty experience with alternative uses for ECMO simulation
- 45 min: Small Group Activity
- 10 min: Questions/ Wrap-Up
- Preferred Number of Participants: 50

**OP 044 – Quality of CPR Provided During Simulated Cardiac Arrest across 9 Pediatric Institutions**

*Topic: Simulation for procedural and psychomotor skills*

**ID:** IPSSW2015-1053

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**Background:** High quality cardiopulmonary resuscitation (CPR) directly influences outcomes from cardiac arrest, yet healthcare providers often struggle to perform guideline-compliant chest compressions during cardiac arrest. The quality of CPR provided during cardiac arrest across various pediatric institutions is unknown. Furthermore, it is unknown if Just-in-Time CPR training or real-time CPR visual feedback have uniform effects across institutions.

**Objective:** Our primary objective is to describe the quality of CPR provided during simulated cardiac arrest across 9 pediatric institutions. Our secondary objective is to describe the influence of Just-in-Time CPR training or real-time CPR visual feedback (during cardiac arrest) on the quality of CPR across institutions.

**Methods:** We conducted secondary analyses of data collected from a prospective, multi-center trial, including 134 CPR certified healthcare providers who participated in a 12 minute simulated cardiac arrest scenario. Participants were equally randomized to either: (1) No intervention; (2) Just-in-Time CPR training before cardiac arrest or (3) Real-time CPR visual feedback during cardiac arrest. Measures of CPR quality (chest compression depth and rate) were collected, with an average calculated for each 30-second epoch of resuscitation. Our primary outcome was the proportion of epochs with chest compression depth > 50 mm, and our secondary outcome measure was the proportion of epochs with chest compression rate 100-120/min. We compared the results for compression depth and rate amongst 9 sites (for all 3 groups) using Fisher’s Exact Test.

**Results:** We collected data from 528 epochs in the no intervention group, 523 epochs in the Just-in-Time training group, and 552 epochs in the visual feedback group. In the no intervention group, 0-11.5% of...
epochs across all sites met targets for compression depth and 0-60.4% of epochs met targets for compressions rate. When Just-in-Time training was provided, the proportion of epochs meeting targets was 0-34.5% for compression depth and 0-72.9% for compression rate. Lastly, use of visual feedback during cardiac arrest resulted in 0-14.6% of epochs meeting targets for compression depth and 33.3-95.8% meeting targets for compression rate. There were statistically significant differences (p<0.001) demonstrated between sites for compression depth and rate in all three groups.

**Conclusion:** The impact of Just-in-Time training and visual feedback on CPR depth and rate is variable across sites, suggesting a need to customize educational interventions to address CPR performance deficits specific to each institution.

**References:**


**Topic:** Simulation for procedural and psychomotor skills

**Background:** Many healthcare providers rely on visual perception to guide CPR performance, but little is known about the accuracy of provider perceptions of CPR quality.

**Objectives / Research Question:** We aimed to describe the difference between perceived versus measured CPR quality, and to determine the impact of provider role, real-time CPR feedback and Just-in-Time CPR training on provider perceptions.

**Methods:** We conducted secondary analyses of data collected from a prospective, multicenter, randomized trial of 324 CPR certified healthcare providers who participated in a simulated cardiac arrest scenario between July 2012 and April 2014. Participants were randomized to one of four permutations of: Just-in-Time CPR training and real-time visual CPR feedback. We calculated the difference between perceived and measured quality of CPR and reported the proportion of subjects accurately estimating the quality of CPR within each study arm.

**Results:** Participants overestimated achieving adequate depth (mean difference range: 16.1% to 60.6%) and rate (0.2% to 51%), and underestimated chest compression fraction (0.2 to 2.9%) across all arms.
Compared to no intervention, the use of real-time visual feedback and Just-in-Time training (alone or in combination) improved perception of depth ($p < 0.001$). Accurate estimation of CPR quality was poor for depth (0 to 13%), rate (5 to 46%) and chest compression fraction (60 to 63%). Perception of depth is more accurate in CPR providers vs. team leaders (27.8% vs. 7.4%; $p = 0.043$) when using real-time visual feedback.

**Conclusions:** Healthcare providers’ visual perception of CPR quality is poor. Provider perceptions of CPR depth are improved by using real-time visual feedback during cardiac arrest and prior JIT CPR training.

**References:**

**OP 046 – Subjective or Objective Stress? Evolution of Stress Parameters during Immersive Simulation of MDTs**

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

**ID:** IPSSW2015-1174

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**Background:** Stress impairs clinical performance in real life (1) and in simulation-based training (SBT) (2,3). Subjective or objective measures can be used to assess stress during SBT (4). Correlation between subjective and objective parameters of stress is not clearly defined. We hypothesized that all multidisciplinary team (MDT) members would experience stress during immersive SBT and that it would decline after debriefing. Because of their different physiological mechanisms, we did not expect a correlation between subjective and objective stress parameters.

**Methods:** IRB approval by the University Hospital of Poitiers, France, and INSERM-CIC 1402 (Research Institute). Single-center RCT. The results of the 1st 12 SBT sessions are presented here.

**Objectives:**
1. To evaluate subjective and objective stress parameters during SBT;
2. To search for a correlation between them;
3. To study status effect.

48 participants were randomized in 12 MDTs of 4 members: an emergency physician, a resident, a nurse, and an ambulance driver (French EMS team) for an immersive SBT (infant in hypovolemic shock – SimNewB, Laerdal*). Good-judgment debriefing after each SBT. Subjective stress was assessed by STAI, and objective stress by salivary cortisol (SC) and Holter analysis. STAI and SC were measured on pre-simulation day (T0), immediately after simulation (T1), and after debriefing (T2). Holter provided: basal heart rate (HR), pNN50 (adjacent RR intervals >50ms), and LF/HF (low frequency/high frequency, i.e. spectral analysis) reflecting the autonomic nervous system (ANS).

M±SD for STAI, SC, HR, pNN50, and LF/HF and their variations (absolute=T2-T1, relative=T2-T1/T1). Evolution during SBT: ANOVA or Kruskal-Wallis. Comparison: t-test or Wilcoxon test. Correlation: Pearson’s R correlation test.
Results: STAI increased from T0 (39.66±8.01) to T1 (48.2±12.26) (p<0.0001) and decreased at T2 (56.69±14.48) (p<0.0001). SC increased from T0 (0.13±0.03) to T1 (0.36±0.24) (p<0.0001) and decreased at T2 (0.25±0.15) (p<0.0001). HR increased from T0 (65±10) to T1 (86±11) (p<0.0001), and remained unchanged at T2 (86±12) (p=0.97). PNN50 decreased from T0 to T1 (19.4±15.9 vs 9.43±8.43, p<0.0001), and remained unchanged at T2 (10.1±9.5, p=0.57). It was similar for LF/HF: T0 to T1 (3.04±1.59 vs 6.35±3.43, p<0.0001) and T2 (6.06±3.06, p=0.57). There was no correlation between the variations of all parameters except for FC and pNN50 (p<0.0001). There was no status effect for all parameters.

Discussion/conclusion: Immersive SBT produced stress for all MDT members regardless of status. Subjective and objective stress parameters were not correlated as previously suggested (5). Even if the evolution of stress parameters was paralleling, there were no correlation between them. Our study suggests that psychological, biological and electrophysiological stress parameters evolve on independent paths. Combined evaluation should be used to assess stress during SBT.

References:

OP 047 – Impact of a Novel Decision Support Tool on Adherence to Neonatal Resuscitation Program Algorithm

Topic: Multimedia, e-learning and computer-based instruction

ID: IPSSW2015-1067
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Aim: Studies have shown that healthcare professionals (HCPs) display a 16-55% error rate in adherence to the Neonatal Resuscitation Program (NRP) algorithm. The aim of this study was to evaluate adherence to the Neonatal Resuscitation Program algorithm by subjects working from memory as compared to subjects using a decision support tool that provides auditory and visual prompts to guide implementation of the Neonatal Resuscitation Program algorithm during simulated neonatal resuscitation.

Methods: Healthcare professionals (physicians, nurse practitioners, obstetrical/neonatal nurses) with a current NRP card were randomized to the control or intervention group and performed 3 simulated neonatal resuscitations. The scenarios were evaluated for the initiation and cessation of positive pressure ventilation (PPV) and chest compressions (CC), as well as the frequency of FiO2 adjustment. The Wilcoxon
rank sum test was used to compare a score measuring the adherence of the control and intervention
groups to the Neonatal Resuscitation Program algorithm.

**Results:** Sixty-five healthcare professionals were recruited and randomized to the control or intervention
group. Positive pressure ventilation was performed correctly 55-80% of the time in the control group vs.
94-95% in the intervention group across all 3 scenarios (p < 0.0001). Chest compressions were
performed correctly 71-81% of the time in the control group vs. 82-93% in the intervention group in the 2
scenarios in which they were indicated (p < 0.0001). FiO$_2$ was addressed three times more frequently in
the intervention group compared to the control group (p < 0.001).

**Conclusions:** Healthcare professionals using a decision support tool exhibit significantly fewer deviations
from the Neonatal Resuscitation Program algorithm compared to those working from memory alone during
simulated neonatal resuscitation.

**References:**
2. Chitkara R, Rajani AK, Oehlert JW, Lee HC, Epi MS, Halamek LP. The accuracy of human senses in
the detection of neonatal heart rate during standardized simulated resuscitation: Implications for
3. Carbine DN, Finer NN, Knodel E, Rich W. Video recording as a means of evaluating neonatal

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**OP 048 – Serious Gaming for Nephrology: Development an Online Virtual Peritoneal Dialysis Simulator**

**Topic:** Multimedia, e-learning and computer-based instruction

**ID:** IPSSW2015-1258

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**Context:** Interest in nephrology as a career choice has declined in recent years, and medical students have
reported nephrology topics as too complex and lacking in relevance [1]. Web-based tools have been shown
to be an effective way to teach complex topics, including the field of nephrology [2-3]. Serious gaming is a
web-based tool that offers the potential to accelerate learning in complex topics. The incorporation of adult
learning principles makes serious gaming very appealing, especially for today’s millennial learners [4].
Here we describe the development of a virtual peritoneal dialysis simulator.

**Description:** Building on our successful virtual mechanical ventilation simulator, we developed a virtual
peritoneal dialysis simulator utilizing expert-derived algorithms and incorporating all elements of managing
a child undergoing peritoneal dialysis. In collaboration with our technical partner, the simulator was built
utilizing the following stages: Discovery, Knowledge Transfer, User Experience Mapping, Design, Application
Development, Quality Assurance & Testing, and Release and Evaluation. The simulator includes a
knowledge guide, short problems to solve (tactics), and case studies. The interface includes opportunities
to examine the patient, monitor vital signs, input and adjust the dialysis prescription, view laboratory
results and the patient chart, and administer medications to the patient (Figure 1).
Observation/Evaluation: The device will soon be deployed on OPENPediatrics (www.openpediatrics.org), a web-based training platform. Robust analytics embedded in the platform will track user actions including user profiles, time spent in simulator, percent of simulator completion, and scoring on tactics and case studies. User surveys will provide qualitative feedback for ongoing formative evaluation.

Discussion: Although still in the development and testing phase, the virtual peritoneal dialysis simulator was modeled after our successful mechanical ventilation simulator, and has the potential for providing an innovative way to teach peritoneal dialysis in a fun and engaging way. Ongoing work is still necessary to validate the simulator, better understand common challenges faced by learners, and further refine the learning experience.

References:

OP 049 – Increasing Environmental Realism and Learner Engagement - Introducing SimHide
Topic: Simulation technology (including novel adaptations of current manikins, technology and hardware/software and development of new hardware or software for simulation-based education)

ID: IPSSW2015-1065
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Context: During in-situ simulation exercises, one factor known to increase the buy-in and sustained engagement of the learners is the extent to which environmental, conceptual and emotional realism can be achieved. The learners should interact with the mannequin during the scenario but ideally, the computer operator and associated paraphernalia should not intrude physically on the simulation space. This is because a visible faculty member sitting behind a laptop, within the clinical area, during a simulated event draws the attention of the learners and reduces authenticity. Our objective was to create a mobile custom hide, which could house all the simulation equipment and disguise the presence of a technician.

Description: We identified which items of furniture at our children’s hospital were large enough (once “gutted”) to accommodate all the simulation equipment; universal to all clinical care areas; and amenable to “gutting”. A tall, double-fronted medical supply cart satisfied these criteria. We undertook a process of design by iterative refinement – a collaborative effort by anesthesiologists, simulation educators and medical engineers. The unit was “gutted” internally, leaving only an external shell, with custom-created sham shelf fronts, to give an observer the impression of well-stocked shelves. The unit includes a subtle viewing window with one way plexiglass which is virtually un-noticeable from outside, but through which the operator, seated in the rear of the unit has an unrestricted forward view. Cameras are mounted on the exterior of the unit with live feed to the operator and concurrent video capture for debriefing and research purposes. Internally, the structure is modified to house every component of the simulation equipment during transport plus a desktop, compressor, shelves and mounted audiovisual control unit. The unit is on wheels so as to be mobile. This description can be augmented by staged photos of the development of SimHide and video of the unit in use.

Evaluation: As a component of our program evaluation, a post-simulation learner survey includes questions regarding engagement, authenticity and believability. We are comparing data for our in-situ sessions before introduction of SimHide to those following its recent introduction and are finding an increase in these scores. More data and formal statistical analysis of these will be available by IPSSW2015.

Discussion: We have created a novel mobile structure for housing, transporting and hiding simulation equipment, audiovisual equipment and a computer operator, whilst still affording that operator a full view of the simulation events. We have demonstrated an increase in the engagement of our learners and improvement in their rating of the realism known to be associated with improved learning experience. The project was completed with minimal budget, increasing the cost-effectiveness of the endeavour.

OP 050 – A Novel Approach to ECMO Training for Nurses in a High Fidelity Simulated Environment

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

ID: IPSSW2015-1099

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Context: Extracorporeal membrane oxygenation (ECMO) is a modality of treatment offering cardiac and/or respiratory support in critically ill patients1. Our institution has an active education program for ECMO nurses, relying predominantly on didactic sessions with wet lab drills to ensure the skills are maintained at
a high standard. The inauguration of a new high fidelity simulation centre has provided the opportunity to modify our ECMO training program within the more realistic setting. Although wet lab drills are frequently used to simulate catastrophic events, the presence of props and personnel required to manipulate the circuit detracts from the fidelity of the simulation, one of the key purposes of team based exercises and learning.

**Description:** Our aim was to design a simulation program with an appropriately high level of realism to enhance clinical authenticity and enable application of wet-lab drills in a realistic patient setting. The simulation space was replicated to match the Children's Intensive Care Unit (CICU) environment using SimJunior™. The ECMO circuit was connected to a reservoir bag placed underneath the manikin. A novel method for remotely inflating intraluminal balloons positioned inside the circuit tubing allowed independent modification of arterial and venous pressures from the control room via concealed tubing fed through a specifically designed sub-floor conduit in the simulation centre. As well as independently manipulating the venous and arterial pressures of the circuit, this method also allowed simulation of massive venous air entrainment. The ECMO console continuously displayed flow rates, revolutions per minute, venous inlet and arterial outlet pressures and pre-programmed alarms which the participants used for troubleshooting. A very high level of authenticity was achieved with the simulation co-ordinator working in tandem with the perfusionist to vary physiological parameters.

**Evaluation/Observation:** A questionnaire using a five point Likert scale (1-strongly disagree to 5-strongly agree) was created to evaluate relevance of material and skill/knowledge gained from the exercise with space for comments and examples as well as open and closed ended questions. 100% of participants (n = 12) strongly agreed that they had gained skills and knowledge from the session, the content was relevant and that the patients of the CICU would benefit from this simulation based training.

**Discussion:** Limited techniques for remote control of the ECMO circuit have been described. Remote inflation from the control room of intraluminal balloons positioned inside the circuit tubing via a subfloor conduit allows manipulation of circuit physiology and utilisation of actual ECMO circuit monitoring parameters. We believe our system which has yet to be described in the literature offers a very high degree of realism in duplicating real life situations.

**References:**

**OP 051 - Developing Educational Applications for New Technology: Google Glass™ in Healthcare Education**

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

**ID:** IPSSW2015-1135

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Overall Goal: To introduce delegates to a new piece of audiovisual technology and allow participants to observe its application in a number of educational and clinical settings. To then work within groups to explore in a hands-on workshop how this technology can be incorporated into attendees educational practice to enhance learner feedback and experience. At the end of the workshop delegates will: 1) have an understanding of the Google Glass™ and its basic function; 2) worked in small groups to develop an educational session using the Google Glass™; 3) understand how new technologies can be used to develop and explore new learning opportunities.

Method of Delivery: The workshop will commence with video-demonstrations of some of the educational uses we have developed using Google Glass™. The main part of the workshop will involve small hands-on practice with the Google Glass™ to develop an educational session which candidates can take back to their base institutions.

Intended Audience: Educators / Technicians – actively involved in the delivery of simulation/clinical workplace based learning within paediatric practice.

Relevance to Conference: This workshop aligns directly with the main theme of the conference – Reaching Out to the Future. The session will demonstrate how new technologies can be used in exciting and innovative ways to help learners and educators expand the educational opportunities available both within simulation and the actual clinical environment.

Workshop Timeline:
- **Introduction:** Faculty and participant introductions, workshop objectives and learner’s experience.
- **Background (15mins):** Introduction to Google Glass™ and video demonstrations of facilitator’s experience of using the technology for feedback within educational and clinical environments.
- **Interactive Session (45mins):** Small group, hands-on participation, to develop innovative ways of using Google Glass™ to promote learning within the educational and clinical environments.
- **Final Summary and Questions (15mins):** Summing up and questions.

References:

PO 001 – Simulation-Based Training in Infant Sleep Position & Conditions of Young Mothers to Prevent SUDI

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

ID: IPSSW2015-1173
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**Background:** In France, there are 250 cases/year of Sudden Unexpected Death of Infancy (SUDI) – stable for the last decade (1). Prone/lateral sleeping positions did not change from 2000 to 2010 (respectively 6% and 12%) (2,3). In 2010, a study found that 98.5% of infants had > 1 risk factor at 3 months (4).

Information about SUDI prevention is routinely given to mothers at discharge from maternity by explaining the risk factors and providing a document. Simulation (one of Kolb’s learning styles) (5) has never been
used for SUDI prevention. A previous regional study did not find any effect on risk factors at 3 months of a 45 min-talk + video on SUDI prevention prior to mother’s discharge (2).

**Hypothesis:** Simulation-based training (SBT) in sleep position/conditions for mothers may decrease the number of risk factors of their infant at 3 months.

**Research question:** Effect of SBT on SUDI prevention: What are the sleep position/conditions at discharge from maternity? At 3 months? Are there any differences between them? Is there any relationship with socio-economic class?

**Proposed methods:** IRB approval (University Hospital of Poitiers and INSERM-CIC 1402). It will be a single-center, **Randomized Controlled Trial lasting** 9 months.

**Objectives:**
1. To measure if SBT for mothers modifies sleep position/conditions of their infant at 3 months;
2. Idem at discharge and D7;
3. To compare findings at 3 months with those at discharge and D7;
4. To study the effect of socio-economic class.

Inclusion: >18yo, primipara, healthy mother + newborn, ability to send pictures (MMS, email), in a 1-bed room, informed consent. Number of subjects: 240.

Current information on SUDI prevention at discharge for all. For SIM+ group (on D2-D5): 1-hour SBT (Ben*, Laerdal®) for: 1) Detection/correction of non-recommended sleep position/conditions of the mannequin in its crib; 2) Choice of sleep position/conditions on the mannequin as if it were their own child. Assessment by checklist. Good-judgment debriefing. For all participants, after D7 and after 3 months: the same letter on recommendations for prevention of SUDI.

**Comparison:** SIM+ vs SIM−; discharge vs D7 vs 3 months.

Primary outcome is sleep position/conditions at 3 months (questionnaire by telephone & picture of the baby in its crib). Secondary outcomes will require: MCQ, picture of infant’s room prior to discharge and at D7 (with baby), information on socio-economic class.

Descriptive data: M±SD. Comparison between groups or times: ANOVA, t-test or Mann-Whitney, and Chi2 for qualitative variables.

**Difficulty encountered:** How to classify discordant answers between questionnaire and picture?

Sending a letter was imposed by the IRB so as to avoid receiving high-risk information without answers. But how to analyze the real effect of SBT?

**Questions for discussion:** We anticipate wrong answers from discharge to 3 months and answers becoming wrong at 3 months. How to interpret answers becoming right at 3 months?

**References:**
PO 002 – Implementation of ECMO Simulation Team Training Programme in Great Ormond Street Hospital

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

**ID:** IPSSW2015-1198

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**Context:** Extracorporeal membrane oxygenation (ECMO) is one of the most complex therapies offered in intensive care medicine. Currently, guidance for training standards is provided by Extracorporeal Life Support Organisation (ELSO).

ECMO support has been established for 22 years in cardiac intensive care unit (CICU) at Great Ormond Street Hospital. The ECMO Simulation Team Training Programme was introduced 5 years ago.

CICU personal attend a 5 day multidisciplinary ECMO course, content includes theoretical teaching and simulation training incorporated in ECMO specialist education.

The education programme for surgical registrars, responsible for emergency ECMO and Extra-Corporeal Cardiopulmonary Resuscitation (ECPR) cannulation in CICU, appears resource poor compared to CICU personal, with no protocolised educational programme.

ECMO cannulation is a complex procedure requiring high surgical expertise. Achieving adequate cannula positioning is an acknowledged difficulty in most ECMO units worldwide. Earlier this year, we acknowledged a need for intervention regarding ECMO cannula insertion by auditing cannula position. To address this, we decided to introduce a quality improvement programme by implementing Simulation Team Training for initiation (cannulation) of ECMO and ECPR in CICU.

**Description:** Emergencies in the CICU require interactions among multiple care providers including physicians (cardiologists, intensivists, surgeons), nurses, and ECMO specialists. Simulation Team Training Programme will be focused on training the multidisciplinary teams performing specific technical competencies, communicating skills and coordinating multiple tasks. Training induction for the surgical team will be provided by cardiothoracic consultant supervising ECMO cannulation. Cardiothoracic surgical registrars will then attend a two day intensive basic course plus two days of advanced simulation. The basic course will address correct insertion and positioning of the cannulas proceeding to initiation of ECMO support. To achieve the best results, we will use variable teaching modalities, video sessions, animal and mannequin models to support initial cannula insertion and correct placement for peripheral and central (open chest) cannulation. Advanced course will address trouble shooting during complicated ECMO runs and multidisciplinary ECPR team simulation. Introducing the team training will improve general understanding of the difficulty of the cannulation process.

**Evaluation and discussion:** Results and improvement will be monitored by surveys aiming for reduction in incidents concerned with ECMO cannula position.
Cannula position (chest X-ray and ECHO), rate of repositioning, complication rate and timing of team work during ECPR will be monitored by consultants throughout one year post training.

We expect that multidisciplinary Simulation Team Training Programme will improve knowledge and level of confidence for ECMO initiation and ECPR among participants.

References:

PO 003 – Innovations in Simulation and Deliberate Practice in a Resource Conscious Model

Topic: Debriefing and teaching methodologies

ID: IPSSW2015-1148

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**Context:** The interactive and engaging environment of simulation is well recognized as a powerful teaching tool for both communication and teamwork skills as well as clinical skills. However, resource barriers of financial cost and faculty time can limit the use of simulation. We know that learners’ experience is enhanced through deliberate and repeated practice.(1) This repetition which is so important also increases the financial burden, as the simulation must be run twice for each group of learners.

In developing a new model, a focus on the premise of deliberate practice was maintained and enhanced. The idea was to create a more efficient design to traditional simulation (simulation, debrief, repeat) that enables learners to practice and apply a set of skills three times back-to-back.

In addition to being conscious of faculty time and cost of using simulation center resources, this simulation intervention introduces learners to team-based stations and transitions them to concepts of teamwork early in their training.

**Description:** In this new model learners rotate through a series of four stations. At each station scenario objectives are supported through a variety of interactive means. In the self-guided Skills Station learners are presented with a hands on clinical task or physical exam skill. Next the go to the Observation Station where they watch a group of their peers complete a scenario live on video. This is primed observation in which a checklist is provided to the group for them to give objective, as well as constructive feedback to their peers. In addition, the checklist provides a mechanism to stimulation conversation amongst the learners about the scenario which they are watching. Then the learners proceed to the simulation scenario. Outside the room is a door chart giving them final background information on the simulation setting and patient. During the scenario the have fifteen minutes to perform a history and physical exam, as well as develop an assessment and plan. Learners verbalize their findings and discuss the encounter out loud, thus aiding the understanding of the group watching on video. Lastly, learning participate in a self-guided debrief in the Post Encounter Station, again a checklist helps promote self reflection and prompts pertinent discussion points.

**Observation/Evaluation:** Data has been collected over the past three year and has included surveys of students both reflecting on their own experience and of their peers. This feedback mechanism has been an important part of instruction. Future evaluation will include comparing this model directly with traditional simulation models and traditional classroom models such as lecture and flipped classroom teaching.

**PO 004 – A Novel Milestone-Based Evaluation Tool for Pediatric Resident Simulation**

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

ID: IPSSW2015-1059

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**Context:** Simulation has been identified as a method for improving patient safety and quality through teamwork and communication training. In addition, simulation provides exposure to a wide array of situations to supplement real-life clinical experiences, especially for events that are rare or high-risk. This is particularly true in Pediatrics, and thus, simulation has become an integral aspect of pediatric resident education. Simulation allows residents to gain experience without harm to a patient, provides a structured opportunity to evaluate resident interpersonal communication and clinical performance, and permits immediate debriefing. The Accreditation for Graduate Medical Education (ACGME) has developed “The Pediatric Milestone Project” for evaluating pediatric resident competencies in patient care, medical knowledge, professionalism, interpersonal skills, systems-based practice, and practice-based learning and improvement. These milestones are evaluated throughout resident education with the goals of measuring proficiency and progression from internship through the end of resident training. Simulation is a valuable
venue to use in the evaluation of resident communication and clinical competency, and is a novel way to incorporate the new milestone-based assessments.

**Description:** In our residency program, we have created standardized in situ simulations for our residents and a unique evaluation tool for each scenario based on selected core competencies from the Pediatric Milestone project. Selected competencies include: interpersonal and communication skills, professionalism, patient care, and systems-based practice. Residents are evaluated on their performance during cases such as: stabilization of a patient with myocarditis, an infant with croup, a child with head trauma, and a death and dying scenario with difficult conversations.

**Observation/Evaluation:** Prior to this project, our residents were completing evaluation of the simulation experience but we did not have any individual assessments of the residents themselves. These milestone-based evaluations provide a means to track resident competency and document objective data regarding milestone-based performance. The simulations take place twice weekly and each resident participates several times annually, which will provide a wealth of data with which to track resident performance within the residency program. We will present our experience using these evaluations, how they have enhanced our simulation training and competency assessments, and the impact on individual resident performance in interpersonal communication, patient care and medical knowledge.

**Discussion:** Milestone-based evaluations during resident simulation provide an objective, controlled measurement of competency, communication and interpersonal skills. The end result will allow us to better tailor our education of pediatric residents to improve patient safety and quality.

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**PO 005 - Can Multidisciplinary Simulation in a Paediatric Department Improve Clinical Governance?**

*Topic: Patient safety and quality improvement*

ID: IPSSW2015-1061

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**Introduction:** Simulation is increasingly becoming an integral part in pediatric teaching. It offers the opportunity to practice medical emergencies in a safe environment and allows addressing human factors that are pivotal in safely managing the critically ill child. However, multidisciplinary simulation in our pediatric unit has also facilitated discussion about clinical governance issue within the wider institution.

**Objectives:** To demonstrate whether multidisciplinary simulation program in pediatrics addresses clinical governance issues.

**Methods:** From May to August 2014 ad hoc in house multidisciplinary simulation sessions were conducted in the pediatric department of a London university hospital. These involved medical and nursing staff of all levels from the pediatric, anesthetic, radiology and emergency medicine team. The simulation sessions were held on pediatric wards and in the emergency department. Faculty members were resuscitation officers, pediatricians, anesthetists and nurses with experience in conducting simulation. SimBaby® and SimMan® models were utilized. A tablet was used as vital signs monitor while a smart phone served as a remote control to make changes depending on learning goals and participants’ performance. The sessions lasted 20-25 minutes; followed by debrief for another 20 minutes. Immediate feedback on the simulation sessions and learning points was obtained. Written summary of the scenario including learning points were circulated to all participants. The quality, the usefulness and the conduct of the simulation were evaluated in a feedback form.
Results: In total, thirteen simulation sessions were held over a five month period and there were 11 attendees per session (range 6-17). Simulation sessions were rated from good to excellent in 96.5% of responses. During immediate discussions, areas of concern were identified. These included clinicians’ performance, human factors and clinical governance issues. Governance risks included inadequate resuscitation equipment, access to emergency lifts, and the quality of emergency activation system. These were escalated to the divisional management team and appropriate steps were taken to address them and minimize the risk to sick children.

Conclusion: Multidisciplinary simulation sessions are an important learning tool in addressing human factors that are crucial to successfully manage the critically ill patient. At our institution multidisciplinary pediatric simulation has demonstrated it is key in identifying and addressing clinical governance issues. This is fundamental in minimizing clinical risks and thus improving patient safety.

References:

PO 006 - A Different Perspective: Incorporating Patient Actors and Family Members into Systems Simulations

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Background: The use of actors in medical and communication simulations has been previously reported.1-5 The incorporation of actors or family members into systems testing has not been described. In-situ systems simulation testing can identify latent safety threats, test processes and workflows before patients or families are placed at risk. Incorporating actors or real family members may optimize the realism of these scenarios and garner a unique perspective.

Objective: To evaluate the impact of patient actors and family members on the realism of in-situ simulations for systems testing and to identify their effect on identified latent safety threats.

Methodology: Simulation-based systems testing was conducted for a new inpatient psychiatric unit. Seven patient care scenarios were created with psychiatric content experts, incorporating common and high risk patient and staff situations. Patient actors and family members were recruited to participate. During the simulations, observers recorded identified patient safety threats. Each threat was reviewed by a clinical and facilities expert and categorized according to the level of risk (e.g. critical - needs mitigation prior to training, high - needs mitigation prior to opening), themes (e.g. communication, equipment) and role of identifier (e.g. staff participant, actor). Anonymous surveys were collected from participants, actors, family members and observers at the conclusion of the event.

Results: There were 58 participants, including 3 family members and 7 patient actors. All participants identified that the inclusion of actors and family members enhanced realism [mean 4.67 (0.48)] and made the simulations more effective at identifying potential patient safety threats [mean 4.58(0.58)] on a Likert scale 1= strongly disagree to 5= strongly agree. In total, 544 unique patient safety threats were identified, 122 (22%) of which were classified as critical or high risk. Themes included critical alarm failures, communication failures secondary to a larger physical space and disruptions in clinician workflow. Patient actors and family members recorded 62 safety issues, 92% of which were not documented by other participants. These included high risk areas for patient self harm, environmental factors increasing the risk of harm during agitated patient escalations and risks for patient concealment or evasion. Actors and
families focused on patient care related concerns (34/57 unique issues) more than environmental issues (14/57). Staff equally identified patient care (180/435) and environmental issues (180/435).

**Discussion/Conclusions:** Actor and family member participation enhanced the realism of the scenarios and was well-received by all participants and observers. Patient actors and family members identified 57 unique latent safety threats, not noted by staff participants or observers, which were able to be mitigated before patients, families or staff were placed at risk.

**References:**

**PO 007 – Training to a New Massive Transfusion Process Using Interprofessional In Situ Simulation**

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

ID: IPSSW2015-1220

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**Context:** Massive transfusion therapy requires rapid and complex actions involving multiple staff members and disciplines to provide life-saving therapy. In a tertiary children’s hospital that does not receive frequent trauma patients, we developed and implemented a massive transfusion protocol in 2012. Simulation events in all three intensive care units were used to educate staff on the specifics of the protocol. We sought to assess whether our simulation events around this process resulted in learning specific goals specified as learning objectives.

**Description:** We performed 9 massive transfusion simulation events, involving multidisciplinary staff, over a 5 month period from February to June 2014. Scenarios were adapted to provide clinically relevant patient experiences where massive transfusion was required. Each scenario involved use of a high-technology manikin employing a drainage system to allow intravenous delivery of large quantities of dyed fluid. Participants were expected to recognize hemorrhagic shock, deliver large volume of warmed blood products, send emergency bleeding laboratory studies and manage transfusion related complications, such as hyperkalemia. Standard debriefing and continuous process improvement efforts were performed.
at all events. Following this period, survey data of specific key learning skills was anonymously collected and analyzed.

**Observations:** One hundred thirty-two staff participated in the massive transfusion simulation events. Thirty-seven staff members responded to the survey (28%). Responders included staff attendings, fellows, nurses and respiratory therapists. Eleven process variables were chosen and responders were asked to determine for each process i) good understanding prior to simulation ii) better understanding based on simulation iii) didn’t understand well after simulation iv) not a skill required to learn. Examples of process metrics include how to used blood warmer, how to safely and rapidly administer large volumes of blood products during an emergency and how to send emergency transfusion laboratory studies.

Results of these and other process metrics showed substantial improvement (>50% of participants reporting new learning) in 5 of 9 metrics. Overall 80% of responders found the experience very valuable, 19% rated as somewhat valuable, and 1% not valuable.

**Discussion:** Simulation-based learning of a complex algorithm for massive transfusion requires substantial organizational effort and resources; therefore, it is crucial to determine the efficacy and clinical impact of such training. We were able to show learner-based improvement in specific key learnings as the first step in determining the value of this type of simulation in our institution. Engagement and empowerment of staff in process improvement by actively allowing interval improvements was more difficult to measure, however, the vast majority of staff requested this method of learning in the future.

**References:**


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PO008 – Simulation Process Informs Optimal Equipment Selection
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**Topic:** Innovation/ Future Direction and Outreach Simulation

**ID:** IPSSW2015-1212

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**Context:** A serious safety event review identified that airway equipment issues including non-standardized equipment and use of old technology contributed to an adverse patient outcome. We sought to 1) actively engage staff in process improvement and 2) rapidly and rationally select the best equipment.

**Description:** We developed a rigorous process to pursue the best replacement option for laryngoscope blades and handles with input from multiple disciplines in a blinded comparison. First we sought expert opinion on available models of blades and handles with light-emitting diode to mitigate bulb failure as a contributor to malfunction. Then we obtained various models and narrowed the choice based on cost, environmental considerations, availability of neonatal and pediatric blades and compatibility with other “green-line” equipment already in use. We then invited participants including all those who could be expected to perform direct laryngoscopy to a self-directed simulation. Two mannikins of each size range
Observations: Fifty-seven participants evaluated blade/handle devices, 39 of whom performed written evaluation of the devices, 69% attending level physicians, 13% fellow level physicians, 10% resident level physicians, and 8% nurses or respiratory therapists on neonatal transport team. Represented disciplines included were anesthesiology, otolaryngology, pediatric intensive care, neonatology, pediatric emergency medicine, pediatric residents, respiratory therapists and neonatal nurses who participate on transport team. Three hundred sixty-eight total evaluations were performed, 136 (37%) on neonatal mannikins, 120 (33%) on toddler/child mannikin, and 112 (30%) on adult mannikins. The results were decisively in favor of one blade/handle over (86% versus 14%) compared to the other and allowed for consensus on purchasing decision.

Discussion: Simulation based evaluation of equipment allowed several benefits to the selection process including 1) hands on evaluation of functionality of equipment 2) direct comparison between equipment options 3) engagement of large group of multiple disciplines to allow broader range of opinions 4) reinforcement of importance of practice and technique by bringing focus to specific skill and 5) empowerment of staff to be part of the selection process.

PO 009 - Simulation-Based Workshop on Teamwork Skills for Otolaryngologists: Resources, Challenges and Impact

Topic: Faculty development

ID: IPSSW2015-1247

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Background: Management of airway emergencies requires the expert application of knowledge, judgement and the simultaneous execution of the technical skill necessary to secure the airway. Beyond this however, these critical events are managed by interprofessional teams where crisis resource management is known to impact patient outcome. In order to forge collaborative links between those disciplines that must work effectively together during a loss-of-airway emergency, our group brought a simulation-based team training workshop to an international pediatric otolaryngology conference. This gave delegates the opportunity to go beyond the rehearsal of technical skills necessary to rescue an airway, and explore the complex team dynamics that arise during such cases.

Methods: Conference break-out rooms were converted to simulated clinical environments via a number of innovative solutions. The scenarios were designed to elicit and emphasise the multidisciplinary complexities of airway emergencies and were piloted as part of our institutional in-situ team training program. Customized task trainers were created to allow delegates to perform technical skills during these hybrid simulations.

Eight of the 34 delegates were recruited as active participants. They worked in pairs in each of the scenarios. The remaining delegates were divided in groups to observe via a one-way glass and live video feed with a facilitator present to guide active observation.

Structured debriefing followed each case to facilitate discussion and encourage reflection. Participants completed a questionnaire at the end of the session to document their views on team training exercises,
the perceived benefits and potential impact of the workshop. Descriptive statistics were applied where applicable. Qualitative assessment of the responses to the open ended questions determined recurring themes.

**Results:** The completion rate of the questionnaire was 71%. 100% either agreed or strongly agreed that it is important to assemble real life teams for interprofessional training, and for this to occur in the actual clinical environment. Greater than 90% either agreed or strongly agreed that the simulation activity increased their confidence in the management of similar situations in the clinical environment, that the simulation session was of direct benefit to their clinical practice, and the simulation was authentic and believable. 100% would recommend co-workers attend a simulation session.

**Implications:** We successfully highlighted the interplay of technical and non-technical skills required in a pediatric airway rescue in the context of an international pediatric otolaryngology conference. The impact was significant for the participants and observers. Resources required for this type of event were significant and required thoughtful planning and organization.

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**PO 010 – Human Error Learning in Paediatrics (HELP): A Paediatric Inter-Professional Human Factors Course**

**Topic: Crisis Resource Management/Human factors and Teamwork**

ID: IPSSW2015-1114  
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**Context:** 10% of patients admitted to hospitals experience adverse incidents, half of which are preventable. Human error plays a significant role with communication failure the leading cause. Key healthcare stakeholders are committed to improving patient safety through integration of human factors principles and practices into core education and training curricula for healthcare professionals. Such training aims to optimise human performance and limit human error. Formal clinical human factors’ training is yet to be established within Yorkshire Paediatrics. Recognising this, we have developed a one-day inter-professional course to raise awareness of human factors in human error, provide potential strategies to minimise clinical risk and promote inter-professional learning.

**Description:** Our one-day HELP course will be integrated into the regional level 1 Paediatric, trainee Advanced Neonatal Nurse Practitioner and Paediatric Nurse Practitioner teaching programmes from January 2015, facilitated by an experienced inter-professional faculty trained in human factors. Each course can cater for a maximum of 20 delegates. Varied teaching modalities will be employed including small group tasks, real critical incident re-enactment and multi-disciplinary immersive simulated scenarios. Sessions focus on effective communication, teamwork and leadership, stress, fatigue, distractions, situational awareness, authority gradients and risk management. Videos and examples from healthcare, aviation and everyday life will be incorporated to highlight key learning points.

**Observation/Evaluation:** Course evaluation will be achieved qualitatively using Likert scales and quantitatively using a knowledge-based assessment. Both will be employed using a pre and post-intervention design. Data will be analysed to identify the difference between pre and post course candidate confidence and knowledge. We will be looking for statistical significance using Chi squared test.

**Discussion:** Human factors’ training has shown success in other high-risk industries. This course should promote Paediatric healthcare professionals to recognise and mitigate clinical risk thereby improving patient safety. The long-term aim is to deliver human factors training to all Paediatric staff to improve team
dynamics and performance, disseminate learning from error and to limit the incidence and impact of adverse events.

References:

PO 011 – Paediatric Preparation Day: Smoothing the Transition for GP and Foundation Trainees

Topic: Simulation for procedural and psychomotor skills

ID: IPSSW2015-1107

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Context: The transition from medical student to junior doctor is stressful. Since 2005, all newly graduated doctors in the UK undergo a 2-year Foundation programme, a mandatory pre-requisite before application to General Practice (GP) or speciality training. Despite this, many junior doctors have limited clinical paediatric exposure. As traditional teaching methods including ‘see one, do one, teach one’ become increasingly unacceptable, technology enhanced learning is being advocated to improve healthcare quality and patient safety. Whilst paediatric trainees have extensive access to simulation training in Yorkshire and the Humber, no such opportunities exist for Foundation and GP trainees, who rotate through paediatric placements sharing equal responsibilities. A recent survey revealed that 52.7% of GP and Foundation trainees did not feel adequately prepared for their clinical duties after hospital induction programmes, highlighting a specific training need.

Description: We designed a novel regional one-day course for GP and Foundation doctors rotating into paediatrics. Trainees were given the opportunity to observe and practice fundamental paediatric procedural and resuscitation skills in regional simulation centres using part-task trainers and low-fidelity manikins under the supervision of six paediatric simulation fellows. Each course catered for a maximum of 18 trainees, who rotated through two large group interactive sessions and six small group stations addressing history taking, safeguarding, newborn examination, paediatric and neonatal life support, prescribing, lumbar puncture, cannulation, venesection and intra-osseous access. Each session lasted 45 minutes.

Observation/Evaluation: Course evaluation was achieved through a comparative pre and post-test design using trainee confidence levels and a bespoke MCQ to assess knowledge acquisition for qualitative and quantitative data respectively. 58 doctors attended four pilot courses. Complete pre and post-course comparison data was achieved from 57 trainees. The mean MCQ score rose from 60.7% (95% confidence interval, 58.5% to 62.9%) to 83.9% (82.4% to 85.3%), p<0.0001. Although statistically significant increments in mean confidence levels were demonstrated for every skill, the largest increases were associated with performing lumbar punctures, paediatric and neonatal life support, cannulation and venesection.
**Conclusion:** This simple intervention has facilitated both improved knowledge and confidence of Foundation and GP trainees ahead of paediatric rotations, which should smooth the transition into their new role. The opportunity to practice skills in a safe environment without the risk of patient harm is highly desirable in modern healthcare. Following the success of our pilot courses, our bespoke Paediatric Preparation Day course will be adopted on a regular basis, which should serve to complement hospital induction programmes, enhance trainee performance and patient safety.

**References:**
2. The UK Foundation Curriculum. March 2014

**PO 012 - Pediatric Haematology-Oncology Simulation Program Development at Starship, Auckland, New Zealand**

**Topic:** Crisis Resource Management/Human factors and Teamwork

ID: IPSSW2015-1245

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**Context:** At Starship Children’s Hospital some of the most unwell children (outside of the Pediatric Intensive Care Unit) are cared for on the Pediatric Haematology Oncology ward, which is somewhat geographically isolated from the Pediatric Intensive Care Unit (PICU). Early recognition and management of the deteriorating child and management of an acute medical event are key requirements of staff working on this ward. Previous ward training has focussed on the management of specific oncology conditions and recent sentinel events have spurred the development of the in-situ Oncology simulation based training program which incorporates clinical scenarios unique to this environment, including chemotherapy related events and events related to profound immnosuppression.

**Description:** There were challenges encountered in building a sustainable oncology program. These included:
- Introduction of crisis resource management (CRM) to a team with little experience in simulation
- Growth of local faculty within a small and highly specialised team
- High occupancy resulting in limited availability of in-situ bed space
- High clinical workloads required program delivery within tight time constraints

**Evaluation:** A series of 3 hour CRM courses have been delivered, training a large proportion of the multidisciplinary team on the ward.

We will present the evaluations from these courses and a number of systems improvements and other educational initiatives that have followed the CRM courses.
Discussion: This presentation will also detail the strategies developed to overcome these challenges, and discuss the identified issues, interventions and resolutions that have improved patient safety. These findings should serve as a useful framework for the expansion of other Haematology – Oncology simulation practitioners and CRM development in this area. We will discuss our plans for future development and outcome measurement.

PO 013 – A Novel Code Team Leader Identifier

**Topic: Crisis Resource Management/Human factors and Teamwork**

ID: IPSSW2015-1035

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**Context:** Code team leader identification has been a long-standing problem in both simulated and real-life acute care situations. Multiple studies have demonstrated delays in intervention and errors in communication as a result of poor code team leader identification. A variety of solutions have been proposed and implemented with varying rates of success. These have included visible identifiers such as headwear, lanyards, signs, etc. to better recognize the code team leader. While these objects may have been successful in visually identifying the leader, health professionals have been reluctant to use them and they have not provided any secondary utility beyond identification alone. Our objectives were: to 1. Develop a tangible object that would clearly identify the code team leader, and provide value beyond just visible identification, and 2. Evaluate the effectiveness of this innovation in enhancing code leader identification.

**Description:** We developed a Code Team Leader Card (CTLC) to clearly identify the leader to the rest of the code team while simultaneously providing valuable information to the leader - the PALS algorithms (see attached image). The CTLC provides the added benefit of occupying the team leader’s hands so that he/she is more likely to step away from the bedside and focus on running the team effectively rather than attempting to assist with specific tasks. The CTLC is a double-sided, 18 x 12 inch card that is mounted on firm cardboard. The AHA PALS algorithms are printed on both sides of the card with a fluorescent orange border to make the card more visible. The CTLC is located on the code cart for easy access during an acute situation.

**Observation/Evaluation:** In order to test the effectiveness of this innovation, we analyzed survey data from our pediatric residents who participated in scheduled simulations. In particular, we focused on the question “Was a leader clearly identified by all team members?” The question was scored as Never, Inconsistently or Consistently. For purposes of analysis, we recoded the question scores as: whether a leader was never or inconsistently recognized (0) or consistently recognized (1). The relationship between time (before and after the CTLC) and consistent leader recognition was evaluated using a chi-square analysis. 131 residents completed surveys prior to the introduction of the CTLC (April 2011 to April 2013) and 41 residents completed surveys afterwards (September 2013 to March 2014). Consistent recognition of a team leader increased significantly from 61.8% (n=81) pre-CTLC to 80.5% (n=33) after introduction of the CTLC (p=0.027).

**Discussion:** Team leader identification has been a long-standing problem in simulation without an obvious solution. We present the Code Team Leader Card as a novel innovation to solve this problem. Furthermore, the CTLC may also enhance team leader performance by occupying his/her hands and providing essential information in the form of the PALS algorithms.
PO 014 – Closing the Gap: Improving Paediatric Resuscitation Skills in Queensland Using the RMDPP Program

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

ID: IPSSW2015-1182

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Context: The outcomes of paediatric cardiac arrest are known to be poor. A number of coroners reports into childhood deaths in Queensland, Australia have identified factors which suggest the children in question’s clinical course may have been different had earlier identification and treatment of their condition been available. Australian national safety and quality health service standard nine compels hospitals to ensure staff have adequate training in the recognition and management of the deteriorating patient.

Description: Children’s Health Queensland wanted to develop a short, basic paediatric life support course that encompassed education on the recognition of deterioration in a child’s clinical condition using locally available early warning tools, the basic practical skills required in paediatric resuscitation, methods for ensuring safe handover and an introduction to the principles of crisis resource management. Though developed by a team at the Royal Children’s Hospital, Brisbane, this course had to be applicable and relevant to all facilities caring for children throughout the state. The “Recognition and Management of the Deteriorating Paediatric Patient” (RMDPP) course that we developed incorporates eLearning, case based discussion, practical skills sessions using part task trainers and immersive scenarios which can be run in high or low fidelity based on the resources of the host facility.
Observation/Evaluation: Each participant fills out a 2-page evaluation form incorporating both Likert type ratings and free text responses. Curriculum development is overseen by a steering group, which is composed of clinicians and educators from across the state. On a program level we monitor the frequency and quality of courses delivered at all sites with both participant feedback and regular team presence at externally delivered courses.

Discussion: We describe a multimodal 4hr basic paediatric life support course that is adaptable to the requirements of vastly different clinical environments and is deliverable on a train-the trainer basis by a heterogenous faculty group. The course uses both part task trainers and immersive scenarios to support the knowledge, skills and attitudes required to provide immediate care to a rapidly deteriorating paediatric patient. We describe a train-the trainer model of delivery for this course and outline an approach to quality control of the product.

This poster is an update on a previous poster presented at SimHealth 2014 in Adelaide, Australia by the same authors.

All Authors are employees of Children’s Health Queensland but have no other financial conflict of interest. IRB review was not applicable to this project.

PO 015 – All About SimGHOSTS: The Gathering of Healthcare Simulation Technology Specialists

Topic: Innovation/ Future Direction and Outreach Simulation

ID: IPSSW2015-1092

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Healthcare simulation technology is an essential component and emerging standard in healthcare education & training. Simulation technology is expanding and changing at an exponential rate, both in terms of equipment and in global reach. There is a profound and often unrecognized need for a professional to design, operate, and maintain these technologies. Simulation Technology Specialists serve a key role in enabling clinical educators to focus on the educational goals of these programs. Simulation Technology Specialists have a unique skill set and require advanced and continuing education to run simulation effectively. Started in 2011, The Gathering of Healthcare Simulation Technology Specialists is now a 501(c)3 non-profit organization that has been formed to foster excellence in this emerging professional field.

The purpose of this podium presentation is to demonstrate the worth of hiring a part-time or full time sim tech, and the resources that are available through SimGHOSTS to get newly hired technical staff trained in the operations of this new emerging profession. We will demonstrate the increased growth of medical simulation labs and highlight centers that have had increased utilization and performance outcomes due to the hiring of technical staff (from small one lab programs to massive multi-institutional buildings).

For the first time in 2014, SimGHOSTS provided two hands-on training events in both the United States at the American College of CHEST Physicians and in Australia at the University of the Sunshine Coast. Through these events over 300 Sim Techs from around the world joined together for seven days of hands on training including manikin programming, hardware maintenance and repair, moulage, overcoming IT issues and A/V system bugs, operating procedure manual development, medical terminology and much much more. This rapidly growing organization is dedicated to expanding the technical resources of the international healthcare simulation community. The implications of the demonstrated need to provide a sim tech and the need to support this emerging profession have world-wide and lasting implications for the
PO 016 – Simulation – Benefits of Traumatizing Administration

*Topic: Innovation/ Future Direction and Outreach Simulation*

ID: IPSSW2015-1055

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**Objective:**

1. To expand on the use of interprofessional simulation in pediatric resident education.
2. To provide perspective of front line clinical care to present and future health care administrative leaders to enable a greater understanding of the resources required for high quality emergency pediatric care.

**Methods:** Three interprofessional simulation sessions were conducted in a tertiary pediatric Emergency Department (ED) demonstrating complex, resource intense scenarios. Interprofessional teams provided clinical management of the scenarios. The Chief Financial Officer (CFO) and a class of Masters of Health Administration (MHA) students observed and debriefed on the cases. MHA students provided a budget reflective of the resources utilized in the cases, and completed a survey on the utility of the exercise.

**Results:** Forty health professionals and support staff participated in the scenarios, with sixty MHA student observers. The MHA students confirmed that the exercise was very useful, noting reading the textbook and facilitated discussion are insufficient to understand resources needed for complex care in the ED. The exercise increased their confidence to make decisions for resource allocation in their future roles (figure 1). They described the experience as “powerful”, “stimulating”, “realistic”, “memorable”, “exciting” and “important”.

**Discussion/conclusion:** Decision-making processes for resource allocation are enriched with deeper understanding of the complexity of meeting these challenges. Simulation can be used to provide evidence to justify allocating resources and future planning towards improving front line care.
PO 017 – Modification of the Simulation Effectiveness Tool (SET-M)

Topic: Debriefing and teaching methodologies

ID: IPSSW2015-1244
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Description/Context: The Simulation Effectiveness Tool, designed in 2005 by METI, now requires modification and re-establishment of reliability and validity. This tool is completed following simulated clinical experiences to help educators better understand how effective this teaching experience is. Initial reliability and validity of the SET was established by The Ohio State University, resulting in the establishment of two sub-categories of Learning and Confidence. Since that time, understanding of how to best utilize patient simulation has evolved. The Standards of Best Practice: Simulation were published in 2011. Terminology has changed, the meaning of words has changed and the focus is heavier on outcomes. This quickly changing and evolving teaching method requires that tools used to evaluate effectiveness must be kept up to date. With this in mind, the researchers have updated the SET and seek to re-establish reliability and validity.

Observation: The 13-item tool has been increased to a 19-item tool with a heavier emphasis on debriefing and the addition of a pre-briefing section. The additional items were developed by a small group of
experienced simulation educators who included common terminology from the BSN Essentials and QSEN documents. IRB approval has been obtained and data collection will began September, 2014. In collaboration, two large US nursing schools will provide access to a sample of 1000 undergraduate nursing students who are in a clinical course utilizing patient simulation as a teaching strategy. Demographic and descriptive data will be obtained.

Data will be analyzed for 1) descriptive statistics; 2) demographic information, to include frequency of response for age, gender, level of student in program, type of course, and work experience; 3) construct validity to include exploratory factor analysis for subscale identification (in comparison with original tool), internal consistency analysis with Chronbach’s alpha, and relationships between each of the subscales by Pearson Correlation coefficients; 4) evaluation of missing data responses using Pearson Chi-square tests to determine if there was a difference in those who responded and those who did not based on demographic characteristics; and 5) independent samples t-test to determine if differences existed when the demographic variable is continuous.

Discussion: This presentation will share the psychometric analysis of the tool modification.

PO 018 – Open Access or Predatory Journal? Writer Beware!
Topic: Faculty development

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Context: Preparing, submitting, and revising manuscripts for journal publication can be an onerous process for healthcare simulation leaders. Open access publishing opportunities have grown over the past decade as a result of the desire to widely disseminate scientific knowledge, especially that produced as a result of government funding. More than 8,000 open access journals exist a mere ten years after the Berlin Declaration on Open Access to Scientific Knowledge, approved in 2003 (Schopfel & Prost, 2013). According to Forgues and Liarte (2013), the growth of OA has been even steeper, more than doubling to over 10,000 journals between 2009 and 2013. However, this movement toward accessibility has created an open door for predatory journals to lure authors.

Description: Predatory journals, while estimated at only 3% of the OA journals currently in production (Forgues & Liarte, 2013), employ questionable marketing tactics that promise rapid publication for a fee (Beall, 2013). According to Beall (2014), the number of predatory publishers has grown from 18 in 2011 to 477 in 2014. Investigation into these publishing opportunities yield information that is in opposition to the Committee on Publication Ethics’ (COPE) Conduct of Conduct and international standards (COPE, 2014).

Observation/Evaluation: Predatory publishing practices will impact the individual author as well as the state of simulation science and practice. While an expedited review and publication is desirable, these companies function for profit and often without any semblance of peer review. It is invaluable for the simulation community to be aware of these and other concerns and how to avoid these practices. This presentation will compare traditional, OA, and predatory publication processes. The focus will be on identification and avoidance of pitfalls associated with predatory publications.

Discussion: One of our greatest charges as simulation experts in pediatric healthcare and beyond is to positively impact patient outcomes. While vital that our efforts and results be disseminated to the greater healthcare community, it is crucial to the process that we avoid predatory publishing ventures. Whether a
new or seasoned author, benefit from this presentation that identifies the red flags associated with predatory publishers.

References:

PO 019 - Consistency in Facilitating Learning: Development of the Facilitator Competency Rubric (FCR)

Topic: Faculty development

ID: IPSSW2015-1221

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Context: Many variables that must be identified and controlled for when planning research involving simulation. This increases the challenge of evaluating learner and program outcomes while hindering attempts to move toward high-stakes testing. Facilitators learn in a wide variety of ways: 1-5 day courses, certificate programs, journal articles, conference presentations, books, observation, and often by trial and error. Facilitator variability is one of the most concerning aspects of study design. There are currently no evaluation tools available to objectively evaluate simulation facilitators.

Description: A training program, including online, face-to-face didactic, and hands-on training was completed at multiple campuses (11) of a US undergraduate nursing school. It was determined that a method of objective evaluation was not available so would therefore need to be created.

A novice-to-expert approach (Benner, 1984) was used as the foundation for the development of a rubric with categories of Beginner, Advanced Beginner, Competent, Proficient, and Expert. The main concepts are Preparation (7 items), Pre-briefing (4 items), Facilitation (6 items), Debriefing (8 items), and Assessment (4 items). Each item was determined by a group of experienced simulation faculty.

Observation/Evaluation: Due to concern that the rubric would become overwhelming to use, the developers determined that the most important outcome was to identify the competent facilitator, the one who needed additional training and mentorship and the expert facilitator who would be able to provide that assistance. The rubric was therefore changed to have three categories: 1) Beginner/Advanced Beginner, 2) Competent, and 3) Proficient/Expert. The rubric was presented during recent conferences, during which participants were asked to work in small groups to develop the rubric items, differentiating between the expectations in each category. The tool is now under review of an expert panel. Following IRB approval, data collection will commence for psychometric analysis.

Discussion: The Facilitator Competency Rubric (FCR) is needed in order to determine competency levels of simulation facilitators. The rubric will undergo two pilot studies: 1) identify wording, clarity, confusion concerns and time to complete; 2) test-retest reliability. Following any necessary adjustments, a sample size of 1100 faculty facilitators will be asked to undergo evaluation by experienced simulation nursing
educators after inter-rater reliability has been established. Statistical analysis will include frequency distributions and standard deviation for each item, Chronbach’s alpha coefficient for each subscale, confirmatory factor analysis, descriptive statistics, and ANOVA between subscales and appropriate variables.

This presentation will include the results of the psychometric analysis and recommendations for use of the tool.

References:


PO 020 – Hybrid Simulation for Resident Nutrition Education

Topic: Innovation/ Future Direction and Outreach Simulation

IPSSW2015-1045

Dawn Taylor Peterson¹, Sue Teske², Amy Morse², Amber Q. Youngblood³, Lynn Zinkan³, Nancy Tofil¹

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Context: Medical schools are often unable to include a thorough module of study for nutrition in undergraduate medical education. We find that physicians begin their pediatric residency feeling inadequately trained regarding the intricacies and issues of pediatric nutrition. While written data is shared alerting residents to clinical signs of potential nutrient deficiencies, they are unsure of how to integrate this information into direct patient care. Our simulation center partnered with the clinical nutrition staff in our facility to design and develop simulations for residents to specifically address this content deficit.

Description: Learning objectives for this simulation course were defined based on a needs assessment of pediatric residents and medical students at Children’s of Alabama, and competencies were identified from the general pediatric certification exam of the American Board of Pediatrics. The ultimate goal in designing the course was to prepare pediatric residents to safely and appropriately provide evidence-based nutrition care to patients. The objectives of the simulation are as follows: 1) eliciting and evaluating a detailed age-appropriate nutrition history, 2) recognizing pertinent nutritional dilemmas that can arise from low socio/economic status and ineffective patient education, 3) describing the content of various infant formulas and indications for their use, and 4) recognizing the signs, symptoms and risk factors of nutrient deficiencies (zinc, essential fatty acids, and selenium) in children with failure to thrive. This one hour hybrid simulation course is currently scheduled once a month for residents on their general inpatient service rotation. An infant manikin is used for the patient, and a simulation educator is the simulated parent who provides symptoms and history when prompted. Typically 4 to 5 residents attend the course. After each simulation, residents complete a standard simulation course evaluation.

Observation / Evaluation: Twenty-three residents have participated in the course to date. Residents reported having learned the following: How to take a good nutritional history, How to check essential fatty acids, Storage and preparation of infant formulas, Identifying trace element deficiencies and paying attention to what is included in TPN, and Criteria for soy galactosemia. Residents also commented that the simulation was a good review of infant nutrition and vitamin deficiencies. All 23 of the residents who participated in the course agreed that the simulation experience would improve their care of pediatric patients.
Discussion: Simulation provides an opportunity to expand residents’ knowledge and apply quality nutritional practices in a safe environment. Due to positive evaluation responses, future plans for the course include adding registered nurses and registered dieticians along with the physicians to make the course interprofessional.

References:


PO 021 – Mobile Headwall to Enhance Realism in Non-Clinical Simulation Environments

*Topic: Innovation/ Future Direction and Outreach Simulation*

ID: IPSSW2015-1177

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Children’s Hospitals and Clinics of Minnesota’s Simulation Center staff provide mobile customized training experiences focused on neonatal and pediatric emergencies for internal and external customers. The Simulation Center team was often required to present simulated emergencies in nonclinical areas resulting in participant complaints about how the lack of clinical realism negatively affected their learning.

The Simulation Center team began to strategize how to improve realism and increase learning satisfaction with minimal cost. A mobile headwall system was felt to be the best alternative to being in the clinical environment.

The Simulation Center researched commercial headwall units. However, the commercial products did not meet the quality and training needs of the Simulation Center. The Simulation Center team approached Children’s biomedical engineers. The biomedical engineers were instrumental in building our mobile simulation bus, and had a reputation for effectively building clinical facades that increased the sense of realism of being in a clinical environment.

The biomedical engineers first interviewed the Simulation Center team to determine important attributes of a mobile headwall. The biomedical engineers contracted with a machine shop to build a customized metal skeleton on wheels that would house the oxygen, suction, nitrous oxide, waste gas, and power outlets. The metal skeletal was designed so that the simulation center could take the headwall apart and transport the unit in a car. The rear of the skeleton was designed to hold a very quiet air compressor and suction unit. This design allows simulation participants to have air flow from the mock gas valves and realistic suction. The functioning power outlets allow for additional equipment to be utilized during simulation. A removable ophthalmoscope and otoscope are also part of the unit’s capabilities. The cost of the unit was under $5000 US dollars.

The innovative mobile headwall has been a successful addition to the Children’s Simulation Center program by increasing realism in nonclinical environments. Feedback from participants utilizing the mobile headwall has been positive. Specifically, the mobile headwall has been helpful in building muscle memory when responding to the simulated deteriorating pediatric patient. The mobile headwall has been in such demand that we requested a second unit be built. A static headwall with a similar design has recently been built in a conference room to meet the needs of a mock clinical environment.
PO 022 – SimCentral in Mock Code Training: NICU Nurses’ Survey

**Topic:** Faculty development

**ID:** IPSSW2015-1238

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**Background:** Comprehensive simulation programs are springing up in medical, nursing, and allied health schools. Main objective of this survey was to check the efficiency of Comprehensive simulation program in Mock Code training among neonatal intensive care unit (NICU) nurses.

**Observation:** To gather feedback from SimCentral trainees we asked 18 NICU nurses to grade their learning experience on a scale of 1 to 5 (the worst to the best life-time learning experience).

The training topic was Mock Codes. No low ratings of 1 or 2 were submitted. Responses to the five questions are summarized as below:

**A.** Compared with previous training, training received at SimCentral for Mock Codes provided a better learning experience? **Evaluation grade/ responses:** 3 (6%); 4 (6%); 5 (88%).

**B.** Does having a “patient” with “vital signs”, “breath sounds”, “heart beats”, etc., enhance the learning experience? **Evaluation grade/ responses:** 4 (22%); 5 (78%).

**C.** There was enough time to practice skills? **Evaluation grade/ responses:** 4 (22%); 5 (78%).

**D.** All the equipment needed for Mock Code training was available? **Evaluation grade/ responses:** 3 (17%); 4 (39%); 5 (44%).

**E.** Was orientation/training at SimCentral adequate for you to function in the NICU? **Evaluation grade/ responses:** 4 (17%); 5 (83%). Comments from the participants included: “Love the idea of going to the SIM Lab; SIM Lab is a great learning experience! Thanks for the hard work; Liked small group, a wonderful program; Helped a lot; Informational; Thanks – excellent; SIM Lab was great, much better than the regular Mock Code training we’ve done; and Watching the video of the code is a great learning tool, We really enjoyed the class.”

**Conclusion:** From the survey Comprehensive simulation programs found effective and well received by NICU nurses for Mock Code training.

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PO 023 – Enhancing Major Trauma Team Performance by Using Paediatric Medical Simulation

**Topic:** Interprofessional Education (IPE)

**ID:** IPSSW2015-1064

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**Context:** In April 2012, NHS trauma services were restructured leading to the creation of Major Trauma Centres (MTC). Prior to the launch of the MTC in my region, trauma simulations were run to test the new SOPs in the regional trauma manual and to develop roles within the trauma team. Following the simulation training we noted a reduction in the time taken to intubate a trauma patient from 57 to 9 minutes, post admission to the MTC.

**Description:** In April 2013, funding was secured to expand the paediatric trauma training. A multi-disciplinary education team arranged monthly paediatric trauma simulation events within the emergency department (ED). Initially, these simulations concentrated on trauma scenarios with the aim of ensuring treatments such as intubation and transfer to CT scan were provided within national target times. We also
wished to review clinical skill sets, role identification, policy development, standardisation and use of equipment. These training events allowed the teams to explore the challenging human factors identified in team working, promoted collaborative working with child health and facilitated critical incident reporting, leading to improved governance within the service.

**Observations/Evaluations:** 6 month review of progress demonstrated significant service improvement. However, a review of one year’s paediatric resuscitation room admission data revealed that only 11% of admissions related to major trauma. It was decided to extend and enhance simulation training by constructing cases that might present to the medical team but have an unrecognised trauma origin, for example, status epilepticus as a result of non-accidental injury. By adding paediatric medical simulation to major trauma it was anticipated greater benefits would accrue to the MDT and patient care in the ED.

**Discussion:** In conclusion, a broad based, regular, point of care team based simulation programme has improved care of critically ill and injured children in the ED.

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**PO 024 – Single Centre, Multi-Location, Interprofessional Real Time Outreach Simulation**

**Topic: Innovation/ Future Direction and Outreach Simulation**

**ID:** IPSSW2015-1117

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**Context:** Seriously ill children presenting to small district general hospitals face increased risk unless cared for by a team trained to recognise, stabilise and manage them prior to retrieval by a specialist transport team [1]. Simulation is a teaching technique that has been shown to enhance the clinical skills of interprofessional teams, identifying learning needs whilst not exposing patients to harm [2]. A real time simulation was instigated as part of a quality improvement program after a hospital merger. This unannounced single site, multi departmental, inter-professional simulation was designed and implemented to offer staff training opportunities to enhance their skills when faced with acute life threatening illness in the paediatric patient. Support was received from stakeholders and the regional simulation team.

**Description:** The simulation followed the real life patient journey of a child with serious illness; from arrival in the resuscitation room of the Emergency Department, transfer to the acute paediatric ward for further stabilisation before being moved to the operating department recovery area, for intubation and ventilation. Staff from all areas participated in this simulated real life event caring for the high fidelity wireless simulated patient, who was accompanied by actor parents to add authenticity to the situation. Contingency plans were established in case an acute emergency was to present during simulation.

**Observation/Evaluation:** The simulation exercise was fully observed by stakeholders from all departments. Immediate verbal feedback was provided to departments after transition of the patient to the next care team. This process identified latent risks and raised human factors awareness and an action plan was produced. Many of the recommendations were implemented the same day to address key areas of patient safety and clinical care.

**Discussion:** This simulated patient journey demonstrated the feasibility and value of real time outreach training in small district general hospitals helping to improve availability of safe healthcare irrespective of location. It helped strengthen multidisciplinary working relationships and improve patient safety. Stakeholder feedback was positive and has identified a strong desire for further simulated training opportunities.
References:

PO 025 – Chest Physiotherapy in the PICU: a Workshop to Improve Competence and Confidence of Physiotherapists.

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Background: Maintaining clinical expertise and confidence among physiotherapists (PT) working sporadically in the paediatric intensive care unit (PICU) is a challenge amplified by the paucity of continuing education in this field. Moreover, high-fidelity simulation is seldom used in physiotherapy training and the literature on this subject is poor.

Research question: Does a workshop including simulation improve PTs’ self-assessed competence and confidence in managing patients needing chest physiotherapy in the PICU and is this effect maintained at 6 months?

Methodology: The workshop focused on physiotherapy practice in the PICU and consisted of 2 high-fidelity simulation scenarios, 2 interactive group sessions and 2 lectures. A questionnaire was filled before and after the workshop and comprised 17 self-assessed competence items and 8 self-assessed confidence items. A reassessment will take place in March 2015. Five demographic questions were completed and presented using descriptive statistics. A chi-square with a p value of 0.05 was applied to compare the pre and post workshop assessments.

Results: Forty-five PTs took part in the workshop and 42 completed the questionnaire. Thirty PTs (72%) had done < 6 calls in the past year. Before the workshop, they reported a lower level of competence and confidence than PTs with more clinical exposition (9 competency questions and 5 confidence questions had a p value < 0, 05). Twenty-two PTs (52%) had < 4 years of experience with respiratory paediatric patients. Before the workshop, they reported a lower level of competence and confidence than more experienced PTs (10 competency questions and 3 confidence questions had a p value < 0, 04).

After the workshop, both self-assessed competency and confidence significantly improved for the entire group (13 competency questions and 6 confidence questions had a p value < 0, 03). More specifically, less experienced PTs and those with less clinical exposition seemed to display a greater improvement than more experienced PTs and those working more often with this clientele.

Discussion/Conclusions: This workshop significantly improved competence and confidence of PTs working sporadically in managing respiratory patients in the PICU. It seemed to have a greater effect for PTs having less clinical exposition and less experience with this specialized clientele. Upcoming data will help assess if this improvement is maintained over time. This workshop used several teaching methods including high-fidelity simulation. The positive results will hopefully open the door to other studies focusing on the use of high fidelity simulation in physiotherapy education.

Keywords: Chest physiotherapy, Simulation, Paediatric Critical Care
PO 026 – How Can We Improve The Hospital Environment For Paediatric Patients?

*Topic: Innovation/ Future Direction and Outreach Simulation*

**ID:** IPSSW2015-1052

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**Background:** The current paediatric hospital environment, an integral part of patient care, has evolved over three hundred years. It has been shown to affect patient anxiety levels, physiology, and ultimately, recovery. Numerous low-cost interventions to improve clinical environments, both paediatric and adult, have been implemented in various localities with promising results.

**Research Question:** Our study was designed to provide insight into the following question, “How can we improve the patient centred environment for patients attending a major paediatric hospital?”

**Aims:** The aim of this project was to explore the child’s sensory perspective when attending hospital for a range of clinical reasons, elective or urgent, and to create a scoring matrix to facilitate future improvements.

**Methods:** The Paediatric Centred Environment (PCE) Score was constructed after an extensive literature review. Common patient pathways within a major children's hospital were analyzed using a wheelchair-bound paediatric simulator with eye level cameras and data logging sensors for sound, temperature and luminescence.

**Results:** Video analysis of the patient pathways and sensory perception mapping provided a valuable insight of the environmental factors affecting children as they pass through common pathways of care within the hospital. Each care area was ranked using the PCE score. All clinical areas scored “satisfactory” or “excellent”. However areas for improvement were observed and unsafe areas including the car park and a physiotherapy training area were highlighted.

**Conclusions:** This novel use of a simulated child revealed the potential to improve the paediatric centred environment and patient safety profile of the hospital with several low cost interventions. Further research is required to assess the validity and reliability of the Paediatric Centred Environment Score. Future research on the perceptions of real children is also planned.

**References:**
PO 027 – Evaluating Knowledge Acquisition and Retention after a Pediatric Intern Boot Camp

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

ID: IPSSW2015-1063

**Tristan Knight** 1, Jannet Lee-Jayaram 1, 2, John Chen 1, Len Tanaka 1, 2, Gen Ouchi 1, 2

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**Background:** The rise of simulation-based boot camps reflects the growing need for a short, intensive, hands-on approach in preparing incoming residents for the responsibilities they will face. Boot camp training has demonstrated value in increasing new trainees’ self-reported confidence [1,2,3] and observed psychomotor skills [4,5,6,7]. To date, only one study has evaluated outcomes in pediatrics, via self-reported skill and confidence [8].

**Research Question:** Are objective cognitive outcomes improved after a simulation-based pediatric intern boot camp intervention?

**Methodology:** All pediatric PGY1 residents (n=7) participated in a half-day intensive boot camp with multiple rotations through 3 simulations, using high-fidelity manikins and a partial task trainer. The simulations were: (1) infant lumbar puncture (2) recognition of the deteriorating patient/PICU handoff, and (3) rapid response team (RRT) and code blue team activation and roles. PGY2/3s (n=12) did not participate, but served as control group.

Cognitive outcomes were measured via standardized exam, administered to PGY1 residents immediately pre-and-post intervention, and 1-month later. Testing covered cognitive objectives discussed during debriefings; criteria for correct answers was based on current best practice guidelines.

Pre/post/retention data was compared to the control group via two-sample t-tests (for quantitative data) and Fisher's exact tests (for binary data). Pre vs post, and pre vs retention data was compared using paired-sample t-tests (for quantitative data) and McNemar tests (for binary data).

**Results:** Knowledge of LP consent requirements was better in PGY1 post-intervention compared to controls (6/7 vs 3/12; p-value=0.02), but was not retained. Lumbar puncture procedural knowledge showed no difference at any time between the two groups.

Knowledge of code team roles was better in PGY1 than controls at pre-intervention (0.79 vs 0.56; p-value=0.044), post-intervention (0.92 vs 0.56; p-value=0.0001), and at retention (0.88 vs 0.56; p-value=0.001).

Post-intervention, PGY1 were better than controls in knowing when to activate RRT (0.86 vs. 0.50; p-value=0.046) and how to do so (7/7 vs 0/12; p-value<0.001). At retention testing, PGY1 retained the latter (4/7 vs 0/12; p-value=0.009).

Knowledge of a structured handoff was better in PGY1 compared to controls post-intervention (0.97 vs 0.42; p-value<0.001). This was not retained.

**Discussion:** To date, there has been no objective measure of pediatric boot camp outcomes in the literature. Pediatric interns are required to rapidly assimilate new information; the acquisition of this knowledge must precede the demonstration of competence in applying this knowledge. We demonstrate that a simulation-based pediatric boot camp can be used to acquire such knowledge more effectively than via clinical experience alone. However retention after one month decreases in most areas and requires further study to determine ideal methods/timing for refreshers.
References:


PO 028 – Exploratory Study of Infant CPR Performance Measured by a Workplace Based Manikin Feedback Device

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

ID: IPSSW2015-1158

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Background: Rapid skill degradation in CPR performance has been well described.1-4 Training with CPR feedback devices has shown improved learning and CPR performance.5 Unrestricted access to a CPR manikin in the workplace, providing immediate, objective feedback, could develop CPR skills whilst avoiding the disadvantages of inter-rater variability and requirements for observer presence.

Aim: To explore scores of CPR performance provided by an infant CPR feedback device, determining potential associations and limitations and overall ability to accurately reflect capability of participants.

Research Question: Can we measure CPR performance on an infant manikin feedback device in the workplace?
**Methodology:** We collected baseline data from participants in a study on the effectiveness of self-motivated CPR using an infant manikin feedback device. Individuals carried out 2-minutes of CPR on the device, which provided a compression percentage score based on rate, depth, hand position and release, and a ventilation percentage score derived from rate and volume. The device’s scoring algorithm was developed in collaboration with the American Heart Association\(^5\). The compression and ventilation scores were then amalgamated to produce an overall mean CPR percentage score.

Data collected include: role, rank (seniority), department, type and timing of previous life support training or ‘real-life’ CPR.

The data were explored descriptively and via univariate linear regression. Due small numbers within many potential subgroups, the predictors considered were formed via combining similar levels of seniority.

**Results:** The study recruited 170 participants. The overall mean baseline score was normally distributed, (mean 49.4%, SD 21.5, range 1.0-92.0). Cardiac compression scores showed 27.6% (47) of participants scoring <10%, with the remainder being spread relatively uniformly. Ventilation scores showed a tendency to higher values, with 72.9% (124) scoring ≥50% and 12.4% (21) scoring ≥90%, however 15.9% (27) scored <10%. Consultants scored significantly higher (p<0.001), but not senior nurses (p=0.556), than other staff. This remained significant when tested as an overall effect. Previous life support course attendance or ‘real life’ CPR experience had no significant effect.

**Discussion:** Cardiac and ventilation scores can discriminate high vs. low performers with a CPR feedback device. The use of this device indicates improvements in CPR skills are viable for all participants, regardless of level of training. Because a conventional annual life support course had no impact on CPR performance, further research into 24-hour-access self-motivated CPR training is warranted.

**References:**

3. How frequently should basic cardiopulmonary resuscitation training be repeated to maintain adequate skills? Berden HJ, Willems FF, Hendrick JM, Pijls NH, Knape JT. BMJ. 1993 June 12;306(6892):1576-7. PMID: 8329917 [PubMed - indexed for MEDLINE]
6. PMID: 19477574 [PubMed - indexed for MEDLINE]
PO 029 – Impact of Emergency Information Forms for Children with Special Health Care Needs: A Simulation Study

Abraham GG, Fehr JJ, Ahmad FA, Jeffe DB, White AJ, Yu F, Copper TC, Schnadower D

**Background:** Children with special health care needs (CSHCN) are particularly vulnerable during emergencies. Emergency Information Forms (EIFs) have been proposed by the AAP and ACEP to provide essential and timely information to emergency providers, however they have not been widely disseminated and their potential impact has not been assessed.

**Objective:** To measure the impact and utility of EIFs in simulated emergency scenarios of CSHCN.

**Methodology:** Twenty-four pediatric providers [12 junior (2nd and 3rd year residents) and 12 senior (PEM fellows and attendings)] performed 4 consecutive high fidelity simulations: a baseline acclimation DKA scenario and 3 complex scenarios of CSHCN (cardiac, neurological and metabolic emergencies) where access to an EIF was randomly assigned. All scenarios had critical action checklists and predetermined consequential pathways and complications developed by simulation experts and pediatric subspecialists. Scenarios were terminated at critical actions completion or at 10 min. Video-recorded performances were independently assessed by two reviewers. We compared provider performance in scenarios with and without an EIF using Pearson’s $X^2$ and the Mann-Whitney test. We calculated Spearman’s $p$ to assess interrater reliability. We also assessed provider views on the utility of EIFs via a questionnaire.

**Results:** Provider performance was significantly superior during the scenarios where an EIF was available (table 1), independently of their seniority (table 2). Interrater reliability was excellent ($r=0.982$, $p<0.001$). All providers strongly agreed that EIFs can improve clinical outcomes in CSHCN.

**Table 1: Provider Performance**

<table>
<thead>
<tr>
<th></th>
<th>Scenarios with EIF N=36</th>
<th>Scenarios without EIF N=36</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median critical action score (IQR)</td>
<td>84.2% (71.7-94.1%)</td>
<td>12.5% (10.5-35.3%)</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Median Time to completion in min (IQR)</td>
<td>6.9 (5.8-10)</td>
<td>10 (constant)</td>
<td>$&lt;0.001$</td>
</tr>
<tr>
<td>Presence of complications (95% CI)</td>
<td>30.6% (17.4-46.3%)</td>
<td>100% (92.2-100%)</td>
<td>$&lt;0.001$</td>
</tr>
</tbody>
</table>

**Table 2: Median Critical Action Score by Provider Type**

<table>
<thead>
<tr>
<th></th>
<th>Junior N=12</th>
<th>Senior N=12</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>With EIF (IQR)</td>
<td>87.5% (80.7-94.1%)</td>
<td>81.3% (70.0-94.9%)</td>
<td>$=0.406$</td>
</tr>
<tr>
<td>Without EIF (IQR)</td>
<td>11.5% (6.2-22.9%)</td>
<td>20.4% (10.5-41%)</td>
<td>$=0.104$</td>
</tr>
</tbody>
</table>

**Conclusions:** EIFs significantly improved physician performance and patient outcomes in simulated emergency scenarios of CSHCN, and access to EIFs was desired by all participants. These data can be used to justify the implementation and efficacy evaluations of EIFs in CSHCN in real-world scenarios.
PO 030 – The Unintended Benefits of Role Play in Simulation

**Topic: Crisis Resource Management/Human factors and Teamwork**

ID: IPSSW2015-1181

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**Background:** The increased use of simulation for teaching clinical and non-technical skills has revolutionised our multidisciplinary retrieval training at The South Thames Retrieval Service and is now mandatory for all staff. This consists of a day of equipment refreshers, systems update and high fidelity simulation scenarios. The scenarios are real to life based on retrievals from the previous year. The faculty discuss key learning points in advance, while remaining open to allow the group to take the lead and select their own learning from the debrief that follows, (Fanning & Gaba 2007).

The opportunity to experience real-time situations and respond within a safe environment is widely documented as an invaluable teaching tool, (Issenberg et al 2005 & Ladden et al 2006). It allows teams to explore not only the treatments of different conditions utilising algorithms and guidelines but also to focus on the human factors, (Libin et al 2010).

**Unexpected Results:** There has been an unexpected benefit of the South Thames Retrieval simulation days. The staff attending the day are asked to play differing roles during the scenarios. While the faculty has a plant within the room, course members who are not actively participating in the current scenario fulfil the position of local hospital staff or a parent to the critically ill child. The staff asked to play these roles are fully briefed on the background to the scenario and asked to act as they feel they should in that situation.

These experiences have resulted in unanticipated insights into what it is like to be involved in a retrieval from 'the other side'.

**Results:** Retrieval team members have responded in differing ways. Staff saying, ‘the child was really ill and it was such a relief when the team arrived’, showing real insight into the experiences of the local staff. ‘It gave me a bird’s eye view of retrievals’.

**PICU Nurse acting as a DGH Nurse**- ‘the main thing I felt I wanted to do was help, But felt I had to wait until I was asked to do something (i.e. draw up drugs etc) by the retrieval team, as I didn’t want to get in the way and knew they had their plan of what they wanted to do’.

**PICU Nurse acting as a Mother**- ‘I could see how focused the retrieval team was on my child but I could only focus on my child, I could not take anything else into consideration, such as the importance of what the nurse and the doctor was doing’.

‘I felt very emotional; I just wanted to protect my child’

‘It was a great insight into how the parents feel’

Members playing the role of parents often became emerged in their roles feeling close to tears at times when things were not going well.

Other comments included, ‘there were so many of them I felt left out and out of control’

**Conclusions:** These comments will be further explored and discussed with relation to how these experiences can be translated into our practice and improve the service we deliver to our critically ill children and their families.
References:

PO 031 - Performance and Success Rate of Simulated IO Insertion 3 Years after Simulation-Based Training

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

ID: IPSSW2015-1170

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**Background:** Intraosseous (IO) access is a rare procedure in pediatrics, indicated in cardiac arrest and decompensated shock (1). Its training procedures fit well with simulation-based training (SBT) (2,3). Three years ago we reported on the benefit of SBT in teaching how to insert a manual IO access device in an infant (4). Long-term benefit of SBT for skills is rarely investigated. Nevertheless, the rarity of use of IO access can endanger its performance, even in thoroughly trained practitioners. This fact is of importance considering the high-stakes situations in which IO access is recommended. The aim of this study was to measure the benefit of SBT for manual IO access 3 years later.

**Methods:** The research protocol was approved by the IRB of the Faculty of Medicine of Poitiers, France. It was a single-center randomized control trial that took place in the Simulation Laboratory. The second phase of this study is presented here. The primary objective was to assess the performance and success rate of IO access insertion at 3 years. Secondary objectives were to assess knowledge about IO access procedure, and to measure differences in outcomes between values at 3 years and those on day 1. Three years ago, 40 participants (10 medical students (MS) in 2nd, 3rd, and 5th years and 10 residents (PGYs)) were drawn by lots from each promotion and randomized in 2 groups, SIM- receiving didactics, and SIM+ receiving didactics + SBT on manual IO access insertion. Their knowledge (MCQs), performance (IO performance assessment scale) (5) and success rate were analyzed 3 years after the initial training phase. Scenario was a 6 m.o. infant in shock (dehydration) (Ben* mannequin, Laerdal®). Comparisons used t-test, Mann-Whitney or Chi2.

**Results:** None of the participants had performed or observed any IO access insertion within the last 3 years. Performance score was higher in SIM+ than in SIM:-11.05±3.7 vs 7.55±3.6, p<0.006; nevertheless there was no change in success rate: 35% vs 25%, p=0.36. There was no difference in MCQ score:
2.95±1.0 vs. 2.85±1, p=0.72. At 3 years, memory loss was massive and similar in each group: -19% for performance, -20% for success rate, and -59% for knowledge, although there was a trend towards less theoretical loss in SIM+ than in SIM- (p=0.052). The 2 most frequently forgotten steps were use of a safety guard on the needle and twisting motions for insertion into the bone. There was no status effect.

**Discussion/Conclusion:** SBT maintained higher performance scores 3 years later compared to controls. Memory loss was nonetheless considerable, and clearly prevented the success rate from being higher. Importantly, the forgotten items of the procedure were directly linked to the success/failure ratio, with risk of transfixion of the opposite cortical layer if omitted (5). Further study should focus on the rate of repetition of SBT sessions for a rare and high-stakes procedure such as IO access insertion.

**References:**

**PO 032 - Validation of a Performance Assessment Scale for Breaking Bad News**

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

**ID:** IPSSW2015-1101

**Denis Oriot* 1, Aïham Ghazali1, Raphaele Badiola1, Laure Cohen1, Aurélie Desbordes1, Michel Scépi2

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**Background:** Giving bad news is inevitable in physician’s life (1). This difficult and stressful task is often accompanied by a feeling of unpreparedness (2). Use of a structured framework has objectively improved communication (3). The SPIKES framework is the most famous teaching strategy (1). In the early 1990s Greenberg initiated simulation-based training (SBT) on giving bad news with standardized patients (SPs) (4). Despite the existence of well-established settings, evaluation of trainees’ performance in SBT programs has remained subjective: either self-evaluation performed by the participant (5-7) or by the SPs (8-10).

**Objective:** To design and validate an objective performance assessment scale for delivery of bad news.

**Methods:** Research was approved by IRB of the University Hospital of Poitiers, France. Two experts (Pediatrics, EM, Palliative Care) designed a paper-based assessment scale. The content of the scale was extracted from SPIKES study and Greenberg’s work. But as it was impossible to objectively assess empathy, different medical gestures (indirectly linked to empathy, i.e., “having tissue available”, “being at a distance of one arm”) were used to assess behavior. Validation followed Downing’s methodology (content, response process, internal structure, relationship to other variables & consequences). Sixty participants were included: 16 medical students (MS), 23 PGYs and 22 pediatricians/emergency physicians (EPs). All
but EPs received a didactic lesson and a 2-hour SBT session on breaking bad news with SPs (actors). Then, 4 weeks later all were evaluated during a simulation session with SPs on the same scenario (imminent death of a 14 y.o. boy injured in a MVA). All participants received an evaluation form at the end of the session. Assessment was performed by two independent blinded observers. Internal consistency of the scale used Cronbach alpha coefficient (AC). Reproducibility used linear regression and intra-class coefficient (ICC).

**Results:** Content resulted in items that could be objectively assessed through the SPIKES protocol and other sources. Response process resulted in the modification of some items, in order to reflect actual practice and avoid redundancies; it ended up with a 30-item scale and a total score of 30 transformed to 100. Internal structure showed a good internal consistency (CA=0.69) and reliability: no difference between observer 1 and 2’s scores, high reproducibility (ICC=0.858, p=0.026, y=1.0449x, R²=0.77). Comparison showed that PGYs and EPs had higher scores than MS: respectively 68.19±9.65, 61.77±6.73 & 49.19±16.85. Consequences: 94% of the participants reported having gained in theoretical knowledge and practical skills in delivery of bad news.

**Conclusion:** We designed a reliable and reproducible performance assessment scale evaluating the procedure of breaking bad news in an educational and research-centered framework. This tool can be used to measure improvement of trainees after SBT.

**References:**
5. Garg A, Buckman R, Kason Y. Teaching medical students how to break bad news. CMAJ 1997;156:1159-64

**PO 033 – Determinacion Del Nivel De Entrenamiento En Vía Intraósea En Pediatria**

**Topic: Interprofessional Education (IPE)**

**ID:** IPSSW2015-1030

**Jose A. Rubiano**

1Medicina, Universidad De Pamplona, Cucuta, Colombia
La investigación es un estudio descriptivo cuantitativo retrospectivo realizado a técnicos en enfermería que asisten a formación en soporte básico de vida pediátrico en la Cruz Roja Colombiana Seccional Norte de Santander identificando el nivel de entrenamiento, conocimiento de los equipos, conocimiento de la técnica y número de procedimientos realizados previamente a la simulación y entrenamiento, concluyendo que a pesar que en la actualidad, el acceso intraósleo está recomendado por la European Resuscitation Council (ERC) como segunda opción si no se consigue canalizar una vía venosa y antes de intentar instaurar un acceso central, tanto en adultos como en niños, los 120 evaluados 100% no habían realizado el procedimiento in vivo, de esta población 100 personas eran técnicos en enfermería donde el 95% no conocían la técnica ni los equipos y solo el 5% habían tenido entrenamiento previo con simulación.

La Cruz Roja Colombiana y en especial su Instituto de Educación de la Seccional Norte de Santander (IECRCNdS) han venido por más de 10 años fortaleciendo los procesos de educación continuada para personal técnico en enfermería de la región bajo los lineamientos institucionales de salvar vidas cambiando mentalidades a través de procesos de educación. En tal sentido y como una necesidad de la comunidad se han establecido varios programas estandarizados por organismos internacionales de formación de competencias para la atención de personas que vivencian situaciones de emergencias que en nuestro contexto no son ajenas y que requieren de una intervención eficiente y eficaz. Es así como desde el año 2010 el IECRCNdS ha desarrollado sistemáticamente procesos de formación en soporte básico de vida y soporte de vida pediátrico bajo los lineamientos del European Resuscitation Council (ERC) en cuyo seno se alberga nuestra filial española y cuya traducción oficial nos permite brindar elementos académicos de formación para nuestra región. En el periodo de la presente investigación agosto de 2013 a agosto de 2014 el IECRCNdS desarrollo 12 entrenamientos de soporte básico pediátrico con una participación de 100 técnicos en enfermería, 10 enfermer@s profesionales y 10 médicos generales donde a través de una encuesta determinamos el nivel de entrenamiento previo en la técnica y algunas características especiales de ese conocimiento.

References:
8. Vallejo De La Paz y colaboradores en su artículo vía intraósea, análisis del conocimiento de enfermería, Revista Páginasenferurg.com Volumen III Número 12
PO 035 - Comparing Cognitive Aides in Paediatric Cardiac Arrest Using Simulation – A Pilot Feasibility Study  

Topic: Crisis Resource Management/Human factors and Teamwork

ID: IPSSW2015-1193  
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Background: Given the low occurrence of out of hospital cardiac arrests in the paediatric population (1) deviation from best-practice guidelines is common and not unexpected (2, 3). Easily accessible diagnostic and treatment information, such as visual cognitive aides, improves adherence to evidence based practice (4), yet there are practical difficulties in directly studying cognitive aide use (5)

The simulation environment can mirror real life situations accurately allowing risk-free practice of poorly retained skills (6) and potentially an environment in which to study the usability and practical design of cognitive aides.

Research Questions:
1. Is it feasible to use the simulation environment to study the design and relative utility of cognitive aides in paediatric cardiac arrest?
2. Is the functional utility of the cognitive aide for paediatric cardiac arrest produced by the Australian Resuscitation Council better than that produced by APLS Australia?

Methodology: This was a prospective, unblinded, simulation-based study. A VF arrest scenario was developed. Simulations were carried out in-situ in the Emergency Department of a tertiary children’s hospital in Sydney, Australia using a low capability mannequin in a high fidelity environment. Participants were provided with an algorithm published by either the Australian Resuscitation Council or APLS Australia. The cognitive aides were alternated between simulations. An observer collected data using a specially designed data collection sheet. Outcomes measured were appropriate identification of steps in management, delays in aspects of care and correct dosing. Following debriefing all participants were asked to complete a short survey on usability and usefulness of the provided cognitive aide.

Results: Nine scenarios were run and 41 participants were recruited. The majority of participants were medical students but also included medical and nursing staff. All statistical tests were performed using SPSS 20.0 (SPSS Inc., Chicago IL, USA).

There was a significantly shorter time from the second shock to adrenaline administration in the ARC groups. There were no other significant differences in management or participant rating. We did show the feasibility of the simulation environment for studying the functional utility and design of cognitive aides. Sample size calculations were also conducted using StatMate (GraphPad Software Inc., La Jolla CA, USA) to indicate the number needed for significance if these proportions were to hold true. A minimum sample size of 30 would be needed for significance across most parameters.

Conclusions: We have demonstrated the feasibility of the simulation environment to compare cognitive aides in paediatric cardiac arrest. Several clinically interesting differences were noted; consequently, a higher power study should be performed using similar study design to assess if these are true proportions.

References:


PO 036 - Virtual Reality for Pediatric Sedation: An RCT using Simulation

**Topic:** Multimedia, e-learning and computer-based instruction

**ID:** IPSSW2015-1066

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**Background:** Virtual reality provides immersive learning. Studies show good acceptance and some validity for surgical skills training (1-7). However, studies assessing its effectiveness in team training and patient care are limited (8-10). We sought to assess the effectiveness of a virtual reality module in teaching preparation and management of procedural sedation (PS).

**Methods:** We conducted a randomized controlled trial to compare a virtual reality module to a traditional web-based module for pediatric PS. We created a virtual reality environment in Second Life to train participants in PS. The intervention group used a virtual reality module, while the control group did the web-based module. A 20 question pre- and post-test was administered to assess knowledge change. All participants then participated in a simulated pediatric PS scenario that was video recorded for review. Performance on preparation and managing a complication was assessed using a 32-point checklist, adapted from a previously published checklist (11). Reliability of video review was confirmed with an ICC of 0.688. A brief survey elicited feedback on the virtual reality module and the simulation scenario.

**Results:** 32 2nd and 3rd year pediatric residents were randomized. 22 subjects completed the simulation with 10 in the intervention group and 12 in the control group. 10 residents did not complete the study due to schedule conflicts (N=8), refusing to continue (N=1) and failure of the intervention module (N=1). Due to recording failures (N=8), data was obtained for 7 residents in each group. Results of the pretest, posttest and simulation assessment are below. The intervention group had a median score of 75% for the assessment checklist versus 70% for the control.

Overall, there was no difference in sedation performance between those who trained using the virtual training module compared to those who did not. However, survey assessment of userability was favorable with 8 of 12 agreeing or strongly agreeing that it was easy to use and navigate. All residents who did the virtual reality module felt it added to their education regarding sedation.
Table. Scores of Intervention and Control Groups

<table>
<thead>
<tr>
<th></th>
<th>Intervention Group</th>
<th>Control Group</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. correct (%)</td>
<td>No. correct (%)</td>
<td></td>
</tr>
<tr>
<td>Pretest</td>
<td>14/20 (70%)</td>
<td>13/20 (65%)</td>
<td>p=0.251</td>
</tr>
<tr>
<td>Posttest</td>
<td>15/20 (75%)</td>
<td>16/20 (80%)</td>
<td>p=0.674</td>
</tr>
<tr>
<td>Assessment Checklist</td>
<td>24/32 (75%)</td>
<td>22.5/32 (70%)</td>
<td>p=0.318</td>
</tr>
</tbody>
</table>

Conclusion: Virtual reality training is a novel tool that appeals to the newest learners. This RCT demonstrated that a virtual reality module was as effective as a traditional web-based module in increasing knowledge about sedation, and performance in a simulated sedation scenario, in pediatric residents. Furthermore, participants reported that the virtual reality interface was easy to use, and added to their education. As technology in education continues to evolve, virtual reality may become a preferred means of training compared to web-based learning.

References:
PO 037 – Debriefing the debriefers  
**Topic: Debriefing and teaching methodologies**

ID: IPSSW2015-1206  
**Fiona E. Bickell**¹, Marilyn McDougall¹, Kirsteen McCulloch¹

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**Background:** The use of high fidelity simulation has become an integral part of our staff training within the South Thames Transfer Service. All members of the transfer team attend a compulsory full day of scenarios all based on real transfers performed during the previous year. Particular transfers are picked which have challenging aspects relating to technical, non technical skills or encompassing both. The use of the actual equipment and paperwork ensures a level of realism which enhances the experience and allows staff to be fully immersed within the scenarios, (Ladden et al 2006).

The debrief is well documented as an essential component of simulation allowing participants to reflect, discuss and as assimilate knowledge use in future practice.

**Discussion:** Successful debriefing is a skill in itself, and is crucial maximise learning opportunities and improve clinical practice, (Runnacles et al 2014). All debriefers within the faculty have attended formal debriefing courses where basic skills are taught and practiced. Most team members also participate in debriefing for other courses run within the simulation centre. The faculty has a variety of debriefing experience and allocation is made with experienced debriefers working alongside those who are developing.

To help the debriefers further develop the faculty have formally participated in a debrief of the debrief. Videos of debriefs were watched and good and poor techniques were openly discussed. While at times acutely uncomfortable this was felt to be really worthwhile with faculty reporting feeling more confident afterwards.

**Study:** This year we plan to self assess our debriefing skills before the debrief videos are re watched using a scoring system devised by Runnacles et al (2014). After the debrief of the debriefing, faculty will be asked to repeat a self assessment. Any differences will be discussed giving the faculty greater personnel insight into their debriefing style and identifying areas for individual and group development. These findings will be shared and extrapolated within the poster.

**References:**


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PO 038 – Evaluation of the Effectiveness of Simulation of Cardiac Arrhythmias in Children  
**Topic: Debriefing and teaching methodologies**

ID: IPSSW2015-1103  
Isabelle Bragard¹, Marie-Christine Seghaye², Thomas Baugnon³, Yasaman Shayan⁴, Anne-Marie Etienne¹, **Katharina Schumacher**²

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**Introduction:** Cardiac arrest is a rare event in the pediatric population (Tibballs et al., 2005; Topjian et al., 2009). Its management requires specific skills (e.g., dose adjustment of drugs) and is causing a high emotional stress. Studies suggest that for best clinical outcomes, both technical and non-technical skills (e.g., confidence in his abilities, leadership) must be improved (Flin at al, 2008; Rall et al., 2005). High fidelity simulation training with debriefing is recommended to promote the learning of these skills. However, studies are needed to prove the effectiveness of this training tool. Our goal is to assess the effectiveness of a high-fidelity simulation training with debriefing in managing cardiac arrhythmias in children.

**Method:** Four teams of participants, each composed of two medical registrars (one pediatric and one emergency) and two pediatric nurses, were divided into 2 groups: the experimental group participated in five filmed simulation sessions with debriefing and the control group participated in two filmed simulation sessions without debriefing. Five different scenarios on rhythm disorders were used. Subjective changes reported by participants were collected through questionnaires (confidence, stress, attitudes). Objective changes in knowledge, clinical skills, leadership and communication strategies are analyzed with a validated grid (Grant et al., 2012) by two independent experts.

**Results:** The study began in May 2014 and ends in September 2014. Analysis of the results is in progress.

**References:**
**Method:** Our primary data source is a series of innovative simulation scenarios at 2 major UK venues over 3 years.

The Big Bang Fair (BBF) is the UK’s largest science and engineering fair for young people (attendance 63,000 over 3 days). We presented the lead stand in the Health Zone over three consecutive years, using sequential simulations (SqS) of a range of healthcare scenarios. These included adolescent asthma, heart attack, craniotomy to head injury and surgical treatment of knife injury. SqS presents a series of scenes presented in front of a large audience, some of whom participate by playing roles alongside clinical practitioners. Set-piece demonstrations are complemented by interactive stands and discussion areas, inviting young people to engage with healthcare professionals, designers and computer scientists.

The Green Man (GM) is a three-day music festival in Wales. The venue includes Einstein’s Garden, a large co-operative space where children and families experience performances and interactive sessions based on art, science and nature. We explored unorthodox approaches to surgical engagement over two consecutive GMs. Collaborators included a sculptor, puppeteers and a stage magician, with each of whom we explored parallels between surgery and other forms of craft and performance (especially around communication and teamworking).

Observational, interview and written free-text data was collected at each event.

**Results:** Evaluation data shows extremely positive responses. BBF 2014 showed that only 2% of respondents could suggest improvements, with the remaining 98% highlighting the interest/informative nature, realism, and interactivity. 95% of BBF 2013 respondents “loved” or “liked” our exhibit, while 90% of respondents reported learning or gaining knowledge. Analysis of the evaluation from GM is ongoing but preliminary analysis shows similar levels of interest and engagement.

**Conclusion:** These results build on our previous findings that immersive public engagement offers major potential to introduce clinical practice and biomedical science to new audiences, opening up two-way channels of communication and feedback resulting in *reciprocal illumination*. Simulation is highly effective in engaging schoolchildren and young people, and encouraging them to consider healthcare, technology or science as possible careers.

**References:**
1. National Coordinating Centre for Public Engagement 2014; http://www.publicengagement.ac.uk/explore-it

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PO 040 – Impact of a Longitudinal Simulation Curriculum on Pediatric Resident Performance in Code Situations

**Topic: Innovation/ Future Direction and Outreach Simulation**

ID: IPSSW2015-1200

**Victoria E. Cook**¹, Haley de Vries¹, Anas Manouzi¹, Brian R. Cook², Mary Bennett³, Kyla J. Hildebrand⁴

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Simulation is considered an essential component of post-graduate medical education. Over four decades of research support the role of simulation-based medical education (SBME) in acquisition and maintenance of a variety of clinical skills including communication and technical procedures (1,2). Although there is significant evidence to support claims that SBME improves patient outcomes, these studies focus on algorithms as well as technical and procedural skills (1,3). At present, there is insufficient evidence to determine whether SBME improves trainee performance across the spectrum of real codes encountered in clinical care. Retrospective review of code management is hampered by inconsistent record keeping. In pediatrics, the relative scarcity of acute care events in clinical practice further impairs our ability to answer this important question.

The UBC Paediatrics Residency program at BC Children’s Hospital (BCCH) offers a graduated, interdisciplinary simulation curriculum, mandatory for approximately 60 trainees. Results of a recent survey indicate that 91% of residents have participated in actual codes, and 30% report experience as code leader. Together, the large number of ‘real world’ experiences and mandatory simulation curriculum present a unique opportunity to explore empirically the impact of SBME on patient outcomes.

We propose use of mixed qualitative methods (i.e., semi-structured interviews and focus groups) to explore the impact of SBME on paediatric resident clinical performance during actual code situations.

We will approach senior residents with approximately 2 years’ experience in an integrated simulation curriculum for consent, both by email and in person at the program’s academic half day. Residents will be offered either in person or telephone interviews. Prior to the interview, participants will receive a short list of open-ended questions upon which data-gathering questions will be based. Participants will be given the option of withdrawing from the study at any time. Interviews will be used to establish residents’ understanding(s) of the impact of simulation training on code performance. Using open-ended questions, pilot interviews will be conducted prior to commencement of the study in order to establish patterns and identify themes; this will, in turn, allow the research team to refine the interview questions to ensure comparable data and a robust methodology. Interviews will be conducted either over the phone or at BCCH. The interviews will be recorded and transcribed verbatim for coding and analysis using a grounded theory approach.

As use of SBME increases, it is necessary to understand how SBME impacts trainee performance in real codes. Given the uncertainty, subjectivity, and the paucity of data, a qualitative approach can help identify the ways that paediatric trainees connect SBME with their experiences in code situations. This information may allow us to improve educational interventions to better serve trainees.

References:
Overview: The Medical Simulation Center (MSC) at Loma Linda Children’s Hospital developed a course focused on unit-based disaster preparedness (DP). The course used different pediatric settings: PICU, NICU, and an outpatient clinic. The simulation involving the outpatient clinic was an active shooter (AS) simulation. Utilizing actors and a police SWAT team. Active shooter target vulnerable populations and education consist primarily of handouts and videos, very few simulations. Our simulation immersed learners in an AS scenario and further reinforce recommendations of the Federal Emergency Management Association to run, hide, and fight.

Description: The AS simulation immersed learners in a simulation that cultivated fear and a sense of realism. To engage the learners our shooter verbally intimidated and threatened the learners. The shooter also brandished a pistol and fired blanks. The scenario evolved into panic and chaos. A SWAT team entered and removed the threat, securing the area for paramedic teams to manage the crowd and triage victims.

Education: The educational design of the simulation focused on Kolb’s Experiential Learning Cycle. The simulation created the experience for our learners and provided a safe, anxiety-inducing event. The 2nd stage of Kolb’s Cycle involves observation / reflection. We discovered stage 2 occurred during the simulation and the debriefing. Some learners were so fearful only able to watch and think, others reacted. The 2nd stage continued in the debriefing where learners were able to process their reactions through reflection. Learners in the debriefing who entered stage 3 were processing future abstract planes. The relationship between learners in stage 3 help to facilitate the learners who remained in stage 2. Content experts from both the SWAT and paramedics helped learners transition from stage 2 to 3 and also empowered the learners in stage 3 to refine future plans and constructively review their actions.

Conundrum: Majority of the learners were nurses from PICU, NICU, and pediatrics. This group of nurses asked the same question “What do we do with our patients?” This question produced a dialogue with the SWAT team that did not completely reach resolution. The recommendation was to run and flee. Take the patients you can, but leave the patients who hinder an escape. SWAT team attempted to help the learners realize that remaining had a higher mortality. Preliminary evaluation of the pre and posttest did not show a difference in learner respond to an AS.

Discussion Question: The simulation placed learners in an AS where they had to respond. With a new enhanced situational awareness, our learners did not predict their future behavior would change. Nurses acknowledged they would have a greater chance of surviving if they fled, but could not verbally commit. How do you adjust pediatric hospital DP through simulation when learners predicted behavior remains unchanged even with increased risk of mortality?

References:
PO 042 - Simulation-Based Root Cause Analysis

**Topic:** Patient safety and quality improvement

ID: IPSSW2015-1243

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Root cause analysis (RCA) is a retrospective method used to examine adverse or serious events. The goal is to identify factors that caused or contributed to the adverse event and prevent future harm. Traditionally, this is done through a structured protocol involving data collection, record review and participant interviews. The identified timeline is analyzed, root causes found, solutions identified and implemented.

Literature shows that simulation may be used prospectively to identify errors and error producing conditions in high stake, low frequency events. In these simulations, areas for improvement are identified and used to prevent future medical errors. Simulation and RCAs thus have the same goals. We hypothesized that simulation may be used to conduct an RCA.

We conducted a retrospective simulation based RCA (SBRCA) of an actual adverse event. An Emergency Department (ED) patient in hypovolemic shock and respiratory failure was intubated, fluid resuscitated and admitted. Initial blood sugar in the ED was normal. Blood sugar on arrival to the ICU showed significant hyperglycemia. All key team members involved in the actual case were involved in the simulation. Team members reenacted all events following the actual timeline. Real time vital sign and exam changes were represented during the simulation. Two independent observers analyzed the actions of the team members. The observers then facilitated a debrief with team members.

A traditional RCA was conducted simultaneous with our SBRCA. Both the traditional and SBRCAs identified that a fluid administration error occurred. Only the SBRCA discovered specifically how that error occurred and detailed the steps of the error. The SBRCA also identified multiple contributing factors including labeling, team role, and communication issues. The SBRCA identified solutions and action plans to prevent future errors.

SBRCA is effective and may identify more elements than traditional RCAs. Simulation should be a routine part of event analysis.

PO 043 - Sim "To Go": Harmonizing a Complete Pediatric Hospital Network from Ground Up via Cascaded Sim

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

ID: IPSSW2015-1149

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1Newborn Medicine, 2Emergency Medicine, 3Pediatrics, 4Simulation, Boston Children's Hospital, Boston, United States, 5Divisions of EM and Pediatrics, Memorial University, Newfoundland, Canada, 6Anesthesia and Critical Care, Boston Children's Hospital, Boston, United States

**Background:** The SIMPeds SIM Network division is reaching beyond walls to connect Boston Children's Hospital to healthcare providers working with us in the community setting. The first stages of this program include reaching out to 9 BCH affiliated community hospitals in our network. Karen Gruskin MD, Elizabeth Doherty MD, Terri Becker DO, Lindsey Elliott, RN, and Jeff Rosebach with support from the Boston
Children’s Hospital Simulation Program (BCHSP) are leading the Network Simulation Program. The team launched the Network Simulation Program with a “kick-off” in June 2013 to community healthcare leaders, completed 8 Boot Camps geared towards physicians in emergency medicine, pediatric hospitalist medicine, and newborn medicine practicing at our affiliate community hospitals. June 2014 marked the next phase of the program as 36 BCH Network Providers including nurses, nurse practitioners, and physicians completed Instructor Training to become facilitators to start the process of providing in-situ simulation training at each community hospital. By cascading “know how” throughout the community and by developing sustainable simulation activities to occur on-site to support partnering institutions, BCH is able to raise the level of Network training with the ultimate goal to improve patient safety and care. The objective will be to evaluate the effectiveness of the program employing both process and outcome evaluation models.

**Educational Goal:** To develop a blueprint of the BCH Network Simulation Program with integration of the CIPP Evaluation Model Checklist (Context, Input, Process, Product)

Proposed approach to addressing the goal:
1. Needs assessment development/completion to create context to the program (CIPP)
2. Survey development to focus on input, process, and product (CIPP) to understand how the program is structured and functioning; how the program is working; what can be changed for improvement (Delphi method utilization)
3. Survey development to determine number of sites who have instituted system changes based on course

**Conundrum/ Difficulty:**
1. Course adaptation based on both skill and experience of Network group and on “lessons learned” from BCH Network Staff (Facilitators and Simulation Specialists)
2. Development of a debriefing strategy to adjust to particular Network Hospital needs: 2.0 Debriefing (High Signal); **2.5 Debriefing** (Novel-bridge of High Signal and Human Factors); 3.0 Debriefing (Human Factors)
3. Identification of Delphi Team for the Survey focused on IPP

**Discussion points:**
1. Best approach to modify debriefing
2. Refinement of Delphi Survey
3. Delphi Team identification

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**PO 044 – Sharing Lessons Learned**

**Topic: Patient safety and quality improvement**

ID: IPSSW2015-1253

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**Introduction/Background:** In 2013, this busy pediatric simulation center’s internal training program provided training to over 1,800 health team members equating to over 4,000 face-time hours. Much of the internal training being done is in the in-situ environment. Simulation with immediate debriefings allow for reflection and improvements in knowledge, skill and team performance. Frequently, potential safety threats are identified.

**Problem:** Simulation in the clinical environment is often chaotic, as simulation staff are clearing the environment to ready it for the “real” patient. Lessons learned are often documented in haste, and clinical
leaders may or may not be at the simulation and debriefing session. No one likes to complete a simulation in the clinical environment where many gaps are noted, only to come back 6 months later and find that many solutions to the problems identified had not been addressed.

**Approach to solving the problem:** Simulation experts at this pediatric hospital began to pursue a way to document lessons learned and provide the feedback to the clinical unit leaders. Findings often could be categorized into 1) Equipment and supplies, 2) Algorithm knowledge and application, or 3) Communication and teamwork. Simulation experts developed a template to report what went well and what could be improved and began to provide a copy back to the unit or department managers and medical directors. It serves as a tracking mechanism for simulation discoveries and continues to show the importance of staff taking the time to come into the in situ simulator to practice. National quality and safety benchmarks with recognition of those scoring high are important to hospitals and the public opinion alike. This document format assists in reporting to those benchmark surveys such as Leapfrog group and US News & World Reports Best Hospitals in America. The documents assist those planning curriculum for their areas to assure follow up on latent threats has occurred and serves as a gap analysis for educational needs.

**Questions:** What are other simulation centers doing to document findings? How are findings protected under quality improvement statutes?

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**PO 045 – Use of Simulation for the Care of Sick and injured Children in Limited Resource Countries**

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

**ID:** IPSSW2015-1194

**Donna Moro-Sutherland**¹, Marjorie L. White²

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**Background:** High-fidelity simulation (HFS) has been shown to be an excellent tool in medical education at all levels of training in industrial countries. In limited-resource countries (LRC), HFS is relatively absent. Equipment is expensive and sustainability has not been achieved. Several groups have explored the incorporation of low-fidelity simulation (LFS) in established educational programs and have shown that it is a valuable and effective tool. The most popular educational courses in pediatrics and maternal health include Pediatric Emergency Assessment, Recognition and Stabilization, Emergency Triage Assessment and Treatment and Helping Babies Breathe. These programs are sponsored through the American Heart Association, World Health Organization and American Academy of Pediatrics with Laerdal Global Health, ensuring their success in LRC.

**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 1:** A panel of colleagues in the field of pediatrics, simulation and global health will review pediatric simulation cases. The cases will focus on seven scenarios: sepsis/septic shock, malnutrition, pneumonia, gastroenteritis/diarrhea illnesses, malaria, HIV, and injury of a child in a limited resource setting. Incorporated within each of these cases will be the learning objectives, pediatric simulation scenario, and procedural skill set which will be covered during each of the teaching modules.

**Part 2:** Pilot testing and validation of each of the 7 pediatric scenarios. 5 sites in Africa will participate. At each of these sites the principal investigator, member of the panel and an individual educating at the site will be responsible for pilot testing and validating each of the 7 scenarios. The sites are located in Kenya,
Uganda, Botswana, Tanzania, and Rwanda. This component of the project is essential to show applicability.

Part 3: Establishment of a portal for pediatric cases, airway and procedural skills for the care of the sick or injured child in a LRC. This will begin with dissemination of the 7 pediatric scenarios for educators and learners in the global health arena.

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 046 – Simulation Using Standardized Patients Helps Staff Identify and Treat Ebola Patients

Topic: Patient safety and quality improvement

ID: IPSSW2015-1248

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Background: In light of the transmission of EBOLA to a healthcare worker in Dallas, many institutions are undergoing mandatory training for their staff with respect to CDC guidelines concerning the identification and care of potential EBOLA patients. All point of contact personnel, faculty and staff, in the Arkansas Children’s Hospital in key portal of entry areas have been identified. All the personnel in the Emergency Department, outpatient clinics, on transport service, and selected inpatient personnel will undergo
mandatory training to don and doff personal protective equipment (PPE), and follow standardized CDC protocols to both identify and treat patients potentially infected with Ebola. This is mandated by the Chief Medical Officer of the Hospital and will be required of all staff in those areas as part of their job. Standardized patient (SP) actors will assist in testing the protocols and provide practice for the staff and they undergo training. The SP inclusion also been mandated by ACH administration.

**Methods:** The pediatric simulation center will serve as a practice and training site for PPE education. Content experts from clinical education, the emergency department, and infectious disease will serve as trainers and resources for the center personnel who will assist with training and observation. The SPs will serve as test patients, in secret shopper fashion, to examine the integrity of the protocols in the involved hospital areas. The test patient results will be collected from each area as to adherence to the protocols and help identify any system issues that may arise on a department or hospital wide level.

The living subjects used are staff, n= approximately 400, that are all required to undergo training. No demographic data is being collected on the staff. The individual personnel will learn to properly don and doff PPE and then test the CDC protocols for their integrity and usefulness for personal and patient safety. The data collected and any protocol problems identified in the training are used for QI purposes of the ACH Hospital Administration only.

Specifically, we are observing how individuals adhere to the established CDC protocols and provide teaching and feedback to the individuals about any deviation from the protocols as part of their simulation training. If many individuals are observed to make the same mistakes then the protocol may be modified in a QI manner to allow better adherence for patient and personnel safety.

**Results:** These are pending, but we expect to identify several system issues that will be used to in a QI fashion to improve the protocols, thus enhancing patient and personnel safety.

**References:**

**PO 047a – Residents Do Not Designate a Team Leader during Mock Codes**

**Topic:** Patient safety and quality improvement

**ID:** IPSSW2015-1241

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**Objective:** Poor team leadership and lack of assigned duties can result in chaos, confusion and possible errors during a code. 3 Errors lead to repetition of tasks and incomplete procedures, resulting in negative patient outcomes. We hypothesize that pediatric residents do not regularly identify themselves as the team leader or assign team roles during mock codes.

**Description:** In 2012, an in-situ mock code program was re-instituted at Children’s Hospital of the King’s Daughters (CHKD) to evaluate the effectiveness of the PGY-2 and PGY-3 residents during simulated codes. All mock codes were unannounced, were conducted in the general pediatric units of CHKD and included two PGY-3 residents and one PGY-1 or PGY-2 resident. Simulation manikins from the Sentara Center for Simulation and Immersive Learning represented patients. An observational rating tool was used to record declaration of leadership and team member assignments. Review of the rating tool showed that of ten mock codes observed, the PGY-3s declared leadership on only five occasions and of these, only one
assigned tasks to the other members of the code team. In addition, one team leader performed tasks that should have been assigned to another team member such as bag mask ventilation, intubation, compressions, family interview, and drawing up and administering medications. Also one team leader announced themselves, but during the debrief the rest of the code team stated they were unaware of who the leader was during the code.

**Conclusion:** Pediatric residents do not regularly identify themselves as team leaders or assign team member roles in simulated codes. In order to improve the code team structure, a new and innovative curriculum will be introduced to the pediatric residents beginning in July 2014. This curriculum will incorporate the TeamStepps program and simulated patient encounters structured around team building events in order to educate residents on the importance of team leadership and communication. After the program’s implementation, it is expected that residents will regularly declare leadership and identify team member assignments during mock code.

**References:**


PO 047b – INSPIRE EpiPen

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**Background:** Epinephrine is the cornerstone of treatment for life-threatening conditions such as anaphylaxis, status asthmaticus and cardiac arrest. Pediatric physicians in training (PPITs) are expected to achieve a clear understanding of epinephrine’s dosing, dosage forms and routes of administration. It is unclear as to the extent that PPITs achieve this understanding. The purpose of this survey is to evaluate PPITs’ epinephrine knowledge base to inform further investigation using simulation based assessment and teaching.
**Research Question:** We sought to determine pediatric residents and pediatric critical care and emergency medicine fellows’ level of knowledge with the use and dosing of various epinephrine preparations.

**Methodology:** A survey was administered to pediatric residents and fellows at multiple training programs across the United States. Participants were asked about their epinephrine related training and experience as well as their knowledge of epinephrine availability and supply in their institution. The survey included 8 questions that queried participants’ knowledge about dosing, route of administration, and concentration of epinephrine as related to clinical scenarios.

**Results:** Surveys were distributed to 746 pediatric trainees at 7 institutions. The response rate was 68%. The majority of respondents (79%) were in their first three years of training. Training year has a statistically significant association with mean number of correct answers (p<0.0001) on the 8 questions about epinephrine dosing, concentration and route of administration. On average, PGY1s correctly answered only 50% of the 8 knowledge questions, while PGY3s and trainees in fellowship correctly answered 63% and 75% respectively. The questions most commonly missed were the epinephrine dose in mg/kg for resuscitation and the concentration of epinephrine in a standard auto-injector. In terms of dosing, 41% of PGY3s did not know the dose in mg/kg of resuscitative epinephrine and 49% did not know the concentration of epinephrine in a standard epinephrine auto-injector. There is no statistically significant difference in average knowledge score between participants who have personally administered epinephrine compared with those who have not. Those who had no educational experiences performed worse than those with at least one experience (p =0.0031).

**Discussion/Conclusions:** This study revealed a knowledge gap in a critical area of pediatric emergency care, and shows that pediatric training should be enhanced in this area. Despite a steady improvement in knowledge base with increasing level of training, the senior trainees had yet to achieve the level of knowledge to correctly use epinephrine that would be expected before completing training. This survey study serves as a needs assessment to inform further education. Due to the interactive active thought process and required clinical application of this topic, simulation may play an important role in this education. Modifications of this survey and methodology can be adapted for other topics where clinical application of knowledge could be further informed by a baseline assessment of trainees’ knowledge base.

A Work In Progress from the INSPIRE EpiPen Research Group

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**PO 048 – Effectiveness of Kangaroo Mother Care on Low Birth Weight Infants in NICU**  
**Topic: Simulation for procedural and psychomotor skills**

ID: IPSSW2015-1081  
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**Background:** Kangaroo Mother Care is defined as skin-to-skin contact between a mother and her newborn baby, frequent and exclusive or nearly exclusive breastfeeding and early discharge from hospital. This concept was proposed as an alternative to conventional methods of care for low birth weight infants, and in response to problems of serious overcrowding in NICUs. KMC essentially uses the mother as a natural incubator. According to this principle where maternal body heat can help control the baby’s body temperature. Although this practice is not the norm in KSA.

**Research question:** To assess the feasibility and acceptability of running a randomised controlled trial (RCT) to evaluate the effectiveness of KMC in LBW infants in KSA.
Methodology: A pilot RCT with supportive qualitative interviews was conducted, underpinned by a post-positivist approach.

Methods: This was a mixed methods study. Quantitative methods were used to measure the effectiveness of KMC, and qualitative methods were used to explore women’s and nurses’ experiences of a) KMC and b) trial processes. The quantitative element comprised a two-group, individually randomised controlled pilot trial with 20 mothers-and-babies per group. The qualitative element comprised semi-structured interviews, within 48 hours of birth, with a sample of 20 mothers who participated in the pilot RCT and 12 nurses who were attending these mothers. All 40 mothers were also telephoned when their babies were 6 months old to ascertain their feeding method and exclusivity of feeding.

Quantitative data were managed using SPSS and analysed descriptively to estimate confidence intervals and effect sizes. Statistical tests and regression models were used to explore associations with potential outcome measures. Qualitative data were analysed manually, using the Framework Approach.

Results: The pilot study confirmed that trial processes were efficient, the intervention was acceptable (to mothers and nurses) and that the outcome measures were appropriate; the percentage of women exclusively breastfeeding at 6 months was identified as the most appropriate primary outcome. A large scale trial of KMC would be feasible and acceptable in KSA. Conclusion: A large scale RCT comparing KMC with standard care in KSA is feasible, acceptable and recommended. However, prior to progressing to a large scale study, a thorough planning stage is necessary which considers cultural practices and ward environment. The understandings gained from this research will be transferable to other research within similar settings.

References:

PO 049 – Infant CPR Quality in Pediatric Emergency Department: Adherence to 2010 AHA Guidelines

Topic: Patient safety and quality improvement

ID: IPSSW2015-1219
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Background: Despite extensive provider training, outcomes from Cardiopulmonary Arrest (CPA) in children remain poor. Optimal cardiopulmonary resuscitation (CPR) performance is challenging due to the low-frequency of exposure for pediatric providers.

Research Question: Do highly trained inter-professional pediatric providers performing infant CPR adhere to the 2010 AHA guidelines? H1: Provider’s with more recent certification will have higher adherence. H2: Provider’s with increased confidence or experience will have higher adherence.

Methodology: Inter-professional providers (RN, MD, EMS, Tech) were recruited to complete a simulated CPA scenario at a large Pediatric Emergency Department (ED). Providers reported certification status (BLS only to BLS with PALS/ACLS), time since last certification, confidence in adherence to AHA 2010 guidelines and previous CPR experience via an online survey. The *Laerdal Resusci Baby QCPR with Skill Reporter©* was placed in an ED patient room and providers were presented a standardized case. Quantitative data was collected over 2 minutes and extracted from the Skill Reporter© software. Descriptive and inferential statistics were performed using SPSS.
Results: 77 providers completed the intervention. 100% providers were BLS certified, 83.1% PALS and 51.9% ACLS certified. Time since last certification was 1-3 months for 41.6% of providers, 4-6 months for 6.5%, 7-9 months for 7.8%, 10-12 months for 28.6%, and >1 year for 15.5% of providers. 20.8% had previous infant CPR experience within last one year. 62.3% were confident in adherence to 2010 AHA guidelines. Overall CPR score was 36.45 (23.03), 95% CI [36.45 ± 5.14], compression rate 130.77/minute (33.18), 95% CI [130.77 ± 7.41], compression depth 37.57mm (6.62), 95% CI [37.57 ± 1.48], correct hand placement 65.77% (36.69), 95% CI [65.77 ± 8.19], recoil 71.11% (34.13), 95% CI [71.11 ± 7.62], hands off time 8.23seconds (3.2), 95% CI [8.23 ± 0.72], chest compression fraction 61.89% (11.55), 95% CI [61.89 ± 2.58], ventilation rate 4.34/minute (2.69), 95% CI [4.34 ± 0.60] and ventilation volume 46.75ml (21.29), 95% CI [46.75 ± 4.76]. The relationship between provider characteristics and CPR performance is reported in Table 1.

Table 1. Provider Characteristics and CPR Quality:

<table>
<thead>
<tr>
<th>Score Level</th>
<th>1</th>
<th>2</th>
<th>p-value 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>59/77 (76.6%)</td>
<td>18/77 (23.4%)</td>
<td></td>
</tr>
<tr>
<td>Time since last Certification (PALS, ACLS or BLS)</td>
<td>9.54 months</td>
<td>5.22 months</td>
<td>(p=0.019)</td>
</tr>
<tr>
<td>Previous infant CPR experience (Yes)</td>
<td>13/59 (22.03%)</td>
<td>3/18 (16.67%)</td>
<td>(p=0.623)</td>
</tr>
<tr>
<td>Confident in adherence to AHA infant guidelines</td>
<td>38/59 (64.4%)</td>
<td>10/18 (55.6%)</td>
<td>(p=0.497)</td>
</tr>
</tbody>
</table>

4p-value was calculated using t-test and chi-square test.

Conclusions: The majority of highly trained inter-professional pediatric providers performing infant CPR did not adhere to the 2010 AHA guidelines. Providers with more recent certification had improved adherence and those with increased confidence or experience did not have improved adherence.

PO 050 – Quality of CPR within simulated cardiac arrest and influence of JIT training and feedback

Topic: Simulation for procedural and psychomotor skills

ID: IPSSW2015-1133

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Background: Effective CPR is critical to ensure optimal outcomes from cardiac arrest, yet trained healthcare providers consistently struggle to provide guideline-compliant CPR. It is unknown whether or not chest compression quality changes over time during a cardiac arrest event, and if visual feedback or just-in-time training influences CC quality over time.
Objectives: To describe the changes in chest compression quality over a 12-minute simulated resuscitation and examine the influence of just-in-time training and visual feedback on chest compression quality over time.

Methods: We conducted secondary analysis of data collected from the CPRCARES study, a multicenter randomized trial in which CPR certified healthcare providers from 9 different pediatric tertiary care centers were randomized to receive visual feedback, just-in-time training, or no-intervention. They participated in a simulated cardiac arrest scenario with two team members providing chest compressions. We compared the quality of chest compressions delivered (rate, depth and no-flow fraction) at the beginning (0-4 min), middle (4-8 min) and end (8-12 min) of the resuscitation.

Results: Chest compression depth was less than recommended guidelines in all three arms. There was no significant change in depth over the three time intervals in any of the arms. There was a significant increase in rate (128 CC/min to 133 CC/min) in the no intervention arm over the scenario duration (p<0.05).

Conclusions: There was no significant drop in chest compression depth over a 12-minute cardiac arrest scenario with two team members providing compressions. In this 12-minute scenario, two rescuers were unable to provide good quality CC.

PO 052 – Pediatric Septic Shock: Does Repetitive Simulation Improve Performance?

Topic: Patient safety and quality improvement

ID: IPSSW2015-1083

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Background: Two studies have assessed specific learner performance regarding the diagnosis and management of septic shock (SS)1, 2. However, these studies assessed the learner’s improvement after only a single simulation of SS, and did not examine objective performance improvement.

Objective: To correlate learners’ attitudes (ATT) and knowledge (KNO) regarding the diagnosis and management (D&M) of pediatric septic shock (PSS), to a learner’s performance during serial simulations (SIM) of PSS. We hypothesize that repeated exposure to SIM of PSS will improve a learner’s KNO, performance and ATT regarding PSS.

Methods: Pediatric residents (PR) participated in simulated crises of PSS after answering questions about their confidence (CONF) diagnosing and managing PSS, their ATT towards SIM education, and questions to test their KNO of PSS. PGY-3 PR were the control group, completing one SIM near the start of their third residency year, while PGY-2 PR were the intervention group, completing two SIM during their second residency year and one SIM near the start of their third residency year. Objective SIM performance was measured using a validated 27-item checklist (graded 0/1) related to monitoring, data gathering, and interventions required in the D&M of PSS3. A post-SIM quiz and survey were administered immediately following each SIM. Data were analyzed using paired t-test and two-sample t-tests and Spearman’s rank correlation coefficient.

Results: 18 PGY-3 and PGY-2 PR participated. PR cohorts had similar demographic variables. The PGY-2 PR had higher mean performance percentage scores during their third simulation when compared to the PGY-3 PR (87.3% vs. 76.6%; p < 0.001). PGY-2 PR also had a significant improvement in mean performance scores between each SIM completed (68.6% vs. 80.9% vs. 87.3%; p < 0.001 from first to third SIM).
Furthermore, one SIM for PSS management significantly improved PGY-2 PR KNO, (pre-score 51.3% vs post-score 81.9%; p < 0.001) and overall confidence about managing PSS (p < 0.001). Both PGY-2 PR and PGY-3 PR had a significantly higher mean quiz scores following each SIM when compared to the mean quiz score pre-SIM. PR with lower objective performance scores ($r_s$ = -0.47, p < 0.001) and lower KNO scores ($r_s$ = -0.25, p = 0.025) felt strongly they had forgotten prior PALS training. Higher PR KNO scores were associated with higher PR performance scores ($r_s$ = 0.35, p = 0.002). PR who felt more comfortable managing and treating septic shock prior to SIM had higher quiz scores ($r_s$ = 0.22, p = 0.051), but this confidence did not correlate with their skill performance ($r_s$ = 0.16, p = 0.156).

**Conclusion:** Serial SIM significantly improved resident KNO and overall CONF about managing PSS. PGY-2 PR had significant improvement in performance scores superior to PGY-3 PR, indicating SIM could contribute to improved PR diagnosis and management of PSS. Further study is needed to translate these results to patient care.

**References:**

**PO 053 – Self-Directed Learning Using an Infant Manikin Improves and Maintains Infant CPR Performance**

**Topic:** Simulation for procedural and psychomotor skills

**ID:** IPSSW2015-1157

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**Background:** Effective basic life support is reliant on high quality chest compressions, leading to improved survival and neurological outcomes.1-3 CPR training typically involves a 4-yearly course and annual updates. Despite skill degradation being demonstrated by 3-6 months,4-7 more frequent course attendance is not always possible. Bedside ‘booster’ CPR sessions (ie. rolling refreshers) have been shown to improve skill retention.8 The use of an infant manikin with an integrated feedback device may provide effective self-motivated training to improve CPR skill retention.

**Research Question:** Does self-motivated, rolling refresher CPR training with integrated CPR feedback, in comparison to no such training, improve quality of CPR over time?

**Methodology:** We performed a prospective, randomised controlled trial to assess the effect of self-motivated manikin-based learning on CPR skills over time. Participants were randomised to the intervention of unlimited access to a work-place based infant CPR manikin, which provided immediate
visual feedback on their CPR practice with both chest compression and ventilation scores, or to the control group without such access.

Participants of all grades of healthcare were recruited from theatres and PICU. The training device calculated a compression score based on rate, depth, hand position and release and a ventilation score derived from rate and volume. The device scoring algorithm was developed in collaboration with the American Heart Association. An overall score for each two minute session was calculated by averaging the compression and ventilation scores. Both study arms had baseline scores on the manikin. Baseline and subsequent scores were used to rank participants anonymously on monthly updated league tables, which were posted close to the manikin. Baseline and final 6-month scores were compared between the control arm and intervention arm via paired Wilcoxon tests. For participants not motivated to continue for 6 months, their last recorded score achieved within the 6 months was taken as a final score.

**Results:** Of the 170 study participants, 116 (68.2%) were theatre-based and 54 (31.8%) PICU-based. 91 were in the intervention group (53.5%) and 79 (46.5%) the control group. There were no notable demographical differences between the two study arms.

The median (IQR) baseline overall scores for the control and intervention groups respectively were 47.0 (31.75-63.00) and 47.5 (33.50-63.00).

The median (IQR) 6 month overall scores for the control and intervention groups respectively were 47 (34.50-58.25) and 62.0 (42.00-81.75).

**Conclusion:** Scores for overall CPR performance in the intervention group improved significantly over the 6-month period (p<0.001), compared with the control, suggesting that self-motivated, rolling refresher CPR training with an integrated CPR feedback, can improve quality of CPR over time. This study indicates that interactive CPR manikins can promote self-directed learning in motivated individuals.

**References:**


PO 054 – Does Simulated Scenarios Affect Pediatric Office Emergency Interventions?

*Topic: Simulation for procedural and psychomotor skills*

ID: IPSSW2015-1197

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**Background:** Pediatricians’ offices are common venues of presentation for children with acute medical conditions. Office-based practitioners should have appropriate training and skills to stabilize an acutely ill child (termed office emergency preparedness, OEP). In 2008, we studied 6 pediatric practices in greater Houston and found OEP training increased provider knowledge and perceived comfort in managing emergencies. 1

**Research Question:** Does this OEP educational program affect whether hypoxemic patients receive oxygen in the office prior to ambulance transfer?

**Methodology:** This prospective study was conducted at a tertiary-care children’s hospital and a network of affiliated pediatric practices between August 15, 2011 and August 30, 2013. The eight practices comprising the intervention group (received the OEP) were the sites previously reporting the greatest number of office emergencies. The remaining 36 practices were controls (did not receive the OEP.) The OEP consisted of a 30-minute didactic presentation in each office followed by two simulated scenarios. The simulated scenarios focused on managing emergencies requiring basic life support skills with emphasis on the circulation-airway-breathing concept. The primary outcome was the number of hypoxemic patients receiving oxygen. Data was collected from a TCP Ambulance Transfer Database that was developed to track medical emergencies presenting to the office. Patients were deemed to be hypoxic if they had an oxygen saturation <90% or if they were diagnosed with hypoxia.

**Results:** 327 patients were transported via ambulance from the practices to the ED during the study period. Of those patients 176 (54%) had a diagnosis of hypoxemia: 61 (35%) in intervention group, 115 (65%) in the control group. The majority of the patients that were deemed to have an emergency medical condition were under age 5 (61% intervention group; 84% control group), with over 90% in each group reported as having a previous medical history. The main duration of illness was 3.1 days in the intervention group and 3.9 in the control group. There was no significant difference in admission rates between the two groups (69% vs 74%, odds ratio 0.78, [95% confidence interval: 0.39-1.55]). The mean length of hospital stay was 2.9 days in the intervention group and 4.6 in the control group but this did not reach statistical significance (p=0.20). 93% of the hypoxemic patients in the intervention group received oxygen while 74% in the control group received oxygen (odds ratio 5.03, [95% confidence interval: 1.68-15.0])

**Conclusions:** This study indicated that the OEP was effective in changing practitioner behavior during the medical emergency of hypoxemia. Further respiratory emergencies are the most common emergencies presenting to the office and the majority occur in children less than 5 years with previous medical problems.

PO 055 – A Simulation to Assess the Safety of Systems within a Patient Journey

*Topic: Patient safety and quality improvement*

**ID:** IPSSW2015-1161  
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**Discussant:** Efforts to mitigate unexpected problems during the transfer process of a critically sick child from a new helipad facility to an emergency department or intensive care unit in a new hospital (Greenfield) hospital are imperative to ensure effective health care delivery and patient safety.

The authors are in the planning process of implementing a simulation activity to evaluate the clinical process, timing, efficacy of routes taken and identification of latent errors to assist with team and facility orientation and systems testing prior to opening.

**Background:** Collaborative operational readiness testing and orientation of the accompanying transport team to a new academic medical center is a work in progress. A series of planning meetings involving site visits and schematic design review has taken place in collaboration with the crew of the Helicopter Emergency Medical Service from Hamad Medical Corporation Ambulance Service. The future receiving hospital will be Sidra Medical and Research Center and to date has included groups comprising of security teams, clinical staff, and the Simulation Department.

A paediatric manikin, representing a 25kg eight year old will be loaded on to the transport stretcher and transferred from the helicopter to the new critical care areas of the new facility. Participants will perform any necessary patient care interventions en route. A multiple trauma scenario will be elicited to emulate the dynamics of a real situation that may arise.

**Educational goal:** Debriefings and surveys will be used to assess participants’ perceptions and rating of the new facility's clinical readiness and identified areas requiring attention through deconstructing the patient journey.

PO 056 – Assessment of Cervical Spine Movement during Endotracheal Intubation of a Pediatric Manikin

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

**ID:** IPSSW2015-1131  
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**Background:** The ideal method for protecting the cervical spine during endotracheal intubation (ETI) in the pediatric trauma setting is not known. Our purpose was to determine the optimal patient position and in-line stabilization method for ETI of patients with suspected cervical spine injuries.

**Research Question:** What is the best way to secure an airway with minimal C-spine movement?
**Methods:** This was a single-center, pilot exploratory study of ETI utilizing a static pediatric airway manikin. After a standardized practice session, pediatric emergency physicians attempted (in randomized order) ETI a total of six times. Three spinal immobilization methods were used: manual in-line stabilization from in front of and behind the manikin and cervical collar. Two attempts per immobilization method were performed: one with the bed horizontal (0 degrees) and one at 15 degrees. ETI was performed with a video laryngoscope, and these videos were used for analysis. Primary endpoints included time to intubate; time to best view; glottis exposure, as measured by both modified Cormack and Lehane (MCL) and Percentage of Glottic Opening (POGO) scores; and maximal cervical extension. Two board-certified anesthesiologists, blinded to manikin position and immobilization method, independently assigned time and exposure grades. For each attempt, continuous endpoints were averaged between reviewers. Discrepancies in the MCL score were resolved with a third, blinded, expert reviewer. Cervical extension angle was measured by a computerized inclinometer that was uniquely designed for this study. Dichotomous comparisons were made utilizing the Mann-Whitney U test, and those among more than two groups were analyzed with Friedman’s analysis of variance. All tests were two-tailed, with $P < 0.05$ considered statistically significant.

**Results:** There were 114 ETI attempts by 19 Pediatric Emergency Medicine trained physicians. There was excellent agreement between reviewers, as measured by their assignment of MCL score ($kappa = 0.842$). While no method of immobilization or position was associated with a significantly faster time to intubate or time to best view, there was a trend towards shorter times at 0 degrees vs. 15 degrees ($P = 0.095$). MCL scores trended towards better visualization at 15 degrees ($P = 0.108$). POGO scores were significantly different across all subgroups ($P = 0.014$); pairwise comparisons with adjusted $P$ values showed that the 15 degrees position, holding from the back, led to optimal view. Cervical extension was significantly less at 15 degrees versus 0 degrees ($P = 0.037$), and in a collar versus the two manual in-line stabilization methods ($P = 0.021$).

**Conclusions:** In respect to cervical extension and glottis visualization, our data suggest that pediatric ETI is optimal with the head of the bed at 15 degrees. While visualization may be improved with manual in-line stabilization from the back, keeping the patient in a cervical collar leads to less neck extension.

**References:**


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**PO 057 – Simulation Training Incorporating Progressive Fidelity and Task Complexity Enhances Skill Transfer**  
*Topic: Simulation for procedural and psychomotor skills*

ID: IPSSW2015-1250  
**Catharine M. Walsh**¹, Michael A. Scaffidi², Samir C. Grover²
Background: For simple procedures, a progressive model of simulation-based training that utilizes low-fidelity and then high-fidelity simulators, results in superior skill transfer within the simulated environment as compared with low-fidelity or high-fidelity simulation in isolation. However, the utility of a progressive training model for more complex procedures, and its effect on trainees’ ability to transfer their skills to the clinical context, remain unknown.

Aim: To determine whether a curriculum incorporating progressive levels of simulation fidelity and task complexity improves colonoscopy skill acquisition and transfer to the clinical setting as compared to a curriculum utilizing high-fidelity simulation in isolation.

Methods: 37 novice endoscopists were randomized to 2 groups. The progressive group received 6 hours of simulation-based training, initially for 1 hour on a bench-top colonoscopic simulator (low-fidelity) followed by 5 hours on a virtual reality (VR) simulator (high-fidelity), during which they practiced tasks of sequentially increasing complexity. The high-fidelity group received 6 hours of VR training, with simulation tasks arranged in random order of complexity. Both groups received expert feedback during training and 4 hours of lectures. The primary outcome measure was performance during participants’ first 2 colonoscopies in the clinical setting (performed 4-6 weeks after training) assessed by a single blinded reviewer using the JAG DOPS scale, a task-specific colonoscopy assessment tool. Secondary outcome measures included differences with respect to: (1) procedural knowledge; (2) performance on a VR simulator task immediately and 4-6 weeks after training as measured by a modified JAG DOPS scale; and (3) performance during an integrated scenario (whereby participants perform a VR colonoscopy while interacting with a standardized patient) 4-6 weeks after training as measured by the JAG DOPS scale and validated communication and integrated scenario global rating scales.

Results: There were no significant differences between groups in demographics or VR performance at baseline (p>0.05). The progressive group outperformed the high-fidelity group during their first clinical colonoscopy procedure (p<0.01, d=1.02), but not on the second. The progressive group also displayed superior technical skills on the VR simulator at the end of practice (p<0.05, d=0.96), and performed significantly better during the integrated scenario in terms of communication (p<0.001, d=0.62), global performance (p<0.001,d=0.81), and colonoscopy-specific performance (p<0.01, d=1.51). There was no difference in knowledge acquisition between groups (p>0.05).

Conclusion: A colonoscopy simulation-based curriculum, involving progressive-fidelity and increasing task complexity, led to improved skill retention and transfer. The study findings are commensurate with learning theories on scaffolding.

References:
Background: Healthcare professionals have a 16-55% error rate in adherence to the Neonatal Resuscitation Program (NRP) algorithm. Poor communication has been highly correlated with noncompliance with NRP steps.\(^1,2\) Research in information-dense and high-risk fields such as air traffic control (ATC) has shown that 70% of airline accidents are due to human error, and 80% of errors are due to communication.\(^3\) Standardized communication techniques (SCTs) have been proven to reduce errors in aviation. Despite similarities in risk to human life, no such lexicon for effective communication exists in healthcare.

Research Question: Can use of SCTs decrease the error rate during simulated neonatal resuscitation?

Methods: In a randomized, prospective, cross-over study, subjects performed as lead resuscitator in two simulated neonatal resuscitations. Two confederates were trained to use or not use SCTs based on randomization. Subjects led one scenario in which confederates used non-standard communication, and a second in which confederates used SCTs. Order of scenarios and communication methods were randomized.

An NRP instructor blinded to group assignment reviewed each videotaped resuscitation for number and types of errors committed. Primary outcome measures were calculated percent error rate, time to initiation of positive pressure ventilation (PPV), and time to initiation of chest compressions (CC).

Results: A total of 13 subjects were recruited for participation in this study. Seven subjects were exposed to non-standardized communication in the first scenario. The other six subjects were exposed to SCTs in the first scenario. Order of clinical scenarios was also randomly assigned.

Average number of communication techniques used in the SCT scenarios was 15.5 compared to 6.7 in the non-standard communication group (p=0.0015), indicating that confederates used the SCTs as instructed and per the randomization scheme. Teams exposed to SCTs showed a trend in decreased average error rate (40% vs. 37%, p=0.18), decreased time to initiation of PPV (32.4 vs. 30.7 sec, p=0.58), and decreased time to initiation of CC (120.7 vs. 112.8 sec, p=0.78).

Conclusions: While these results are not statistically significant, they show a trend towards decreased error and improved human performance to suggest that SCTs are effective. There was an approximately 2 second improvement in time to initiation of PPV and 8 second improvement in time to initiation of CC. While not statistically significant, these differences could be clinically significant.

This study has generated novel objective data about the rate and types of errors made during neonatal resuscitation and the efficacy of standardized communication to decrease those errors. Focused training in SCTs has the potential to standardize communication throughout healthcare in much the same way it has been systematized in aviation and air traffic control.

References:
PO 059 – Seeking Best Training Model for Neonatal Difficult Conversations

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1213

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Background: Neonatologists disproportionately preside over pediatric deaths. The communication skills required to support families have traditionally developed through mentor observation. Fellowships increasingly integrate simulation-based training to reproduce the decision context for palliative care and other high stakes conversations.

Hypothesis: A formal Difficult Conversations curriculum prepares fellows better than traditional mentor observation.

Methods: Single-center neonatology fellowship graduates from 1999-2013 were sent a retrospective web-based survey. Some had been exposed to a Difficult Conversations (DC) curriculum, others had not (control group). Four of 32 fellows who contributed to the curriculum were excluded. Each fellow since 2009 participated in one DC workshop annually. Each workshop interspersed lecture, simulation and debriefing. Workshops, offered three times per year, include exactly one 1st, 2nd and 3rd year fellow. Scenarios varied per workshop, customized to year of training: typical 1st year vignette was borderline viability consult; 2nd year was disclosing birth trauma; and 3rd year was managing combative parents. Epoch comparisons were made before and after instituting the simulation-based curriculum.

Results: Response rate was 85%, with 12/25 respondents in the DC group. Self-rated baseline effectiveness at discussing difficult topics was not different. DC group reported more supervised family meetings (p=0.006) by neonatologists who provided more feedback after fellow-led meetings (p=0.03). DC group experienced more communication didactic sessions (p=0.048). Simulations were rated very positively. Fewer in the DC group (25%) reported insufficient communication training than controls (46%). DC group reported increased comfort levels, despite similar thought organization and conversation structure. Specific communication skill acquisition varied (25%-90%) between fellows. Strategic pause (p<0.05) and body positioning (p=0.002), were more frequently in the DC group. In both groups, the highest ranked contributors were: (1) fellowship mentor observation and (2) clinical practice. Among those in the DC group, (3) simulation with standard patients and (4) debriefing videos outranked didactics or other experiences.

Discussion: This survey documents the trajectory of self-assessed skill acquisition by advanced practitioners who regularly direct difficult conversations. Training epochs crossed from trial-by-fire to a deliberate simulation-based curriculum, resulting in fewer trainees reporting unpreparedness. Specific communication skills may be more responsive to simulation-based practice. Increasing supervision and feedback may reflect increasing faculty awareness or trainee empowerment to ask. While simulation-based workshops improve communication skills in these high stakes difficult conversations, they do not substitute for mentor observation and feedback.

References:


PO 060 – Postgraduate Students Medical Competences Simulation Based Evaluation

**Topic**: Patient safety and quality improvement

**ID**: IPSSW2015-1226

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**Objective**: Evaluate medical competences in postgraduate anesthesia and pediatrics residents in simulation based about pediatric emergency scenarios and determine accurate of skills, knowledge background and teamwork.

**Methods**: 24 Pediatrics residentes and 10 anesthesi residents form Universidad de San carlos de Guatemala were included. All of them with former formation in advanced lifes support courses and effective performance of shift and rotation in operating room and pediatric emergency / intensive care. Each of them take a exam with pediatric emergency and advanced life support cases, develop each of them a scenario in SOYUTZ Pediatric Emergencies Simulation Center at Hospital General San Juan de Dios. A low fidelity maniken and vital signs monitor program in a operating room / Emergency environmet
were used. After each scenario a debriefing session were performed and after that we receive feedback form the activity and usefulness of novel methodology in postgraduate courses in Guatemala.

**Results:** None of the postgraduate students had higher score in written exam over 80% of competence, none of them complete well pediatric advanced life support algorithms checklist based in scenario and none develop efficient competence in temawor in the scenario evolution. All of them describes the scenario and the written test were accurate with real possibilities and decision making. All of them recognizes this kind of methodology novel experience, useful, non stressed situation, feel encouraged to recognize pitfalls and describes clear and objective identification of failures. All of them consider simulation based evaluation could be very useful to ensure learning and competences in whole levels pediatrics and anesthesia residents.

**Conclusion:** Simulation based evaluation could be useful and accepted tool for improving learning and quality assessment to assure the good performance in advanced life support and pediatric emergencies / intensive care scenarios in Guatemala.

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**PO 061 – Development of Pediatric Emergencies Simulation Center in Guatemala City Public Hospital**  
*Topic: Programme development/ Administration and Programme Management*

**ID:** IPSSW2015-1225  
**Luis A. Moya-Barquin**

**Objective:** Plan, design, make a Pediatric Intensive Care Unit / Ambulance environment in Hospital General San Juan de Dios / Universidad de San Carlos de Guatemala to develop simulation courses and training to improve performance in graduate and postgraduate health staff. Be the first simulation center in public hospital based and be affordable in training cost by multiple financing.

**Methodology:** Describe a project based in endorsement by Simulation International Group initiative, based in training received Pirogov Russian National Research Medical University (RNRMU), with 10 countries faculty in May 2013. The project was endorsed by Hospital General San Juan de Dios / Ministry of Health and Postgraduate Medical School and reasearch board - Dirección General de Investigacion - DIGI - at Universidad de San Carlos de Guatemala. The design of Type II ambulance and PICU/ Operating room environment in 100 m2 with 4 areas with educational support. In March 2014, colleagues from those countries develop the first international russian-european-latin American course in Central America.

**Results:** SOYUTZ (good union, russian-mayan mixed word ) PEDIATRIC EMERGENCIES SIMULATION CENTER is open to be a support to medical education in a developing country.

**Conclusion:** The development of pediatric emergencies simulation center is the first in Guatemala at least Central America located in public hospital to improve the opportunity to have simulation training and debriefing in medical students, postgraduate and staff.

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**PO 062 – Pediatric Life Support Competences in Medical Students in Guatemala**  
*Topic: Simulation for procedural and psychomotor skills*

**ID:** IPSSW2015-1196  
**Luis A. Moya-Barquin**
PICU / Pediatrics, Universidad de San Carlos de Guatemala, Guatemala City, Guatemala

**Objective:** Measure the performance of skills, attitudes, knowledge and teamwork in pediatric emergencies scenarios.

**Methods:** Descriptive evaluation, 24 last year medical students, divided in 6 groups make a 40 question written test based in medical scenarios, and checklist of performance about the scenario based in Advanced Life Support Course was performed. SOYUTZ (good union: russian - mayan mixed word) Pediatric Emergencies Simulation Center at Hospital General San Juan de Dios / Universidad de San Carlos de Guatemala in Guatemala City. During this evaluation attitudes related feedback and debriefing was done as teamwork proficiency. Each student have completed the academic curriculum of university degree. Each student resolve a scenario with low fidelity maniquen and vital signs simulation software.

**Results:** The score average in written test was 47.8 / 100, the checklist to measure the algorithms was 56 / 100 and the teamwork was 60 / 100 and attitude related to feedback and debriefing was positive in all cases and describes self as a good experience even the performance results needs to improve.

**Conclusion:** None of the students develop enough performance as academic background and none complete accurate algorithms about pediatric advanced life support. All students describes simulation practice a very good experience and aim to use as methodology. The official university background is theoretical and do not measure competences and performance in life treathing scenarios.

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**PO 063 – Simulation Training on Pediatric Emergency Technical Skills: Experience from Nancy and Nice**

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

**ID:** IPSSW2015-1141

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**Objective of the study:** Assess of training on emergency actions for pediatric residents.

**Material & Method:** A multicenter prospective study between December 2013 and May 2014, evaluates 35 young residents on the following actions: ventilation (V), intubation (I), intraosseous catheter (O), external cardiac massage (M). Residents have received academic and practical training (on low-fi models) over 2 days (Day 1: M0 and 1 month later: M1). Then, they have been evaluated by 4 experienced seniors using validated scales at different periods: M0 (pre test and post test analysis), M1 (pre test and post test analysis) at 3 months (M3) and 6 months (M6).

**Results of the study:** At the end of month 1, the mean score ( / 20) of the 4 skills (V , I, O and M) has increased significantly, respectively: “V” from 8.4 (± 3.4) to 19.0 (± 1.4), “I” from 5.3 (± 2.4) to 18.7 (± 1.8), “O” from 6.4 (± 3.0) to 16.7 (± 3.2) and “M” from 10.9 (± 3 0) to 18.7 (± 1.8). The Spearman correlation coefficient is respectively 0.548, 0.505, 0.626 and 0.518 (p < 0.0001). At M3, the mean scores remained significantly higher compared to M0 with respectively for “V” 16.5 (± 2.2), “I” 16.8 (± 2.4), “O” 16.9 (± 2.1) and “M” 16.9 (± 1.8).

**Conclusion of the study:** At M1, residents who received the training are efficient for the 4 skills. At M3, residents remain as efficient as M1. M6 evaluation’s purpose is to evaluate, the assimilation level for each skills, in order to prepare residents to cardiac resuscitation scenarios.
PO 064 – Mapping MEPAT Simulation Course to the Royal College of Anaesthetists UK (RCoA) Training Curriculum

Topic: Process improvement and organizational change

ID: IPSSW2015-1098
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Context: The RCoA Certificate of Completion of Training (CCT) in Anaesthesia is competency based, with an emphasis on achieving competencies within units of training4. Units of training are broken down into a number of coded competencies and evidence for achievement of these can be drawn from several sources including completion of the Fellowship of the RCoA exam, workplace based assessment (WBA) and simulation2, 3. Managing Emergencies in Paediatric Anaesthesia for Trainees (MEPAT) is an international course consisting of a series of literature based, expert peer reviewed high fidelity simulation scenarios which aims to give trainees the opportunity to develop skills in the management of paediatric anaesthetic emergencies4.

Completing MEPAT offers a chance to evidence several areas of the CCT curriculum. However, curricula are wide ranging and extensive and this can be challenging for the trainee to navigate. Curriculum mapping is a tool which helps both the trainer and trainee to explicitly outline key elements of the curriculum and how they link together5. We have produced a map linking the MEPAT course to the RCoA curriculum.

Description: Anaesthesia trainees who had recently completed both their paediatric anaesthesia unit and a MEPAT course reviewed the MEPAT scenarios. Learning objectives were reviewed alongside the RCoA curriculum2, 3 and a list of coded competences was matched to each scenario to create a map. This map was then reviewed by a MEPAT trainer and submitted for comments to the MEPAT faculty.

Visual representation of the map has been produced with competencies in the units of ‘Management of respiratory and cardiac arrest in adults and children’, ‘Critical Incidents’, ‘Paediatrics’ and ‘Airway Management’ and ‘Improvement Science, Safe and Reliable systems/ human factors’.

Discussion: Mapping of the MEPAT simulation course to the RCoA curriculum has not yet been done but mapping of the MEPAPC (MEPA for Consultants) course to the RCoA Continuing Professional Development matrix has been completed4 and is used for appraisal and revalidation. We hope that our new map will benefit trainees in a similar way.

During this mapping process we identified areas of the curriculum in addition to paediatric anaesthesia which are covered in the MEPAT scenarios. Without using our map trainees may miss the opportunity to include these additional areas in their portfolio. So far, feedback on our map from trainees and specialist paediatric anaesthetists has been positive.

MEPAT is delivered in a number of countries including the USA, Canada and Australasia. This mapping exercise could be easily replicated, using the local anaesthesia training curriculum. A further development of this work is the inclusion of WBAs during the MEPAT course – we have developed a template RCoA case based discussion (CBD) form for each scenario which are currently piloting. We hope to be able to comment on feedback on the use of these by the time of poster presentation.

References:
4. www.mepa.org.uk

PO 065 – Learning Together by Simulating Together – Across Departmental Boundaries

**Topic: Interprofessional Education (IPE)**

ID: IPSSW2015-1251

**Ruth Gottstein**¹, Kirsty Macleannan², Minju Kuruvilla¹, Edward Johnstone³, Mark Hellaby⁴

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**Context:** A lack of effective team working and communication can negatively affect patient care¹. In labour and delivery it has been cited that poor communication is the root cause in over 80% of perinatal deaths and injuries².

In large teams it is not feasible to train everyone to work together due to the number of combinations, constantly changing membership and that individuals come together at short notice to rapidly form the team³. Appropriate debriefing by the multi-professional faculty for the whole team, aimed at reviewing performance and improving team mental models has been shown to improve team performance⁴.

Since 2013, a simulation based program involving the Obstetric, Neonatal, Theatre and Anaesthetic teams has been developed. The scenarios were videoed to facilitate retrospective analysis to identify latent issues. This abstract describes one such learning event comprising of three separate simulation scenarios.

**Description:** The three peer reviewed scenarios covered an obstetric and anaesthetic emergency and subsequent simultaneous management of neonatal and obstetric patients following a power failure.

Participants were briefed on the manikins, equipment and expectations. It was reinforced that the aim of the session was to develop team awareness and communication and detect organisational issues.

**Observation /Evaluation:** The 14 staff who participated completed feedback forms with questions on a Likert scale and free text answers. Faculty provided additional information of latent issues.

**Discussion:** It is recognised that often staffing levels are a significant barrier to in-situ training sessions; this was made more challenging by the number teams and people involved. To negate this, we ensured the session was delivered on a day with reduced elective workload, for staff not on call.

The session allowed staff to understand the roles and priorities of different members of the team as well as developing both technical and team responses to the scenarios. It was noted and fed back, that the neonatal and obstetric teams tended to work in isolation and there was no sharing of information and minimal sharing of staff.
Staff awareness and understanding of equipment battery life was deficient and constructive suggestions for further education in this area was obtained.

Feedback from the participants was very positive and staff were actively engaged.

It was agreed that in the future simulations, video would also be integrated into the debriefing. Future sessions will focus on commonly encountered emergencies, high-level incidents and rare major events.

These sessions were very well attended by all relevant teams. In addition, the excellent feedback and learning outcomes described by the participants suggest that they found the sessions both useful and informative. Running these sessions has been extremely useful as they highlighted major barriers of communication between individuals and teams as well as uncovering latent errors.

References:

PO 066 – Building a Culture of Patient Safety Using Simulation
Topic: Interprofessional Education (IPE)
ID: IPSSW2015-1252
Manu Madhok, MD* 1

1Emergency Medicine, Children's Hospitals and Clinics of Minnesota, Minneapolis, United States

Context: Medical errors continue to be leading cause of death in the United States. Much work has been done to identify the human factors contributing to the errors and recognize the potential solutions. It is often easy to own up one’s mistakes rather than telling a peer healthcare worker about their error. Morbidity and Mortality conferences bring multi-disciplinary approach to review a patient course, various interactions and interventions to identify opportunities of improvement in care and correct any gaps in knowledge. Simulation exercise can recreate such situations and identify latent errors in a non-threatening way by taking focus on the clinical situation and thinking frames rather than on the actual case in M&M. Videos of such simulation exercise can be very useful educational tool for a wider audience.

Description: In order to foster the culture of patient safety a simulation case was designed, roles scripted and the simulation exercise was recorded. At the annual mandatory meeting of all employed physicians of this Children's Hospital, an educational presentation was done utilizing video clips of simulated case. The presentation focused on performance and errors being skill-based, rule-based or knowledge-based; and involved audience in identifying each in various segments of the simulated case. Behavior themes depicted in errors and potential prevention strategies were illustrated in comparing "bad" and "good" simulation cases. Communication principles like repeat back, SBAR, ARCC and patient hand-off using I-PASS tool were demonstrated and discussed.
**Observation/Evaluation:** The simulation exercise was very well received and led to a healthy discussion in context of medical errors, communication principles, patient hand offs and emulating best practice. Better patient hand-offs techniques have been incorporated in various departments.

**Discussion:** All humans are fallible, including highly trained and educated. There are distinct types of performance errors, and changing behavior can help drop error rate. Changing physician behavior is difficult but leadership can positively influence change in behavior by embracing patient safety culture at all levels and changing HOW we work and not the amount we work!


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**PO 067 – Standardized Pediatric Mock Code/In Situ Simulation Program**

**Topic: Process improvement and organizational change**

ID: IPSSW2015-1077  
Kelley Sava, Sarah Maciolek, Elise Madeck, Denise Angst

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**Context:** In 2012, our organization integrated two children’s hospitals into a single children’s hospital with two campuses. The two campuses utilized different methods of running mock codes, and in some instances more than one process at a single site. There was not a consistent method for assessing team performance, tracking latent safety threats or evaluating outcomes for this type of training. In May of 2014, our health system began implementing a consistent approach to simulation training. One of the first initiatives was a standardized process for doing in situ simulation training, and the Children’s Hospital served as the first pilot site for this program within the health system.

**Description:** A standardized package was created for performing in situ simulations. This package included an in situ simulation toolkit, standard scenario templates, debriefing template, and a scoring tool. Three facilitator roles were identified including a simulation operator to control the manikin, a scorer to measure team effectiveness skill completion/accuracy, and an evaluator to lead the debriefing. Facilitators attended a training session that included an introduction to the standardized in situ simulation program and tools. In addition, participants attended a debriefing ‘boot camp’ in which they received training on a standard debriefing framework. After the training, facilitators scheduled several in situ simulations within the following weeks and sessions were videotaped for review and scoring.

**Observation/Evaluation:** This is the pilot phase of this program. Feedback from the facilitators has been very positive. They reported improved confidence in debriefing by utilizing the standardized process and appreciated the standardized approach to allow greater consistency in scenarios and performance across care areas. Scoring of the scenarios is being completed post event via video recording. This allows the scorer to review the scenario several times to ensure greater accuracy in scoring. The standard approach requires follow up and documentation for any identified latent safety threat. At this time no latent safety threats have been identified.

**Discussion:** Feedback from the facilitators on the process, tools and educational tactics as well as learner feedback will be utilized to modify the program prior to a wider roll out across our large health care system. Event scores obtained during the pilot simulation will be utilized to determine the baseline metrics for the system. By using a standardized scenarios, processes, and scoring we will be able to better evaluate performance over time and across clinical areas and sites. This information will be used not only to enhance the overall program and ongoing improvements, but will inform future training targeted to
particular types of patients, clinical disciplines, and sites of care. The anticipated results are improved team performance, greater patient safety, and enhanced patient outcomes.

**PO 068 - Curricula Design to Support a Safe Patient Opening in a Middle East Pediatric Greenfield Hospital**  
*Topic: Patient safety and quality improvement*

ID: IPSSW2015-1234  
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Securing a safe patient opening at a Greenfield Children’s Tertiary Care facility creates a unique source of tension and challenge for educational leadership. At Sidra Research and Medical Centre in Doha Qatar, the department of education is tasked with developing a rigorous educational curricula based on the North American Model of Health service delivery to support the onboarding of 4000 Interprofessional and international Clinicians. The purpose of this abstract is to share the progressive and educational approach to Sidra’ curricula design developed to support a safe patient opening.

As with any curricula it is important to define the problem and needs of potential stakeholders. To support an American Model of health service delivery, Sidra in the planning phases outlined that 65% of recruitment was to be from North America with 35% from other recognized Western World countries. All successful recruits would be required to provide evidence of active licensure form their country of origin. With this mix of employees the assumption that all clinicians recruited will demonstrate behaviors consistent with BEST PRACTICE and the American Model is tenuous and is the impetus behind developing a standardized rigorous Inteprofessional model of education.

Standardizing education through a centralized IP approach is again a new and forward approach to education at an academic centre of excellence but becomes even more important at a Greenfield Hospital to attain consistency across the organization with quality curricula to achieve both a safe patient opening and optimal health outcomes. This approach is grounded by both learning and experiential theory, where the assumption that all recruited health care professionals arriving with an active license from the country of origin are competent but need exposure to the new environment, processes and policies and the Interprofessional team members. By taking each IP team through a series of cases, elearning, equipment and skill training and Interprofessional simulation based learning, we create a learning context that enhances the opportunities for clinicians to learn about each other, from each other and with each other as they get acquainted to the Sidra Way. The rigor of the approach is enhanced by opportunities for Sidra leadership team to assess all levels of Blooms’ taxonomy of learning, whilst delivering essential information in a manner that meets the needs of different learners (visual, auditory and kinaesthetic learners). Our outcome measures will include competence assessment throughout all phases of the curriculum.

We look forward to presenting the effectiveness of our approach at a future meeting.

**PO 069 - Multidisciplinary Crisis Simulation Curriculum in Pediatric Radiation Oncology**  
*Topic: Patient safety and quality improvement*

ID: IPSSW2015-1041  
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Children's Hospital of Colorado, Radiation Oncology, University of Colorado Denver, Anesthesiology, Children's Hospital Colorado, Aurora, United States

**Context:** Radiation therapy plays an important role in the management of many pediatric oncology patients. The accuracy of radiation treatment depends on the ability of the child to lay still. Children either too young or in too much discomfort to tolerate the procedure awake usually need anesthesia. In our program, children are treated at an adult ambulatory facility and are managed by anesthesiologists (AU) and oncology nurses (RN) from the children’s hospital. Crisis situations are rare but potentially fatal if managed inappropriately. Other challenges include lack of an in-house code blue system, unfamiliarity of the children’s hospital team with the adult facility, unfamiliarity of the adult radiation oncology team in treating children, and the RNs are not used to the administration of anesthesia.

Our goal was to develop a curriculum that would expose and train the AU and RN team to effectively manage potential crisis situations by familiarizing them with the environment and improving team work.

**Description:** A curriculum was designed to review basic airway skills, orient the staff to the procedural environment, and provide an annual simulation experience. Realistic scenarios were developed from experience with the patient population and environment. Simulation sessions from 2010-13 occurred in situ. In 2014, it was transferred to the Children’s Hospital Simulation Center due to lack of funding. Each session included 2 to 3 high fidelity manikin scenarios with pre- and de-briefing sessions followed by an evaluation of the event. In 2010, the simulation session only had nursing participants and some nurses had to play the role of the anesthesiologist. From 2011-13, the simulation also included an anesthesiologist. In 2014, we included oncology faculty which further enriched the sessions.

**Evaluation:** Evaluations of the simulation were completed after each session. In the first 3 years, the participants (18/19) felt better prepared to care for their patients and more comfortable in managing crisis situations. In 2014, due to a change in evaluation questionnaire, all the participants (n=13) agreed that skills learned during the sessions were useful to their practice and it was worth their time and experience.

**Discussion:** Multidisciplinary simulations increase the realism and enrich the acquisition of team work skills that are needed for successful management of crises. From our simulations, we discovered team members were not familiar with the resuscitation equipment available in the radiation oncology facility. Due to the change in simulation site, we also experienced the pros and cons of in-situ versus simulation center held sessions.

In conclusion, all participants found the simulation curriculum to be very helpful, and asked for it to be repeated at least every year. Many areas for improvement were identified, and will be implemented in the future.

**References:**


PO 070 – Impact of Pediatric Simulation Training on the Management of Preterm Infants

Topic: Patient safety and quality improvement

ID: IPSSW2015-1060

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Background and Aims: The Joint Commission on Accreditation of Healthcare Organizations, reported that more than two thirds of perinatal death could be attributed to insufficient or ineffective team communication [1]. Therefore, it has been suggested to include simulation-based learning methods to acquire and enhance important skills for high-risk events such as neonatal resuscitation [2]. High fidelity simulation training is an ideal tool to improve team behaviour [3].

In the current study we will use simulation training to examine changes in skills, teamwork and communication using scenarios in the immediate newborn period. All participants will be asked to complete a questionnaire prior and after the simulation to evaluate the impact of the training.

Methods: Physicians and nurses from several Russian hospitals will be invited to the Vienna Pediatric Simulation Center (VPSC). Local hospital staff will host a two-day simulation workshop (WS), which will include different simulation scenarios to improve teamwork, communication and the postnatal management of extremely preterm infants. The WS will discuss delivery room management of an extremely premature infant and meconium aspiration syndrome as well as surfactant administration.

After a theoretical introduction, the participants will be able to observe and participate in simulation scenarios using the PremieHal® and NewbornHal®. All simulations will be video recorded using SIMStation™. Our simulation room is fully equipped and resembles a Neonatal Intensive Care Unit (NICU). After each simulation participants will receive structured feedback using debriefing and video analysis.

All participants will complete a pre- and post-WS questionnaire, as well as follow-up-questionnaire at three and 12 months post-WS. These questionnaires will be used to evaluate the clinical benefit of the training. The pre-WS questionnaire includes demographics of participants (e.g. home institutional guidelines), current teamwork and communication during emergency situations in their NICU. Post-WS questionnaire will assess their experience with the simulation-WS and their own learning effect. Follow-up questionnaires will be used to examine whether the simulation-WS resulted in any changes in teamwork, communication or workflow at the participants’ home NICU.

Discussion: We will employ a complete new approach of ongoing education and skills enhancement during the immediate newborn care. Further evaluation will examine if this approach improves clinical outcomes of newborns, patient safety, and interdisciplinary teamwork. The follow-up questionnaires aim to determine
if the WS impacts the participants’ approach of neonatal emergencies, teamwork, communications or improved patient safety.

References:

PO 071 – New Healthcare Environments: Expose Safety Threats with In Situ Simulation

Topic: Patient safety and quality improvement

ID: IPSSW2015-1230

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Goal: Disseminate skills toolbox and perspectives for implementing in situ simulation testing of new healthcare environments. (HCE)

Learning Objectives:
1. Recognize that safety threats (ST) emerge as established care practices transition to new HCE.
2. Structure multidisciplinary implementation team to prioritize learning objectives
3. Outline orchestration of simultaneous immersive in situ simulations and structured co-debriefing to reveal ST in HCE.

Methods of Delivery: Interactive small group activities using worksheets, short videos and very few slides will prepare participants for implementation of in situ simulations in their own institutions.

Intended Audience: Simulation specialists, risk management, quality improvement experts, administrators and nursing leadership with minimal through intermediate simulation experience

Relevance to the Conference: This dynamic, interactive workshop will present participants with a pragmatic paradigm for simulation-based HCE testing. Participants will acquire key skills that they can apply to future environmental changes at their own institutions.

Background: Changes within an existing or new HCE may create ST that remain unrecognized until patients are harmed. In situ simulation has identified ST in new emergency departments1, intensive care units2 and hospitals3. One such methodology “TESTPILOT-NICU” includes all disciplines performing their jobs in two progressive 30-minute scenarios followed by 60-minute group debriefings to identify ST. Since then, three additional university hospital NICUs have successfully implemented the methodology, which is generalizable to many other HCE.

Workshop Timeline:
- Introduction to faculty, objectives, implementation worksheet (10 mins)
  - Disclosures
  - Organize multidisciplinary participant groups by pending (or hypothetical) environment transitions
• **Explore potential safety threats (20 mins)**  
  o Small groups: Brainstorm 5 at-risk care practices with HCE change  
  o Video review: Identify foreseeable and unexpected STs  
  o Small groups: Create three learning objectives to explore potential ST in at-risk care practices  

• **Structure multidisciplinary simulation team (20 mins)**  
  o Large group: Identify key stakeholders, simulation team roles, estimate/delegate workload  
  o Small group: Identify simulation support resources required, staff recruitment, equipment  
  o Large group: Refine scope: # simulations, # sessions, # participants  

• **Develop and Implementation (30 minutes)**  
  o Video example: scaffolding scenario on learning objectives  
  o Apply to upcoming HCE change at your institution  
  o Interactive panel discussion: apply lessons learned from implementation at several institutions  
  o Generating critical mass  
  o Confederate preparation  
  o Creating physical and conceptual fidelity  
  o Orchestrating simultaneous scenarios  
  o Facilitating multidisciplinary debriefing  

• **Wrap up/questions** (10 mins)

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**PO 072** – Emergency Department Clerical Simulation Program  
**Topic:** Programme development/ Administration and Programme Management  

**ID:** IPSSW2015-1104  
**Jane Cichero**¹, Lisa Thomas², Kylie Stark³  

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**Background:** Simulation based programs designed to facilitate health care personnel to enhance communication skills within a team and engage in empathetic conversations with patients and families have been demonstrated to be a successful way of learning. Many of these programs however are for clinicians involved in direct patient care. It has been recognised that clerks working in the emergency department (ED) encounter many situations daily that also require empathetic conversations with parents and staff while simultaneously undertaking a multitude of tasks to keep the “wheels of the department running smoothly”. In addition to this, ED clerks are linked to key performance indicators of emergency flow. Without efficient clerical support NEAT targets are at risk of not being met. A Simulated Learning Environment (SLE) has been identified as an opportunity to support the development of clerical communication skills with families that present to the ED and with the ED multidisciplinary team and to enhance patient flow.  

**Educational Goal:** The purpose of the clerical simulation program is to facilitate the development of effective communication and team work skills of clerks within the emergency department setting.  

**Proposed approach to addressing the goal:** A series of three two hour modules will be conducted over a three month period with the provision for 4 - 6 participants. Modules will be based on identified learning needs of the clerical staff and facilitated by the simulation educators and identified instructors. Each module will include some group work and team exercises to explore the challenges clerks face in
communication with families and staff. Simulated scenarios designed to meet the objectives for the module will be conducted utilising simulated patients and actors to facilitate practical application of identified communication strategies. Debriefing of scenarios will be facilitated by experienced simulation faculty.

By the end of the program participants will be able to:

- Recognise the value of first impressions on families presenting to the ED
- Demonstrate key components for effective communication within the ED team
- Identify positive non-verbal communication cues that enhance and support communication with families and team members
- Identify positive verbal communication skills that enhance and support communication with families and team members

Three areas that have been identified to focus on will inform the theme of each module. These will include:

- Front of House – first impressions count
- Working within the ED Team – keeping the wheels turning
- Telephones & emails – beyond the face to face

Questions for discussion: Are there programs like this already in existence? If so, how did you design the program & what were the challenges?

PO 073 – Assessing Barriers to the Development of a National Simulation Curriculum for General Pediatrics

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1129
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Background: Pediatric Residency training objectives in Canada are determined by the Royal College of Physicians and Surgeons of Canada. To satisfy these objectives educators have turned to simulation to complement residents’ training opportunities. In an effort to standardize residents’ learning experience in simulation and bridge education gaps, a national initiative lead to the development of core objectives for a simulation curriculum for Canadian pediatric residents. However, simulation programs vary widely across Canadian centers resulting in inconsistent access, resources and ability to implement the final curriculum.

Objective: Using a multi-modal qualitative research strategy, we sought to identify the barriers faced by general pediatric programs with respect to the implementation of a nation-wide simulation curriculum.

Methods: This study was implemented as the final phase of a broader project, which assessed and determined the core content of the national simulation curriculum, and is still in progress. A preliminary simulation readiness survey was sent to current and past program directors at all of the pediatric programs in Canada covering educational priorities, practical and logistical barriers. The program directors are in the process of identifying a simulation educator at each of their centers to carry forward the implementation process. Results will be collated and the five most important themes will be extracted from the survey results. With these results, the simulation educator at each center will be contacted via telephone interview to discuss the five main barriers to the implementation of a national simulation and discuss any further concerns. From this, tools and resources will be created to assist schools in successfully rolling out and strengthening their simulation programs.
Results: 10 out of 17 program directors completed the preliminary simulation readiness survey. PICU, general pediatrics and emergency departments were most likely to use simulation within their teaching programs. All institutions indicated that they had access to at least 1-3 trained staff capable of implementing simulation curriculum. Residents had access to equipment for an average of 6 hrs/month and 4 hrs/month available for protected simulation learning. Preliminary results show that the top barriers to implementation are: competing educational priorities and lack of access/time.

Conclusion: Our study will aim to assess barriers to simulation implementation as well as concrete strategies for addressing these barriers both on a center specific and national scale.

References:

PO 074 – Welcome Parents in a Paediatric Intensive Care Unit: Pilot Study by Simulation  
Topic: Process improvement and organizational change

ID: IPSSW2015-1203
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Background: Simulation trainings are gradually integrated into the curriculum for caregivers in intensive care. There are few trainings in communication with families.

Goal: This pilot-study evaluated the impact of a training protocol including a protocol for welcoming the parents of a child admitted into a paediatric intensive care unit on professional practices.

Materials and methods: The training lasted 3 months and included 3 parts: a theoretical contribution, a simulation session with debriefing and a focus group. During the simulation session, a multi-professional team of 3 health providers (physician, nurse, assistant nurse) must apply a protocol for welcoming the parents of a child just admitted. The protocol lasted 35 minutes and included three sequences: reception and dressing by the assistant nurse, medical meeting by the physician and the nurse, support the parents in the room by the nurse and the assistant nurse. The child was simulated by a manikin (SimBaby™, Laerdal) and the parents were prepared actors. The main objective of the pilot-study was to measure the rate of change in professional practices one year after the end of training.

Results: A year later, all caregivers (n = 15) admitted to having changed their professional practices and felt that half of these changes were due to the pilot-study. New practices such as welcoming in pairs, in a dedicated room or to manage a short interview with the parents before supporting the child were applied "always" or "if possible".

Conclusion: The pilot-study showed that the training induced half of the changes of professional practices for welcoming the parents of a child admitted into paediatric intensive care one year later.
References:

PO 075 – Simulation outside the Box: Using Simulation with Untraditional Partners
*Topic: Simulation instruction design and curriculum development*

ID: IPSSW2015-1236

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Simulation programming is often centred on medical and allied health professions either for the purpose of learning and strengthening their own professional knowledge and skills or for interprofessional team training such as mock resuscitations. This workshop explores how simulation programs can be expanded to engage either non-traditional clinical or non-clinical partners within health organizations. The benefits of engaging these partners include increased capacity for simulation based education and training, increased organizational support for simulation programs, and potentially increased resources. This workshop will help to inspire and guide participants on how to expand their simulation programs beyond the traditional by providing concrete examples and tools that can be taken back to their organizations. This workshop will interest Educators and Program Administrators of various levels of simulation knowledge. Participants will be engaged in small group discussions with reporting back to the larger group and opportunity for group feedback.

Upon completion of the workshop the participants will be able to:
1. Identify opportunities to use simulation for non-traditional or non-clinical partners
2. Outline a strategy for engaging stakeholders
3. Describe a process for building simulations with these partners

The agenda is as follows:
- Welcome and participant introductions (10 min)
- Introduction to projects (10 min)
- Activity #1 and Report back: Identify an opportunity and stakeholders (15 min)
- The process: Needs assessment, goals and objectives (10 min) – lecture and interactive discussion
- Activity #2 and Report back: Developing needs assessment, goals and objectives (15 min)
- Evaluation – lecture and interactive discussion (10 min)
- Activity #3 and Report back: Defining outcomes (15 min)
- Wrap-up (5 min)

Tools will be provided to participants to be used during the activities.
PO 076 – Creation of a Pediatric Simulation Educational Elective

*Topic: Simulation instruction design and curriculum development*

ID: IPSSW2015-1038

**Robert Parker**¹, Leah Mallory¹

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More and more residency programs are using simulated clinical scenarios, not only to effectively increase medical knowledge and technical performance, but also to improve patient safety and team communication skills. While it is common for pediatric residency programs to include simulation curricula whereby residents participate in the learner role, some residents seek a more in depth exposure to simulation education and adult learner theory. We have developed a simulation education elective curriculum, designed to allow general pediatric or medicine-pediatric residents to explore simulation education as an interest and means to further advance a potential academic career. By flipping traditional resident roles in simulation, our residents investigate concepts of adult learner theory, modes of debriefing and team communication, while actively teaching procedural skills and clinical scenarios thereby further solidifying their own knowledge base.

Participants are provided a syllabus and are expected to review background literature, including recent articles describing original educational outcomes research. Through guided reading and direct experience in the day to day operations of the simulation center, learners will develop a general understanding of the educational advantages of simulation and begin to explore adult learner theory and its applications within medical education. With supervision from a content expert, residents are expected to create, implement and debrief a novel simulation scenario. Additionally, the elective affords an opportunity to explore and engage in a variety of simulation scenarios designed for different specialties in order to become more familiar with common themes. Exceptionally motivated residents may participate in our center’s bi-annual simulation instructor training course. By fostering adult learning concepts and engraining these theories with hands on learning/teaching, it is our belief that our residents gain valuable knowledge and skills that have direct application for future practice both in academic and clinical settings.

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PO 077 – Optimizing the Flow of Your ECMO Simulation Program

*Topic: Simulation instruction design and curriculum development*

ID: IPSSW2015-1125

**Theodora Stavroudis**⁴, Lindsay Johnston², Anne Ades³, Mark Weems⁴, Gary Oldenburg⁵

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Development of institutional Extracorporeal Membrane Oxygenation (ECMO) simulation training programs can offer a variety of educational benefits for multidisciplinary healthcare teams tasked with providing this high-risk therapy to the most critically ill patients. ECMO simulation can serve as an adjunct to the training modalities recommended by the Extracorporeal Life Support Organization (ELSO) for initial and continuing education that include didactic teaching, water-drills, written exams, animal labs and bedside training. Through the recreation of both the commonly encountered and rare emergent clinical situations, ECMO simulation training can offer healthcare providers repetitive, hands-on opportunities to master the cognitive, technical and behavioral skills necessary to ensure the safe and effective delivery of this low-volume, high-risk therapy. In this way, ECMO simulation training programs can serve as avenues for
institutions to boost operational performance, reduce medical errors, and improve system and patient outcomes.

Nevertheless, limits in funding, time, and manpower can challenge ECMO simulation training programs in meeting their education missions and goals. This workshop will delineate ways in which simulation training can be incorporated into existing ECMO education infrastructures in both resource-rich and resource-limited training environments so that ECMO education can be optimized for all. Specifically, cost-effective ways to enhance ECMO simulation through the incorporation of moulage, interprofessional training, simulator development, and scenario design will be discussed.

Participants will be asked to break into small groups and assigned to trouble-shoot common challenges in delivering ECMO simulation training in a resource-rich and a resource-limited way. Small groups will then be asked to present their work, and faculty will summarize key take home points. Opportunities to form an ECMO educator network will be discussed.

**PO 078 – Simulation Strategies to Detect and Prevent Moral Distress Among Resuscitation Team Providers**

*Topic: Simulation instruction design and curriculum development*

**ID:** IPSSW2015-1047  
**Tessy Thomas* 1, Satid Thammasitboon1, Jennifer Arnold1, Kevin Roy1  

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**Overall goal:** Moral Distress (MD) affects job satisfaction, job retention, and the delivery of quality care. Participants will discuss opportunities to utilize simulation, debriefing inventory guides, and Crisis Resource Management (CRM) in the detection and prevention of MD during high-stakes clinical events.

**Three key learning objectives:**

1. Participants will be able to identify the causes and implications of Moral Distress following resuscitations;
2. Participants will identify opportunities to utilize simulation scenarios, Crisis Resource Management, and debriefing to identify and resolve Moral Distress;
3. Participants will be able to design a simulation-based program to better understand and prevent on-going moral distress within their institution

**Method of delivery:** Our workshop was designed based on Kolb’s learning cycle. We will use a wide variety of media modalities and learning methods to achieve each learning objective. Through the use of video, reflective observation, and abstract conceptualization, to expand on themes identified earlier in the workshop to develop a deeper understanding of the origins and manifestations of moral distress (MD). We will then build on this understanding of MD thru active experimentation as participants apply MD inventories, CRM, and prevention techniques to case scenarios. Last we will utilize an action plan to both reinforce the information presented in the workshop, as well as provide a means for continued application of the knowledge, tools, and techniques discussed during the workshops.

**Intended Audience:** Simulation-based medical educators who practice in clinical environments, with a range of expertise levels

**Relevance to the Conference:** Simulation provides a unique forum to detect and teach identification and prevention of moral distress during high-stakes clinical events.

**Workshop timeline:**
Concrete Experience: A priming video illustrating a resuscitation that may induce MD among team providers (2 min);
Introduction (5 min);
Reflective Observation: Group reflection on priming video, experience, and consequences (15 min);
Interactive Didactic: "Tip of the Iceberg": Present Psychological perspectives of MD and propose ethical framework for deeper understanding of MD (10 min);
Abstract Conceptualization: Reveal and discuss 4 dimensions of resuscitation that may result in MD and introduce MD inventory (15 min);
Paired Exercise: Participants will review the priming video again individually utilizing the MD inventory prior to large group discussion (15 min);
Active Experimentation (Group Exercise): Show the second video and use MD inventory to discuss how to guide the debriefing (20 min);
Large Group Reflection on action lessons learned and development of practical simulation teaching strategies (20 min);
Action Plan: Participants develop an action plan for their institution (5 min);
Conclusion (5 min)

References:

PO 079 – Improvement of Pediatric Resident Confidence during Low Frequency/ High Risk Clinical Events

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1210
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Background: Pediatric Residents at our institution are exposed to inter-professional simulation events representing medical and trauma resuscitations throughout their three years of training. This modality of education has been proven as a measure of effective education to provide a safe and realistic collaborative care delivery model. The primary exposure for our pediatric residents takes place in-situ within the hospital, including all of the intensive care units. Despite faculty efforts to standardize curriculum and create a vast opportunity of exposure, many pediatric residents at our institution express concerns about their confidence in a high risk clinical event such as a medical or trauma resuscitation.

Educational Goal/Research Question: We seek to improve resident confidence levels during resuscitations across the clinical spectrum with exposure to simulated experiences involving an inter-professional team. Will exposure in a familiar environment, complementary to their clinical practice and in-situ simulated resuscitations allow for perception and attitude change among pediatric residents if implemented early during their training?

Proposed Approach to Attain our Educational Goal/Work in Progress: Implementation of a mock code simulation program within protected resident morning conference time, led by core simulation faculty, our institution PALS coordinator and chief pediatric residents.
A three month pilot program has been initiated at our institution drawing from our core simulation education curriculum with a 1 hour monthly session during a resident morning conference. Participants include a resident team to care for our patient (6 members including a team leader) as well an audience of resident observers including PGY-1 to PGY-3 training levels (20+ learners). Feedback from primary participants and observational data to date has been positive.

**Current Conundrums/Discussion Questions:** Our learner group is different each month based on individual resident rotation schedules and duty hour restrictions. How can we assess change in practice attitudes with an ever-changing learner group and what time interval is best for data collection pre and post intervention?

Is a single monthly encounter over the three year training period, in this “protected” environment enough to assess change in perception and attitudes during clinical practice?

Involvement of the full multidisciplinary team: physician, nurse, respiratory therapist, pharmacist, social work has been quite challenging. Given the involvement of the full team in the in-situ setting, do we need to have all members available in this environment to attain our goal of improved resident confidence levels?

**References:**

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**PO 080 – We All Want More Sim! Design and Implementation of a Longitudinal Pediatric Simulation Curriculum**

**Topic:** Programme development/ Administration and Programme Management

**ID:** IPSSW2015-1227

**Victoria E. Cook**1, Haley de Vries1, Anas Manouzi1, Debbie Cain2

1University of British Columbia Pediatrics, 2UBC Simulation Centre, BC Children’s Hospital, Vancouver, Canada

An interactive session designed to provide participants with a general framework upon which to design and implement a pediatric acute care simulation curriculum specific to their setting and needs. Participants new to curriculum development will benefit most but experienced educators are welcome and may benefit through comparison of curriculum design. Concepts are broadly applicable across disciplines and level of experience.

**Learning objectives**
At the end of the session, participants will be better equipped to:
1. Identify their specific educational setting’s learner population and educational objectives
2. Effectively administrate, manage, and implement a pediatric simulation curriculum

**Method of Delivery:** Throughout the session participants will be asked to draw up a draft of their own simulation curriculum. Each learning objective will be addressed in sequence and participants will be...
asked to share their thoughts on their setting specific curriculum at each stage. Session facilitators will also briefly highlight relevant evidence based approaches to curriculum development at each stage. Participants from the same (or similar) setting, level, or discipline will be grouped and will work together. In order to meet time constraints we will aim for a maximum of 4 groups.

**Relevance to the Conference:** The excitement generated by education through simulation will be palpable at IPSSW 2015. We aim to harness this enthusiasm and provide participants with a practical approach to designing and implementing a comprehensive and sustainable simulation curriculum within their own educational milieu.

**Timeline**
- Introduction (description of facilitator experience and outline of our resident curriculum, description of session objectives) 15min
- Learning Objectives
  - Facilitator Topic Introduction (2min) Small group discussion (4min) and Small Group Topic Presentation (4 min)
  - Facilitator Topic Introduction (5min) Small group discussion (10min) and Topic Presentation (15min)
  - Facilitator Topic Introduction (5min) Small group discussion (10min) and Topic Presentation (10min)
- Final Summary and Discussion (15min)

**PO 081 – Resident-Led Implementation of an Interdisciplinary Multi-Year Pediatric Simulation Curriculum**

*Topic: Simulation instruction design and curriculum development*

ID: IPSSW2015-1228

**Victoria E. Cook** *, Anas Manouzi** *, Haley de Vries** *, Debbie Cain*, Mary Bennett**

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The UBC Pediatrics Residency Program at BC Children’s Hospital (BCCH) provides comprehensive Pediatric training, which includes management of life-threatening concerns. Previously, the acute care curriculum was delivered through Academic Half Day (AHD) lectures as well as Emergency and ICU rotations. Unfortunately, increased trainee number led to reduced critical care exposure, and existing simulation experiences did not ensure regular and equitable resident participation. Here we describe resident-led implementation of an inter-disciplinary, longitudinal simulation program for PGY-1 to PGY-3 that was assimilated into the existing AHD structure to improve the acute care experience.

A six-block curriculum was designed around relevant Royal College Objectives (RCOs) and integrated with existing AHD content (Figure 1); a mix of published and newly designed scenarios were chosen to fit objectives. Pre-reading materials incorporated relevant CPS statements and institutional guidelines. A case-review lecture was provided during AHD following block completion. Residents were scheduled to participate in 12 simulations over 10 months during protected AHD time (Figure 2). Sessions took place at the BCCH Simulation Centre contains task trainers and simulation mannequins, and is supported by a coordinator, an educator and a technician. Sessions included student nurses and respiratory therapists, and were facilitated by simulation-trained staff, fellows and senior residents. A survey was completed at the end of the year to obtain resident feedback and perceived impact on resident performance in real code situations.
From September 2013 to 2014, 47 residents participated in the curriculum. Post-curriculum survey response rate was 43%. Most residents described the curriculum as excellent and reported leading 1-3 scenarios. Nearly all residents reported involvement in a real code; 88% felt that participation in the simulation curriculum enhanced their performance. Residents described improvements in their understanding of roles and familiarity with acute decision-making.

This initiative provided residents with additional and equitable exposure to management of acute care scenarios. The trainee-led inception of our curriculum is unique, as is integration of regular interdisciplinary simulation into an existing longitudinal paediatric curriculum. Provision of frequent simulation may prevent the well-documented decline in skills over time (1). Residents report a positive impact of simulation training on actual code performance. We have worked to ensure sustainability through creation of permanent resident coordinator roles with annual handover. Residents are encouraged to submit interesting cases to facilitate ongoing case development. Limitations to generalizability of this intervention include financial resources, trained staff and physical space, all reported barriers to simulation training (2,3).

References:

**PO 082 - Development of a Simulation Curriculum for Senior Pediatric Residents**

**Topic: Simulation instruction design and curriculum development**

ID: IPSSW2015-1229

Anas Manouzi* 1, Steven Rathgeber1, Alison Nutter1, Haley de Vries1, Victoria E. Cook1

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**Background:** Every Canadian Pediatric Residency program must develop an academic curriculum that effectively teaches and evaluates competency in 7 specific “CANMeds” roles: Medical Expert, Communicator, Collaborator, Leader, Professional, Scholar and Health Advocate. These roles are formally taught during clinical rotations and protected weekly academic periods called “Academic Half Day” (AHD).
The University of British Columbia Pediatrics Program most commonly utilizes traditional lecture-based teaching during AHD. This curriculum was enriched by the introduction of Simulation-Based Medical Education (SBME) through a three years-long, longitudinal, interdisciplinary Core Simulation Curriculum. Although the AHD and Core Simulation curriculum addresses effectively the management of common medical emergencies in pediatrics, we realize the lack of structured teaching activities for more advanced communication, collaboration and leadership challenges: Disclosing medical error, end of life situation, delivering bad news, etc. SBME has been shown to be an effective teaching modality for these specific clinical situations. (1,2)

**Educational Goal:** We aim to develop a Senior Pediatric Resident Simulation Curriculum that employs SBME to achieve learner competency in the CANMeds roles of “Communicator”, “Collaborator”, “Leader” and “Professional”.

**Proposed Approach to addressing the goal:** We designed a harmonized AHD-Simulation Senior Curriculum that will be implemented during the 2014-2015 academic year. (FIGURE 1) Specifically, it will consist of 12 simulation scenarios distributed over a 2 years curriculum. PGY-2 and PGY-3 residents will participate in groups of 2-3 residents. These sessions will be interdisciplinary and assisted by actors or confederate participants. High and low fidelity simulators will be used. All debriefing sessions will be performed by simulation-trained pediatricians and other clinicians with a specific expertise for the clinical scenarios used. Whenever appropriate, we will utilize video-assisted debriefing.

Each session will focus on one of six themes: “Complex patients”, “Low-resource setting”, “Challenging Leadership”, “Challenging Communication”, “End of life” and “Bad news delivery”. Multiple scenarios will be developed for each theme. (FIGURE 2) Each simulation session will be preceded or followed by a relevant didactic lecture to highlight and solidify learning objectives.

**Questions for discussion:** Training curriculum for Pediatric Residents must effectively teach and assess competency of all CANMeds roles. How can SBME be used to improve teaching and assessment of competency in communication, collaboration and leadership?

**References:**
PO 083 – Hospital Wide Plan for Improving Staff Performance in “The First Five Minutes of a Code”

**Topic:** Patient safety and quality improvement

ID: IPSSW2015-1046

**Amber Youngblood** 1, Kandi M. Wise4, J. Lynn Zinkan1, Dawn T. Peterson2, Nancy M. Tofli3

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**Context:** Poor CPR quality and delayed care during cardiopulmonary arrest have been linked with adverse resuscitation outcomes in adults.1 Hunt et al, highlighted the importance of the first five minutes of pediatric emergencies suggesting there should be emphasis in instructing medical personnel on appropriate measures that should occur in this critical time frame.1 We sought to improve the response of
bedside personnel during the first few minutes of an emergency by developing simulation-based training targeting personnel on units with limited exposure to resuscitative measures.

**Description:** Mock codes were conducted in all acute care areas during a six month period with the objective to focus on actions that should occur prior to the arrival of the code team (i.e., call for help, quick and effective BLS with backboard, use of monitor, preparing the first dose of epinephrine and normal saline bolus). Nursing staff, care assistants, respiratory therapists and unit secretaries participated. An infant manikin was used for all simulations. The unit’s crash cart was utilized during the simulation for nurses to use the monitor and also during debriefing to point out the location of important items inside the cart. The simulation began when nurses started patient assessment and ended after the team took appropriate resuscitative measures. Debriefing was conducted after each simulation, and major components of effective pediatric resuscitation were discussed.

**Observation/Evaluation:** Each participant completed a questionnaire at the end of debriefing to assess what went well, barriers to delivering patient care and what could be improved during future codes. Barriers to delivering timely and effective care included: lack of experience and knowledge, time delay in assessment and delivering care, missing equipment, non-use of backboard, roles not established, tasks not properly delegated and ineffective communication. 56% stated there were no barriers. Areas for improvement included: better knowledge and awareness of what should be done during the next code, having necessary equipment, drugs and fluids when code team arrives, keep better records, use backboard, act quickly and activate code faster, perform better assessment, start chest compressions faster and initiating role assignment.

**Discussion:** Based on survey data obtained from staff who participated in the “first five minute” simulations conducted at our facility, there are numerous perceived areas for improvement in delivering timely and appropriate care to pediatric patients in the event of arrest. 100% of the participants found their mock code experience valuable, and 78% of participants reported that they would do a better job during subsequent codes. Therefore, this could lead one to believe that simulation is an effective tool for educating medical personnel, identifying strengths and barriers to good and timely resuscitation, and improving patient care during this critical time.


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**PO 084 – Paediatric Advanced Trauma Skills (PATS): A New Advanced Trauma Course for All Grades of Staff**

**Topic: Programme development/ Administration and Programme Management**

ID: IPSSW2015-1215
Amutha Anpananthar\(^1\), Ami Parikh\(^\ast\)\(^1\), Syed Masud\(^2\), Naomi Edmonds\(^3\), Erica Makin\(^4\)

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**Context:** Major Paediatric trauma is rare and therefore trainee and consultant exposure to it is often sporadic and infrequent. Since the designation of major trauma centres (MTC) around London and the rest of the UK, we know that doctors in these centres are likely to see more paediatric trauma. Advances in
paediatric trauma management and the initial management of major paediatric trauma patients are not taught in the more traditional courses such as APLS, ATLS and ETC.

This course has been designed for those with an interest in paediatric trauma based in either MTCs or major trauma units (MTU) who would like to gain further skills. There are no other similar courses at present in England. We initially designed a 1-day high fidelity simulation paediatric trauma course. Following 8 courses, it became clear from feedback that there was a need for a course covering the advanced trauma skills. PATS was subsequently developed as a 2-day course covering essential advanced skills with lectures and simulated scenarios. It is run with senior multidisciplinary faculty from emergency medicine, pre-hospital care, paediatric emergency medicine, surgeons, anaesthetists and paediatric intensive care.

**Description:** We designed a high-fidelity simulation course to incorporate the technical and non-technical skills required in trauma teams with specific paediatric skills. The candidates completed pre- and post-questionnaires.

**Results:** 10 candidates have attended this course to date (4 in 2013 and 6 in 2014). Candidates were expecting to gain more experience with complex trauma scenarios, procedures and leading the team. Despite 70% of the candidates having been involved in other trauma training courses and feeling confident in managing an injured child prior to this course, 90% found the course positively challenging and 100% reported that this course had met their expectations.

The post-course response has been overwhelmingly positive. All candidates had identified human factors as their main learning, with particular mention about communication and leading the team. Other key themes identified were an increased confidence with specific procedures and management protocols. Practicing more procedures during scenarios was requested. Candidates had commented on the benefits of having a mixed seniority of the candidate group (senior emergency and paediatric trainees and consultants) and the faculty.

**Discussion:** PATS offers a further approach to learning skills in major paediatric trauma and team management. Evaluation has demonstrated the importance of this course for multi-grade and multidisciplinary staff seeing paediatric trauma. Simulation is a safe and realistic learning tool and provides a safe environment to acquire and use skills learnt on the course. We will be inviting staff from all disciplines exposed to paediatric trauma to future courses and addressing the request for more practical procedures.

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**PO 085 - Extracorporeal Membrane Oxygenation during Cardiopulmonary Arrest**

* **Topic:** Simulation for procedural and psychomotor skills

**ID:** IPSSW2015-1162  
**Alison Boone* **

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Advancements in medical technology have increased the responsibilities of the bedside nurse. One such example is when a patient needs to be placed emergently on extracorporeal membrane oxygenation (ECMO) during cardiopulmonary arrest. With the operating room (OR)nurses not always readily available the bedside nurses in the Pediatric Surgical Heart Unit (PSHU) were asked to perform tasks previously only performed by an OR nurse. This necessitated educating the bedside nurse on operating room procedures and skills.
The process began in January 2007 with collaboration between staff nurses, PSHU management team, cardiovascular surgical team, operating room management team and ECMO coordinator. With this collaboration, OR scrub packs, emergency equipment packs and a specialized surgical instrument tray were developed. Roles for each team member were defined. A protocol was established for ECMO during cardiopulmonary resuscitation (ECPR). In September 2007, formal education began utilizing simulation. Initial education consisted of impromptu training. It was quickly recognized that a more formal in-service was needed to provide the best education. Beginning January 2008, monthly hour long in-services were offered by nurses who established the protocol.

The protocol and the education are continually changing and adapted based on participant, management and physician feedback. Role definitions were given to each staff nurse. Education is offered monthly to maintain ECPR skills and nurses are required to participate in one in-service each quarter. During their training a team of nurses work through three random preprogrammed scenarios utilizing SimBaby. One of the scenarios requires emergency cannulation. We have the ability to modify the scenarios based on nurse interventions during the training. The next step is to take an interdisciplinary approach by including ECMO specialists, Perfusionists, ECMO coordinator and respiratory therapists.

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**PO 086 – Mechanical Ventilation Simulation for Health Care Providers: A Hands-On Educational Tool**

**Topic: Simulation instruction design and curriculum development**

ID: IPSSW2015-1190

Douglas Campbell, Jaques Belik, Amit Mukerji

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**Context:** Pediatric residency curriculums across North America have incorporated simulation-based training sessions, but many do not address the theory and practice of mechanical ventilation. Neonatal-specific simulators are also infrequently used.

**Objective:** To design a specific anatomically appropriate neonatal lung simulator for use in teaching effective mechanical ventilation strategies in a variety of module-based clinical scenarios.

**Description:** A neonatal lung-model simulator with artificial lungs that allows for simulation of lung compliance changes and air-leak syndrome and end tidal CO\(_2\) monitoring. Twenty-six pediatric health care providers and trainees underwent a series of 3 case-based modules. Data from anonymously performed pre- and post-participation surveys were collected and analyzed. Responses were measured on a scale of 1 (strong disagreement) to 5 (strong agreement). All results are denoted as mean±SD.

**Observation/Evaluation:** Participants scored the need for mechanical ventilation proficiency (4.7±0.45) and potential to benefit from simulation based training highly (4.7±0.48). In the post survey, respondents regarded the role of simulation training highly effective (4.8±0.38), indicated an improvement in mechanical ventilation knowledge (4.3±0.63) and would recommend to their peers (4.4±0.65). In a pre-post comparison, respiratory physiology proficiency increased from 3±1 to 4±1 (P< 0.001) and ventilation skills increased from 3±1 to 4±1 (P<0.001).

**Discussion:** These data support the role of our lung-model simulator in respiratory physiology and mechanical ventilation training for pediatric health care providers. More work remains to see if this educational intervention translates to retained knowledge over time and improvement in decision-making and patient care.
PO 087 – Enhancing General Practice Training in Paediatrics via an In-Situ Simulation Programme

**Topic: Programme development/ Administration and Programme Management**

ID: IPSSW2015-1082

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**Context:** Recent recommendations from the RCPCH and the RCGP (UK) have highlighted the need for General Practice (GP) training to include more paediatric content to allow trainees to develop skills and expertise in the recognition and management of acute childhood illness (1,2). Around 55% of GP trainees undertake a hospital paediatric placement during which they will be expected to assess and provide initial care for acutely unwell children (3). This is commonly a trainee's only postgraduate paediatric training and we need to maximise this opportunity to prepare trainees to manage paediatric emergencies in primary and secondary care.

**Description:** We designed a curriculum-mapped simulation programme of common acute paediatric and neonatal scenarios. These were delivered to GP trainees on paediatric rotations as part of a weekly departmental education programme and were run in real time in clinical ward areas to ensure high situational fidelity. The scenarios were conducted using members of the whole multidisciplinary team and a high fidelity mannikin (SimBaby™). This gave trainees realistic exposure to assessment, diagnosis and management of an acutely unwell child in their normal work environment.

**Observation/Evaluation:** Trainees completed confidence questionnaires following each scenario, and a basic knowledge questionnaire at the start and end of the programme. These questionnaires were also conducted with a control group at a matched hospital who were not undergoing regular simulation training. Our results showed that confidence scores for managing each condition increased by an average of 2 points (Likert scale of 1-5) following the simulation training. These scores were maintained at the end of the 6 month programme. Confidence scores in the control group matched the pre-simulation scores in the intervention group. Overall confidence scores for the management of any acutely unwell child reached a higher plateau 6-8 weeks sooner in the intervention group when compared to the control group. Knowledge assessment results showed a greater appreciation of the non-specific presenting features of acute illness in the intervention group. Key paediatric treatment principles were gained equally from overall occupational exposure in both groups.

**Discussion:** We feel that the implementation of our simulation programme and the unique cross-discipline delivery of our scenarios, has improved our trainees' abilities to recognise and manage acutely unwell children at an earlier point in their paediatric attachment than conventional educational programmes. This programme would be of benefit to other clinicians who commonly work with children (such as Emergency Department Practitioners) and can easily be introduced into departmental educational programmes.

**Ethics Consideration:** IRB review not applicable

**References:**
PO 088 – Preparing Trainees for the Registrar Leadership Role: Evaluation of the London Simulation Programme


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**Context:** The London School of Paediatrics ST3 Simulation programme was established in 2010 for all postgraduate paediatric trainees in preparation for their leadership role as a registrar (ST4). With reduction in training time & reduced exposure to managing sick children, the need was identified for a pair of one-day courses, providing full-immersion (5 scenarios of a seriously ill child) and part-task (chest drain & other procedures plus communication scenarios). A faculty development programme has run alongside this to ensure facilitators are trained in effective debriefing. The programme has been continually improved in response to detailed evaluation. We present the results of the post course evaluation from the first two years, specifically coding of free text responses.

**Description:** Pre-course & post-course online questionnaires were designed using focus groups & expert opinion, emphasising the importance of reflective practice & the transfer of learning to the workplace. Immediate post-course questionnaires asked them to identify what they have learned & 6 week post-course asked how they may change future practice. Our experience has shown that the most valuable feedback is from free text responses in the post-course questionnaires. We have therefore analysed these responses with 3 independent coders & present the results below.

**Evaluation:** Feedback from the 2010-11 and 2012-13 cohort were analysed.

**Part task course:** Chest drain insertion was the most important learning point for both cohorts (60% 2010-11; 47% 2012-13), followed by ETT insertion, IO insertion and airway skills. Interesting securing ETT and chest drains was specifically mentioned. 40% of both cohorts felt that communication scenarios were taught better on this course than other courses. 6 weeks post course, the majority of trainees identified (79% 2010-11; 73% 2012-13) that an aspect of communication had changed/may change in their clinical practice since.

**Full immersion course:** Communication skills were again highlighted as important learning points. Other themes were leadership & discussing clinical guidelines. Managing the seriously ill child was taught more effectively on this course than elsewhere. 6 weeks post course, the main learning identified by trainees included leadership, communication & team work skills.

**Discussion:** Evaluation has demonstrated the importance of the programme in preparing trainees for their leadership role as a registrar. The part task course allows trainees to practice practical skills & improve their communication skills. The full immersion course highlighted non-technical skills (leadership, team-working & communication). The learning points on securing ETT & chest drain will be focused on in future courses. The programme has been improved in response to feedback, but most areas for improvement mentioned were increasing the frequency & opportunity to participate in simulation.

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PO 089 – Trainee and Supervisor Perceptions of a Just In Time (JIT) Room in a Pediatric Emergency Department


ID: IPSSW2015-1191

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Background: Just In Time (JIT) training refers to simulation training immediately prior to performing a procedure. JIT simulation training has been proven to improve trainee confidence. Seattle Children's Hospital opened a new emergency department on April 23, 2013 with a JIT room to create a safe space for procedural education prior to performing the procedure on a specific patient. Stations for practicing splinting, suturing, and lumbar puncture skills are available at all hours for trainees to practice these procedures with minimal set-up time. There have been no studies examining the use of dedicated JIT space.

Objective: To examine the JIT room’s use, impact on perceived skill competence/confidence, and effect on need for supervisor intervention in subsequent procedures.

Methods: Two cross-sectional surveys were created to examine trainee and supervisor perceptions surrounding the Just In Time room. The trainee survey was sent to all residents who have rotated through the new emergency department in the year since opening. Specialties included pediatrics, family medicine, and emergency medicine. The supervisor survey sent to supervising pediatric emergency medicine attendings and fellows. Both surveys queried use of the room, impact on resident confidence, and the impact on supervisor need for intervention during subsequent procedure. Survey responses were anonymous and submitted via REDcap online survey platform, and results analyzed descriptively using Microsoft Excel and REDcap.

RESULTS: 66% (122/186) of resident trainees responded. 73% of pediatrics residents (79/109), 66% of emergency medicine residents (19/29), and 50% of family medicine residents (24/48) responded. 97% (31/32) of supervising physicians. Trainees: (see graphs–unable to upload graphs). Supervisors: 90% of supervisors agree or strongly agree that trainee procedural confidence improves after JIT use. 77% agree or strongly agree that trainee procedural skills improve after JIT room use. 42% versus 58%, respectively, intervene in procedures when trainees use the JIT room compared to when they do not use the JIT room.

Conclusions: A majority of residents report receiving Just In Time training in a pediatric ED with a dedicated JIT training space. Supervisors and trainees agree that trainee skills and confidence improve with the JIT room. Supervisors report that they intervene less after JIT room use, but it is unclear whether this difference is clinically important. Trainees sense no difference in supervisor intervention behavior regardless of JIT room use. These findings suggest that a dedicated JIT room may be important in improving trainee skills and confidence. Further study is needed to quantify the actual effectiveness of a dedicated JIT space on trainee procedural performance.

References:
PO 090 – Handheld Haptic Simulation Procedure Training Device for Peripheral Intravenous Catheter Placement

**Topic: Simulation for procedural and psychomotor skills**

ID: IPSSW2015-1120

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**Background:** In this high-tech medical era, peripheral intravenous (PIV) catheter placement, a low-tech procedure, remains one of the most commonly performed and critical for saving lives and reducing morbidity. Patient based training, particularly in uncooperative pediatric patients, often with challenging access, leads to high stress, failed attempts, and reluctance to attempt the procedure. Simulation is effective and safe for procedure training, but there is a need for lower cost, high fidelity simulators for use outside high tech simulation centers.

**Research Question:** Does handheld high fidelity haptic simulation provide effective training for PIV catheter placement?

**Methodology:** We created an IV catheter placement training device with low cost consumables. The prototype couples a handheld haptic interface with a smartphone/tablet app to guide a user through PIV catheter placement. The haptic component is a replaceable gel block with an anatomically high fidelity ‘vein’ and an IV needle tracking sensor array. The app is a multimedia audiovisual teaching module that details indications, contraindications, supplies, prep, procedure, trouble shooting and complications, and interactively guides and engages the user through skin cleansing, tourniquet application, IV catheter insertion, blood drawing, tourniquet removal, securing and flushing. A standard IV catheter is used to cannulate the haptic vein. Needle tip position is transmitted wirelessly to the app, which shows synthetic, real time ultrasound views. Use and performance data are stored. Knowledge and skill will be assessed and compared in 20 trainees, novice providers at an academic children’s hospital using haptic device vs. standard training arm.

**Results:** Trainees, providers and IV team experts have evaluated device form and function. Attributes noted include portability, ease of use, multimedia, interactive didactic content, opportunity to individualize content and pace for initial and repeated use, and perceived value in providing confidence to attempt IV catheter placement in pediatric patients. Studies to evaluate use, usability and test didactic effectiveness using pre- and post-test, and a PIV procedure checklist developed with the INSPIRE PIV group are in progress. Results will be presented.

**Discussion/Conclusions:** This handheld device enables high signal, low cost standardized training for acquisition and maintenance of PIV catheter placement skills anywhere, anytime, both real-time at point-of-care and discretionary time. It can be modified to provide training for other procedures. It has the potential to create a paradigm shift in accessibility to high-tech, high fidelity non-patient based procedure training in high and low resource settings, and could ultimately expand and enhance the access, quality and safety of healthcare across environments and populations worldwide.

Funded by Consortia for Improving Medicine with Innovation and Technology, DOD USAMRAA W81XWH-09-2-0001
PO 091 – A Novel Pediatric Simulation Clerkship for Third-Year Medical Students

Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1201

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Context: Healthcare simulation has evolved from its introduction into medical education in 1969 as something of a curiosity, through its implementation as a crisis resource management tool for the field of anesthesia in the 1980s, to an integral part of medical education for clinical, procedural and team-training purposes in a wide variety of fields. Recent work in simulation has used simulation to teach skills for difficult conversations1,2,3 and elsewhere included the use of actors to simulate parents in pediatric health care4.

We have created a novel multimodal, actor-enhanced simulated-based curriculum for third-year medical students in pediatrics that includes the important addition of parental presence to integrate the teaching of communication skills along with clinical care. Medical objectives include history taking, physical examination skills, and basic airway and circulatory support. Behavioral objectives include performance related to patient and parent interaction, leadership and communication.

Description: The half-day curriculum begins with an interactive classroom session reviewing pediatric airway and circulation anatomy, physiology and support, emphasizing distinctions between pediatric and adult patients. Student groups then rotate through three sessions. One is a hands-on session reviewing airway equipment for the pediatric patient. The next is a high-fidelity mannequin simulation of a child in status asthmaticus, accompanied by 2 parents played by trained actors. The third is another set of parents and a mannequin in shock due to untreated intussusception. Each group of students has an opportunity to run both scenarios, followed by a debriefing that includes feedback from the parent actors. The program concludes with course evaluations.

All Harvard Medical School 3rd year pediatric clerkship students rotating at multiple hospitals convene at the Boston Children’s Simulator Program to participate in this curriculum. At a pedagogical level, the clerkship provides a consistent exposure to basic airway and circulation management in children. It also provides a unique opportunity to interact with the parents of an ill child and receive their feedback.

Evaluation: The curriculum has received very positive feedback from the students, who self-reported improved management of shock and respiratory distress. Students also endorse greater comfort interacting with the parents of a sick child (mean of 3.72 on a 5-point Likert scale).

Discussion: This curriculum leverages simulation to provide a consistent experience for third-year students that allows them to practice skills related to clinical care, family interaction, and team dynamics. It offers an example of the integration of training related to both clinical care and communication skills for other pediatric educators. Future work may be directed at creating additional opportunities for simulation and debriefing around physician-parent interactions throughout pediatric training.

References:


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PO 092 - Stretching the Simulated Dollar: Combining Reflective Practice and Team-Based Learning

**Topic: Simulation instruction design and curriculum development**

**Problems Statement:** The cost, time and logistical requirements of typical designs for simulated patient (SP) encounters are substantial, thus limiting the application of this useful methodology. We designed a cost-effective approach to training pediatric residents in the delivery of bad news that would allow a large group of learners (e.g., 25-30 pediatric residents) to make optimal use of four SP encounters in a 2.5 hour workshop.

**Approach:** Residents attending a workshop were assigned to one of four “Learning Groups” (LG) each with 6-8 residents. The LGs had 4 separate encounters with SPs, each depicting a different type of bad news scenario. Encounters consisted of 3 phases: group preparation, the particular encounter, and then group review, facilitated by faculty, with the SP in attendance. A different resident volunteered to interact with SPs for each scenario, while others in the LG observed the interaction via video transmission. The observers were instructed not to critique the performance of the volunteer, but to reflect upon how they might have responded to the challenge of delivering such difficult information.

**Lessons Learned:** 183 second year residents have participated in this design over a 3 year period. Retrospective pre-post surveys of self-efficacy in delivering various types of bad news revealed significant improvement (p<0.0001 for all 7 pre-post comparisons). Participants described the encounters as realistic, useful without being excessively stressful, and appropriate for their level of training. In a one year follow-up survey, the majority of residents who in the intervening year had the experience of actually delivering one or more of the 4 types of bad news encounters depicted in the workshop rated the training experience as useful in real life encounters.

**Significance:** Employing our workshop design, a combination with reflective practice and team-based learning, we have been able to produce positive outcomes within the allotted time and at significantly less costs for SP services, facility fees, and faculty time/effort.

**References:**


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**PO 093 - Simulation in the OR with Interprofessional Teams Improving Teamwork and Increase Patient Safety**  
**Topic: Interprofessional Education (IPE)**

ID: IPSSW2015-1084  
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**Context:** CRM, crew resource management, is implemented as a method to increase patient safety in our hospital. Our tools in the operating room, OR, are WHO safe surgery checklist and a model for structured communication, SBAR. To improve the use of these tools, CAMST-pediatric offers all staff members the unique possibility to train different scenarios with high fidelity infant and junior simulators. In the simulator inter-professional teams train acute scenarios in the OR. The goal is to improve the ability of each member of the team. Our instructors are a multidisciplinary group, clinically active in the OR.

**Description:** A full scale Operating theatre is set up in the clinical training centre with simulators representing various ages. Using CRM creates clear leadership, good communication skills and uses all team members’ resources. All participants are trained to follow a structured approach. Each member of the team act in their own professional role.

The simulation is recorded and is always followed by a debriefing. The team has the opportunity to reflect how they relate and how their behaviour can contribute to safer and more effective care. The purpose is to use CRM tools on a daily basis.

**Evaluation/Results:** Our evaluations show that 75% of the participants estimate a greater confidence and higher understanding of the work of colleagues.

**Discussion:** At the department operates 15 Anaesthesiologists, 37 Nurse Anesthetises, and 42 OR Nurses. About 27% has participated in this simulation course.

Simulation training aimed to improve patient safety at our hospital. As 75% of the participants experience improved safety in the professional role it can be assumed that patient safety is affected positively.

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**PO 094 - Teams That Play Together Stay Together! Role of Multidisciplinary Simulation within Transport Teams**  
**Topic: Interprofessional Education (IPE)**

ID: IPSSW2015-1134  
*Sundeep Sandhu*1, Josephine Whiston1, Claire Howard1, Ray Trent1, Peter Waller2, Stephen Hancock1

1Embrace Yorkshire and Humber Infant and Children's Transport Service, Sheffield Children's Hospital NHS Foundation Trust, 2Yorkshire Ambulance Service NHS Trust, Sheffield, United Kingdom
Context: Embrace Yorkshire & Humber Infant & Children’s Transport Service (Embrace) is the first combined neonatal and paediatric transport programme in the UK. Simulation training is frequently used at Embrace for staff to maintain essential skills and knowledge in the stabilisation and transfer of critically ill patients. Recently, the simulation training programme has been extended to regularly involve the ambulance drivers and members of the call-handling team. A 2009 Cochrane review found that interprofessional education can improve collaborative practice, enhance delivery of services and have a positive impact on patient care. Providing opportunities for the Embrace teams to train together has encouraged further development of working relationships as well as crisis resource management skills.

Description: There are regular occasions when the Embrace ambulance drivers play a vital role in assisting the clinical team with the stabilisation or resuscitation process. It was recognised that further education and training would be beneficial to improve the confidence of the driver’s in such situations. There were also some concerns that the call-handlers could potentially feel isolated from the clinical work that takes place at Embrace. Participating in simulation training has been an effective way to deal with this. Both drivers and call-handlers are now regularly invited to simulation training sessions.

Observation: A staff training survey completed by 6/8 (75%) of call-handlers and 8/12 (67%) of drivers showed that 86% felt simulation training is useful to their role. On a scale of 1-10, there was agreement that simulation helps team working, team communication (both 8.4 average) and improves confidence with managing clinical conditions (7.7 average).

Over the last 6 months, 19 team simulation sessions have taken place which have involved ambulance drivers and call handlers. In addition, the drivers are receiving training in paediatric and neonatal basic life support (BLS) and the call handlers have had training in adult BLS. The simulation sessions have evaluated well and the staff have generally reported an improvement in their confidence levels.

Discussion: Multidisciplinary simulation is a useful way to allow teams to develop skills to work together effectively. Simulation training at Embrace has allowed the drivers to acquire some of the key skills required for patient resuscitation and stabilisation and therefore to integrate further into the team. The call handlers have used this opportunity to gain a better insight into the work of the clinical team as well as improving their understanding and knowledge of medical terminology. We hope that developing team training will allow the organisation to improve patient safety and maintain service of a high quality.


PO 095 – Reaching Out to Point of Care - Mobile Simulation

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

ID: IPSSW2015-1233

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Introduction: Neonatal services in United Kingdom are delivered via regional networks. Tertiary level Neonatal Intensive care is centralised to Level 3 neonatal units with Level 2 and Level 1 units providing care to rest of the local population closer to home. For small proportion of newborns, requiring ongoing intensive care (premature babies) or specialised treatments (Cooling therapy, inhaled nitric oxide therapy etc), they will be transferred to local nearest Level 3 Neonatal Intensive care unit. Outcomes for babies would be dependent on care delivered right from birth to stabilisation to improvement in baby's clinical condition.
Our network consists of 2 Level 3 Neonatal units, 2 Level 2 neonatal units and one Level 1 Neonatal unit. The geography of location of these units is such that it is not feasible for staff to attend all the simulation-teaching sessions in one place.

In order to reach out to remote units for training and involve them in simulation, our team resorted to Mobile Simulation. This involved simulation kit and simulation instructors to reach out to local units delivering mobile simulation session locally.

**Method:** Liaison clinician identified at local unit and Simulation and Transport leads within the Level 3 unit liaised with them to agree on mutually convenient date for simulation. The topic of simulation is agreed based on the local need. Simulation team consisting of two simulation instructors and neonatal nursing staff, would work on the agreed topic and prepare for the simulation session. Simulation kit will be assembled as per the requirement of the session and transported in the instructor's car (Simulation kit purchased with its mobility as one of the criteria).

The Simulation team would reach out to the local unit on predefined date and time, taking into consideration preparation and set up time of simulation kit.

Simulation session would include a brief power-point presentation on the topic providing some theoretical background, management plans and question answer session. This will be followed up by simulation session facilitated by two instructors involving local staff. Session would involve simulation in their own setting, stabilisation to the point of transport team arriving, giving handover and getting baby into transport incubator and working collaboratively until the point of safe transfer of the infant.

**Results:** Local units have valued this type of Mobile simulation training exceedingly well as lots of local staff can be trained in one session. Aim is to run one session per local unit on a six monthly basis and regulate the frequency as per the local demand. This has helped better working partnerships and better rapport building and local units feel part of the wider team. They now involve the Level 3 units for advice and opinions more frequently than before. Further plan is to develop faculty consisting of simulation instructors not only from Regional Tertiary units but also from local units.

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**PO 096 – Future of Innovation: Reaching Out to Remote Units Using MOBILE SIMULATIONS**

**Topic:** Innovation/ Future Direction and Outreach Simulation

**ID:** IPSSW2015-1235

**N B Soni**¹, Savi Sivashankar², Ruksana Patel²

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**PO 097 – NEST Programme: Neonatal Equipment, Skills and Training Programme Using Multiple Mini Simulations (MMS)**

Dr N B Soni¹, Dr Aparajita Basu*¹

¹Lancashire Women and Newborn Centre, Burnley, United Kingdom

**Introduction:** Neonatal unit always works in multi disciplinary teams involving junior trainees, senior trainees, consultants, Nursing staffs, Advanced nurse practitioners and support staff including ward clerks, house keepers (Health care assistants) etc. To deliver highest quality of care timely, it is important that there is uniformity and consistency in management of newborns. It is also important that teams works efficiently by having clarity of their roles and role of each other feeds into the wider team role efficiently. Every single member of the team has their strengths and there needs to be a programme which can bring together these strengths so that care is delivered timely, efficiently and to highest standards within existing resources and financial constraints. With this in view, idea of NEST programme has been conceptualized and plans made to deliver this programme on a monthly basis in a consistent manner to all members of the neonatal team. Once successful locally, this idea has potential to be rolled regionally within the network for consistency, efficiency and uniformity on a wider footprint.

**Method:** Programme faculty lead by Neonatal consultant and consisting of Neonatal Matron, senior nursing staff, advanced nurse practitioner, equipment technician and senior trainee has been developed. A full day programme has been developed consisting of first half dedicated to equipment training and learning by multiple mini simulation (MMS) sessions. Second half of the session will be dedicated to systematic approach of addressing different aspects of neonatal care using power point presentations, interactive sessions and again multiple mini simulation sessions. The content of the programme will be largely
consistent apart from last half hour of the programme will include simulation of recent critical incidents to bring home lessons learnt from these incidents. Aim is to get every single member of the team once through this NEST programme annually to have exposure and therefore consistency and uniformity of working within the NICU. Programme is scheduled to begin in March 2015. Poster presentation will display layout of the programme

Benefits: It is expected that by this programme, every member of the team will fell valued, motivated and contribute at highest level in their individual capacity as well as knowing their role in context of role of others. This will avoid duplication of work, make efficiency savings and patients will get more timely care and interventions and receive highest standards of care.

PO 098 - Simulation: Injecting Humanity into Scenarios with Trained Nursing Student Patient Volunteers (PVs)
Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1168

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Nursing students routinely exposed to high quality simulation exercises or that have difficulty “suspending disbelief” regarding the artificiality of simulation experiences can be more challenging to engage in learning. Simulation exercises need to be frequently re-evaluated and more creatively produced to promote perceptual and social realism. (1) Using live actors can be a significant expense if professional Standardized Patients (SPs) are used for primarily learning clinical experiences. To address this challenge and preserve higher quality, more predictable learning experiences, a training workshop for amateur Patient Volunteers (PVs) was developed for use in an undergraduate nursing curriculum. The aim was to use trained nursing students to significantly enhance the fidelity of the existing simulation program. Of particular value was the pool of PVs drawn from the undergraduate population that were available to play pediatric adolescent simulation roles.

The training program was developed with a qualified Standardized Patient Trainer/Coach based on a modification of an approach put forth by Wallace (2). A fully functioning SP program including professional actors supplemented by nursing students trained as PVs, was developed in a single semester. Limited resources required development and use of trained amateur PVs for formative learning events with professional SPs primarily reserved for testing situations such as high-stakes Objective Structured Clinical Examinations (OSCEs).

A range of manikins, including high-fidelity models, and task trainers were used in concert with the SPs and PVs in courses ranging from pediatrics, maternal/child, psych, community health, med/surg and assessment. Special events included firefighter/paramedic training, high-stakes exams and interdisciplinary simulations with Nursing and Occupational Therapy. Scenario templates, verbal and written feedback forms were developed.

To evaluate the effectiveness of the inclusion of trained PVs in the nursing simulation program, simulation program evaluations were obtained that include satisfaction and free response questions. The satisfaction scores were slightly higher when using more PVs in required scenarios and positive feedback/requests for more such experiences were seen in the free response evaluations. Secondary benefit was to the trained student PVs in extra exposure to scenario subject matter and experience as a patient. Certificates were issued on completion of the workshop. An unanticipated benefit to the students who participated in the
training workshop and subsequently played roles in at least two simulation days was the ability to include this information on their resume'.

In this poster presentation we will describe the program development process, resources used, focus on pediatric scenario development using PVs, program structure including templates and SP/PV portfolio binder components.

References:

PO 099 – Simulation for Trainees Returning to Clinical Practice in Paediatrics – A Multi-Professional Pilot

Topic: Interprofessional Education (IPE)

ID: IPSSW2015-1188

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¹London School of Paediatrics, ²Barts Health NHS Foundation Trust, London, ³Eastern Deanery School of Paediatrics, Norwich, United Kingdom

Context: Paediatric trainees take time out of programme (OOP) for various reasons. Most doctors returning to practice after an absence have moderate to significant educational needs [1]. Trainees returning after maternity leave are concerned about attrition of skills and lack of up-to-date knowledge [2]. National guidelines promote the provision of speciality specific updates, refresher courses and formal/informal mentoring [3].

Since 2011 the London School of Paediatrics has run a 1-day “Returning to Training after Maternity Leave” course. Course participants requested additional practical training to help prepare for returning to work. We sought to develop this course by incorporating high fidelity simulation into the programme and offering places to all trainees returning to work after time OOP. The interprofessional education approach to paediatric simulation has been shown to improve clinical and practice-based skills and provide a safe learning environment [4]. Thus we also advertised the course to the paediatric multiprofessional team.

Description: The course was designed by a “Returning to Acute Clinical Practice” Working Group. Content included an update on significant changes in Paediatrics over the previous year, four full immersion paediatric simulation scenarios based on the established ST3 programme and small group work to discuss topics such as flexible training and clinical academia. Participants were signposted to a Paediatric Peer Mentoring Programme [5]. Participation was voluntary. Not all participants took part in simulation. All participants were present for debriefing. Participants completed pre and immediate post course questionnaires.

Observation/evaluation: The course was oversubscribed (39 applicants, 20 places). 38 applicants were paediatric trainees. 18 people participated, including 1 nurse. Most trainees were registrars (83%) and returning after maternity leave (61%). Two thirds of participants had been OOP for more than a year. Pre-course confidence in leading resuscitations was low –13% feeling confident to do so without supervision, and 50% confident to lead with senior support. 94% felt the simulation was realistic and believable. 100% found the simulation useful and felt more prepared in returning to clinical practice.
Discussion: Confidence levels in resuscitation skills are low in trainees following time OOP. A simulation course for this cohort was oversubscribed by paediatric trainees but underrepresented by the multi-disciplinary team. The course was unanimously found to be useful in helping participants feel more prepared to return to acute clinical practice. Participants would like more involvement in simulation and smaller group work. The course will be run three times a year, with a larger faculty to support small group debriefing. We will improve our methods of engaging members of the multi-disciplinary team.

References:

PO 100 – Are You Lonesome Tonight? The Use of Simulation in the Training of After-Hours Physiotherapists
Topic: Simulation instruction design and curriculum development

ID: IPSSW2015-1078
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The Sydney Children’s Hospital Randwick provides a 24-hour acute care respiratory Physiotherapy service seven days per week. In order to provide this service, over 20 Physiotherapists are employed on a part time basis to cover out of hours services to the 250 bed tertiary children's hospital during evenings and weekends. At these ‘out of hours’ times these therapists are tasked with managing the most complex and challenging patients without the benefit of discipline specific support on site. Although there is limited literature reporting on simulation based education for allied health professionals the success of simulation based learning in nursing and medical disciplines is well documented. Since 2013, as new Physiotherapy staff have been intermittently orientated into these ‘after-hours’ roles, the use of simulation has been introduced to develop confidence and assess competence in acute respiratory assessment and intervention. This was specifically targeted at ensuring new Physiotherapy staff are safe and effective in the provision of care to intubated and ventilated patients, patients with tracheostomies and high acuity ward patients, and included review of suctioning technique via invasive and non-invasive routes. The use of simulation as an education intervention provides the learner with the opportunity to analyse and solve a clinical problem within a shared learning environment in which knowledge is constructed and communicated among the learners.

This ad hoc training was expanded and developed into a full day, immersive, high fidelity simulation for all after-hours Physiotherapy staff at the children’s hospital. The program combined skill development, crisis...
intervention, peer-review and competency assessment in an area which traditionally has been deemed as functioning at an advanced scope of practice for paediatric Physiotherapists.

The program was developed using specific competency criteria targeting common areas of acute respiratory management within a paediatric intensive care unit and ward environment. A working party including senior Physiotherapists, the Allied Health Educator, Intensive Care Consultant, Nurses and Simulation Co-ordinator worked to develop the program which consisted of, skills stations and immersive scenarios.

The evaluation of the program focused on the use of peer review to provide constructive feedback on skill development, a self assessed scale of confidence and perceived competence against specific criteria and a feedback questionnaire regarding the program completed by all attendees.

Allied health in general, has been behind our Medical and Nursing colleagues when it comes to the integration of simulation based learning in our training programs. In an era where there is a need for evidenced-based education that is closely linked with improvements in patient care this program is filling a new gap in the education and training landscape for allied health professionals.

References:

PO 101 – 3D Printing Transforms Development of Orphan Educational Devices

ID: IPSSW2015-1074

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Background: Medical applications for 3-dimensional printing (3DP) technology are emerging rapidly and range from prostheses (1), to in vitro scaffolding for organ manufacture (2), to procedural planning prior to a complex cardiac intervention (3). 3DP models have been used in undergraduate medical education for anatomic conceptualization of VSD subtypes (4), as well as simulation-based surgical education. Silicone casts from 3DP molds have been shown to be functional and aesthetically appealing for minimally invasive surgical laparoscopic training (5). Akin to orphan drugs used for rare illnesses, “orphan” educational devices for rarely-performed medical procedures may represent a class of task training devices that are particularly amenable to 3DP. While important to specific training programs, they may not encompass a broad enough market to warrant traditional development.
**Methods:** We describe the orphan development of a 3DP neonatal thoracentesis / pericardiocentesis task trainer. The de-identified chest CT scan of a 5 week old full term infant was segmented into four distinct layers: heart, lung, bone, and chest wall. Each layer was printed with varying density using a new flexible thermoplastic elastomer (Ninjaflex) using a commercially available MakerBot 1 Dual extruder. The combined 3DP layers were adapted to a basic mannequin, and a fluid-filled distended pericardial sac was added. Over the upcoming 3 months, neonatal fellows and attending neonatologist will practice identification and treatment of a pneumothorax and pericardial effusion on the modified mannequin. Additionally, the mannequin will be integrated into Neonatal Intensive Care Unit mock codes.

**Results:** Users will be asked to rate the modified mannequin, scoring each sub-item on a five-point Likert scale. Specifically, users will rate the mannequin on use for 1) algorithm based teaching (e.g. steps of neonatal resuscitation) 2) job competency assessment, 3) formative assessment (health professions education, e.g. medical and nursing students, 4) research protocols and 5) specialty board certification. Simulation educators will additionally rate immersion, ease of use, reliability, and functionality, and desired modifications.

**Conclusions:** Recent advances in 3DP technology and materials facilitate task trainer customization to an unprecedented extent. Resulting task trainers integrated into educational curricula allow focused learning objectives on rarely occurring high risk procedures such as pericardiocentesis. Structured evaluation of devices by simulation users and educators will enable rapid refinement.

**References:**
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