Pediatric Intensive Care Nursing

Journal of the International Pediatric Intensive Care Nursing Association

International Editorial Advisory Board

Franco A. Carnevale
Editor
Canada

Beverley Copnell
Australia

Dirk Danschutter
Belgium

Jos Latour
The Netherlands

Elaine McCall
New Zealand

Patricia Moloney-Harmon
United States

Pang Nguk Lan
Singapore

Mavilde LG Pedreira
Brazil

Marie-Catherine Pons
France

Colin Way
United Kingdom

Volume 8, Number 1, June 2007

Editor: Franco A. Carnevale, R.N., Ph.D., Montreal, Canada
Email: franco.carnevale@mcgill.ca
Fax: 1-514-412-4355
Address: A-411, Montreal Children's Hospital,
2300 Tupper, Montreal, Quebec, Canada, H3H 1P3

CONTENTS

Editorial
Introducing changes to our Journal
Franco A. Carnevale, Canada

The Student Experience of 'Woven' Online Learning for Paediatric Intensive Care Nurse Education
Yvonne Heward & Jon Harrison, United Kingdom

Resuscitation Guidelines - Managing Change In Practice
Michelle Fisher, New Zealand

The use of high-fidelity simulation to implement a weight-based (Broselow) pediatric resuscitation cart system in the pediatric intensive care unit
Ruth P. Chen, Dianne Norman, & Lennox Huang, Canada

5th World Congress on Pediatric Intensive Care
June 24–28, 2007, Geneva, Switzerland
Elaine McCall, New Zealand

Instructions for Authors

Pediatric Intensive Care Nursing is indexed in CINAHL: Cumulative Index to Nursing and Allied Health Literature.

ISSN 1819-7566

This Journal is a publication of the International Pediatric Intensive Care Nursing Association (for more information, visit our website and join our egroup: http://groups.yahoo.com/group/PICU-Nurse-International).

Readers are encouraged to use any part of this Journal for newsletters in their own regions, as long as this Journal, as well as the article's author, are recognized as the original source.

Logo and page layout design by Nicole Bailey

Editorial
Introducing changes to our Journal

Franco A. Carnevale RN, PhD
Montreal Children's Hospital, Montreal, Canada

What an exciting year for the pediatric intensive care nursing community! Our premier Congress was recently held in Geneva, Switzerland, on June 24-28, 2007: The 5th World Congress on Pediatric Intensive Care. It was a tremendous success. Read all about it in the report published in this issue of *Pediatric Intensive Care Nursing*, prepared by Editorial Board member Elaine McCall (New Zealand). We delayed publication of this June issue in order to report Congress events to you.

In addition to the extraordinary educational program presented at the Congress, it provided a wonderful opportunity for pediatric intensive care nurses from around the world to build new friendships, networks, and professional collaborations, or strengthen existing ones. It was exciting to see all the remarkable work being done by our international colleagues. We are pleased to publish three excellent papers in this issue of *Pediatric Intensive Care Nursing*, each is from a different country – two of which were presented at the Geneva Congress.

The energy of this event also catalyzed some long-awaited improvements to our Journal. Our International Editorial advisory Board is pleased to announce that it has finally adopted an official logo. This is presented along with a re-design of our front page. Time to 'freshen up' our look after 7 years!! We are grateful to Editorial Board member Patricia Moloney-Harmon (United States) for arranging to have her colleague Nicole Bailey design this wonderful work.

We are also pleased to introduce our official *Instructions for Authors*, which outlines our editorial requirements for prospective authors. All articles published in *Pediatric Intensive Care Nursing* after this issue will be published in this format. We are grateful to Editorial Board member Beverley Copnell (Australia) for preparing these guidelines.

Finally, we are happy to announce that in our upcoming issues of the Journal, we will resume publishing some of our previous special features such as Spotlight on PICU (featuring PICUs from our colleagues around the world) and Questions & Answers from PICU-Nurse-International (presenting a synthesis of particularly interesting discussions from our egroup. Some additional features are also being designed, but you will have to read our future issues to see them! We hope you enjoy reading YOUR Journal *Pediatric Intensive Care Nursing*.

The Student Experience of 'Woven' Online Learning for Paediatric Intensive Care Nurse Education

Yvonne Heward
Lecturer Practitioner, Paediatric Intensive Care Unit, Birmingham Children's Hospital NHS Foundation Trust and University of Central England in Birmingham, United Kingdom

Jon Harrison
Senior Lecturer, Child Health Division, University of Central England in Birmingham, United Kingdom

Introduction
This paper reflects on the development of a post registration Paediatric Intensive Care (PIC) Nursing course, using a cohort of 12 students, who commenced the course in September 2005, as a pilot group. The reasoning for the innovation will be investigated, taking into account relevant influencing factors and an outline of means of evaluation (Miller and Parlett, 1974, cited Baume, 2003).

Background
Specialist education provided by United Kingdom (UK) Universities and local Paediatric Intensive Care Units (PICU) is essential for PICU nurse development and succession planning. The University of Central England's Learning Beyond Registration BSc/Graduate Certificate course in Paediatric Intensive Care attracts qualified nurses from around the country and some students travel distances of 200 kilometres in order to attend the course (Fig 1).

Consequently, a need developed for a more flexible approach to course delivery in order to resolve the issues that impeded the student's learning, such as distance, their social circumstances and ongoing clinical demands.

During this time, emerging technology was becoming available and the course team recognised the potential benefits of adopting the University's Virtual Learning Environment (VLE) - Moodle in order to address many of the issues that were impeding the student's engagement with the course. The course team took the opportunity at this point, to engage in true course redesign rather than just 'bolting-on' e-learning components to supplement existing learning opportunities. This resulted in the development of a woven method of course delivery (Bartholomew, 2006), in which the e-learning activities tightly linked in with both the face to face, as well as the clinical practice learning activities. Furthermore, the course team used a number of innovative teaching strategies in order to ensure that the students' learning experience was closely aligned with their learning needs and to promote engagement and participation with the subject material.

All of the 12 students completing this post registration degree course were working full time in PIC environments. 40% of the group travelled long distances from a 200 km radius to attend the university and 50% of the group also had their own child care responsibilities. Prior to the use of Moodle, the modules had been traditionally taught using a series of lectures and required the students to attend university once a week. Consequently, some students had difficulties attending for reasons such as adverse weather conditions, transport problems and in addition, there were concerns for the students who were driving long distances when very tired and often after difficult clinical shifts.

It became clear that there was a need to adopt a more flexible approach to the course delivery and the use of a Virtual Learning Environment (VLE) addressed a number of the issues highlighted above, for example, distance. The course team planned to re-design the course and by weaving in Moodle activities, the face to face contact teaching time could be reduced by one third. Instead of university attendance,

Figure 1

United Kingdom & Republic of Ireland
Stoke
Leicester
Birmingham
Cardiff

the students would be able to interact with the learning resources, the course tutor and each other, from anywhere that they had internet access.

Implementation

In order to effectively utilise MOODLE, the course team invested considerable time over the summer of 2005 and completed an online MOODLE course themselves, learning how to set up the online resources and activities and also engaging in the principles of effective e-learning and course design. This experience was invaluable as it gave the course team the opportunity to experience e-learning from a student's perspective and as a result, ensured that the design principles were carefully considered when developing the new course. Furthermore, in order to increase the likelihood of student engagement with the course, the course leader visited potential students in their clinical practice areas and ensured that they had the required basic information technology skills, access to the internet and a live e-mail address.

At the beginning of the module the students attended a face to face 2 hour session in the Information Technology (IT) suite in order to ensure that all the students could log on to Moodle. By 'playing' with MOODLE in a safe environment and where help and support was immediately available, the students were given the opportunity to get comfortable with this new way of learning. They were encouraged to open up resources which would be used later in the programme and also to send each other messages through the online forums. By encouraging the students to practice making these forum posts to each other, the course team ensured that the students were completing the first stage of Salmon's five stage model of e-moderation and associated practice (Salmon, 2004). This model outlines the principles of effective online forum design and deployment and was integral to the success of the course, as the forums would be the main vehicle for communication whilst the students were not together in university. Other online learning activities included pre and post lesson quizzes with associated feedback, post lesson forums – 'Was there anything you did not understand?', story telling of clinical scenarios (McDrury and Alterio, 2000), and ongoing assessment support.

The introductory exercise successfully introduced the group to the use of Information Technology as a learning medium and encouraged subsequent uptake of on-line learning activities via MOODLE. Following this session, 100% of the group engaged in activities throughout the course. The group used the Moodle page to send messages to the course leaders and each other and they had in depth discussions based on topical clinical issues, such as nurse prescribing. The use of the online forums also allowed for the sharing of up to date, relevant evidence as the students and course tutor could easily hyperlink and attach documents to their postings. These forums also appealed to the more strategic natured students who were able to include their contributions within their assessment.

Evaluation

The course team experience

It was important for the course team that their initial aim had been fulfilled and that the students learning experience had been improved as a result of the increased flexibility due to the re-design and embedment of MOODLE within the course. The course team therefore reflected on their own experience of the preparation and implementation of the course and they also asked the students questions both throughout, as well as at the end of the course in an attempt to establish a number of factors. It was important to determine, for example, if the students felt that their learning needs were being met effectively; if the reduction in classroom time allowed them to achieve sufficient depth of learning; if they had any suggestions to improve the delivery of the module which might increase their learning and decrease any anxieties they may have had. It soon transpired that the use of MOODLE within the course had a number of significant benefits and ultimately had promoted the active engagement of the students with the learning materials.

The student experience

At the launch of this project the students seemed enthusiastic. After they had had time to 'play' with MOODLE they were looking forward to participating in the activities and were pleased that they could engage with the course and each other outside of the university setting. The students evaluated MOODLE very positively stating that it had:

'been an excellent learning opportunity',

that it was 'easy to use, useful for links and resources' and 'extreme benefit to me as I could use it to keep track of everything I have done in the classroom and the resources are always available to download'.

One further comment was that:
'MOODLE is brilliant, very useful for keeping up to date with resources and articles. It proved ideal for my assignments'.

Interestingly, it became evident that the students were often keen to share knowledge and experience on-line, yet not in the more formal setting of the classroom. They had heated debates in the canteen at lunch time, which the course leader heard about later, and these were followed up with students setting up their own on-line discussion forums!

The flexibility that the use of on-line learning permitted and encouraged the students to become more independent in their own learning. They could engage with learning resources when and where *they* desired. While this part of the innovation was designed primarily to meet the needs of the long distance students, it soon became evident that the affordances of online learning benefited all of the students:
'the fact that I could sit down and get straight into the work was beneficial as time is not always on my side',

and

'MOODLE has allowed me to increase my computer skills, keep in touch with tutors easily and keep in touch with other members of the group'.

Conclusion

There has been a shift in learning culture as regards the use of technology as a learning medium. The University's learning and teaching strategy has embraced IT as a positive learning environment and by effectively weaving MOODLE activities into the course design, the students learning has become more 'Constructively Aligned' (Biggs, 1999). As a result, the students learning experience has evolved into a process of learning from each other and their own experience, rather than just absorbing new knowledge. It is hoped that by giving the students more flexibility and independence in their learning, they will also develop a more long term and deeper approach to their learning (Baume, 2003). The students have embraced this learning medium and it seems to have fitted in successfully with their busy working and caring lives.

This post registration BSc/Grad Cert Paediatric Intensive Care course is the only one of its type in the United Kingdom, which is currently delivered in this way. As such, this method of course delivery is currently being further developed and it is planned that further innovations, such as interactive multi-media will be embedded into future courses. The flexibility of online learning is a powerful marketing strategy and this has also resulted in the development of partnerships with other Paediatric Intensive Care centres in the UK.

Acknowledgements: Paul Bartholomew, Senior Academic, University of Central England in Birmingham, United Kingdom

References

Bartholomew, P. (2006) 'I'd rather be a weaver then a blender! In favour of structure in e-learning design' http://www.jisc.ac.uk/uploaded_documents/JISCBristolWovenOnline.ppt accessed 3rd August 2007

Baume D (2003) 'Monitoring and evaluating staff and educational development' Chapter 5 in Kahn P and Baume D (2003) *A guide to staff and educational development* Routledge, London

Biggs J (1999) *Teaching for Quality Learning at University* Buckingham Society for Research into Higher Education and Open University Press

Miller, C M L and Parlett M (1974) *Up to the Mark,* Society for Research into Higher Education, London cited in Baume (2003)

McDrury J and Alterio M (2000) 'Achieving Reflective Learning Using Story Telling Pathways' *Innovations in Education and Teaching International* 38:1:63-73

Salmon G (2004) *All things in moderation http://www.atimod.com/e-moderating/5stage.shtml accessed 3rd August 2007*

Resuscitation Guidelines - Managing Change In Practice

Michelle Fisher
Nurse Educator, Paediatric Intensive Care Unit, Starship Children's Health Service
Auckland, New Zealand

Abstract
In 2005, The International Liaison Committee on Resuscitation (ILCOR) released advisory statements and a revised universal algorithm for Infant, Child and Adult Cardiopulmonary Resuscitation (CPR). Subsequently the New Zealand Resuscitation Council (NZRC) developed and disseminated revised guidelines for use within the New Zealand Healthcare System.

Within the Paediatric Intensive Care Unit (PICU) the challenge of integrating new practice standards whilst ensuring compliance with CPR guidelines, was how to disseminate information to over 80 staff nurses working 12 hour shifts.

Following implementation of an education programme, a survey completed by 20 staff members demonstrated that staff felt well supported with the introduction of the new CPR guidelines (90 %) and confident that they understood the changes to the resuscitation guidelines (90 %). Staff identified that the poster display (95 %) and the mail sleeve "flyer" (80 %) helped them understand the changes to CPR.

Background
When a health care professional performs resuscitation the aim is to both recognise and prevent a premature cardiovascular death through knowledge and skill. Yet cardiopulmonary resuscitation (CPR) is not a single skill that a person learns, but instead a series of assessments and interventions that varies depending on the type of arrest, aetiology (AHA, 2005) and age. So how do we successfully ensure that CPR is both evidenced based and performed well?

Internationally this very question was being addressed by the first International Liaison Committee on Resuscitation (ILCOR) who produced international guidelines (AHA, 2000). Since then ILCOR researchers have continued to evaluate resuscitation science culminating with the release of advisory statements and a revised universal algorithm for Infant, Child and Adult CPR (2005, Consensus Conference). Internationally each resuscitation organisation has used this algorithm to form the basis of its own guidelines with subtle modifications.

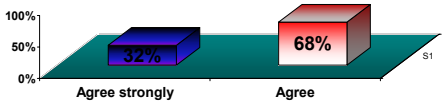
The universal algorithm recommended some key changes to practice; no pulse check - commence compressions if victim unresponsive / shows no signs of life; a single compression-ventilation ratio of 30:2 for infant/child/adult; single shock therapy for a "shockable rhythm" followed by 2 minutes of CPR irrespective of resultant rhythm; an emphasis on minimal interruption to chest compressions.

The New Zealand Resuscitation Council (NZRC) developed and disseminated revised guidelines for use within the New Zealand Healthcare System which were finalised by each District Health Board in late 2006. Starship Children's Health chose the month of December 2006 to formally introduce the new guidelines.

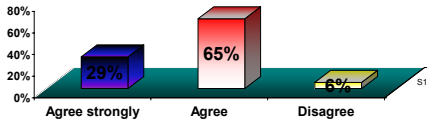
The project
It is well documented in the literature that in order to elicit a change in practice, the facilitator must first understand: the problem; the key stakeholders; the environment, culture and context of the setting; as well as potential barriers (Cockburn, 2004; Grol & Wensing, 2004; Rosswurm & Larrabee, 1999; Taylor-Piliae, 1999).

The primary aim of this project was to successfully integrate the new CPR guidelines into existing practice without compromising patient safety standards. The secondary aim

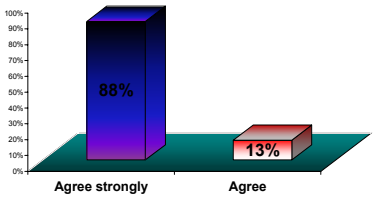
Was the poster display useful?



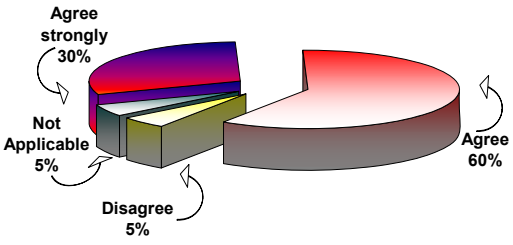
Was the mail sleeve drop useful?



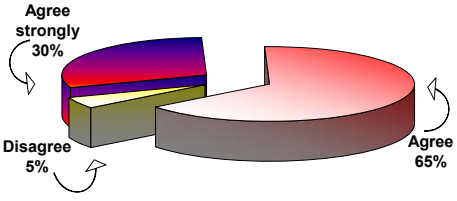
Was the practical session useful?



Did you feel well supported with the new CPR guidelines?



Do you understand the new guidelines?



was to develop and evaluate systems for successful implementation of practice change.

The challenge of this project within Paediatric Intensive Care (PICU) was how to disseminate information to over 80 staff nurses working 12 hour shifts which is often a barrier to successful change; and secondly how best to address the significant changes in CPR practice so that staff both understand and felt comfortable with the changes to practice.

In order to transcend the potential barriers, including shift work, time constraints and sheer number of staff, it was decided that a blended educational approach be used to disseminate the information over a period of 1 month. This took the form of a visual poster display and mail sleeve drop with practical teaching sessions where possible given the units staffing constraints. A survey was conducted at the end of that time frame.

Eighty staff were exposed to a mail sleeve "flyer" and poster display over a month period.

Of those surveyed, 40% had also received a practical session during the month's campaign, which they felt cemented their understanding of the new changes to resuscitation. The limited number of staff exposed to a practical resuscitation session (10% of total staff) reflected the physical barriers to education such as time & staffing constraints of the unit.

Overall the survey indicated that 90% off staff felt well supported with the introduction of the new resuscitation guidelines and 95% felt confident they understand how to implement those guidelines in practice.

Implications

Whilst it is preferential that a clinical skill such as CPR be maintained and updated through practical skill based education sessions, the reality is such that barriers like time, clinical workload and shift work are difficult to transcend. Therefore it is imperative that a multifaceted educational approach is deployed and assessed to ensure staff CPR skill and knowledge currency results in competent and confident practitioners.

Integral to the success of any new practice, is the facilitator who affects the change process. Provision of adequate help and support using a variety of methods will enable the staff to analyse, reflect and change their own

Between November 2006 and April 2007, 57 staff have also had a practical teaching session.

Results

A survey of nursing staff was undertaken at the end of the month's education campaign. Forty surveys were randomly given to nurses within the unit and 20 completed surveys were returned giving a response rate of 50%. This represents 25% of the total nursing staff in PICU. The survey was designed to explore the two main education methods employed during the months campaign, staff identified that the poster display (95%) and mail sleeve "flyer" (80%) helped them understand the changes to resuscitation. However whilst the poster display was a useful visual aid, staff commented that they found it difficult to find the time to read it whereas the flyer was simple and easy to take away to revise at another time. Those who did not find the mail sleeve drop useful stated they had not received/accessed their mail sleeve to review the flyer.

attitudes, behaviours and ways of working to maximise patient outcomes.

References

American Heart Association in collaboration with International Liaison Committee on Resuscitation (2000). Guidelines for Cardiopulmonary Resuscitation and Emergency Cardiovascular Care—an International Consensus on Science. Resuscitation. 46. 3–430

American Heart Association (2005). Toward International Consensus on Science. Circulation. 112 (22 Supplement). III-1.

Cockburn, 2004; Grol & Wensing, 2004; Rosswurm & Larrabee, 1999; Taylor-Piliae, 1999

Cockburn. J. (2004). Adoption of evidence into practice: can change be sustainable? Medical Journal of Australia. 180. S66-S67.

Grol, R., & Wensing. M. (2004). What drives change? Barriers to and incentives for achieving evidence-based practice. Medical Journal of Australia. 180. S57-S60.

Rosswurm. M. A., & Larrabee. J. (1999). A model for change to evidence-based practice. Image – The Journal of Nursing Scholarship. 31 (4). 317-322.

Taylor-Piliae. R.E. (1998). Establishing evidence-based practice: issues and implications in critical care nursing. Intensive and Critical Care Nursing. 14 (1). 30

2005 International Consensus Conference on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations, hosted by the American Heart Association in Dallas, Texas, January 23–30, 2005.-37.

Acknowledgement: Thanks to the staff of the Paediatric Intensive Care Unit, Starship Children's Health, Auckland, New Zealand.

Come & Join
PICU-Nurse-International

An Internet discussion group of the
International Pediatric Intensive Care Nursing Network.

For more information, visit our website:
http://groups.yahoo.com/group/PICU-Nurse-International
or contact Franco Carnevale (moderator) at
franco.carnevale@mcgill.ca

The use of high-fidelity simulation to implement a weight-based (Broselow) pediatric resuscitation cart system in the pediatric intensive care unit

Ruth P. Chen, RN MScN
McMaster University, School of Nursing, Hamilton, Canada

Dianne Norman, RN BScN
McMaster Children's Hospital, Hamilton Health Sciences, Hamilton, Canada

Lennox Huang, MD FAAP
McMaster University, Department of Pediatrics, McMaster Children's Hospital, Hamilton Health Sciences, Hamilton, Canada

Corresponding Author: Ruth Chen, 1200 Main Street West, HSC 2J34H, Hamilton, Ontario, Canada, L8N3Z5; chenrp@mcmaster.ca

Abstract
Background: Implementation of new equipment systems is a complex process requiring culture change and trials in the patient care environment. High-reliability organizations use simulation training for complex equipment systems to ensure readiness for critical events. We report the novel use of high-fidelity simulation (SIM) for the implementation of colour-coded, weight-based Broselow carts in the pediatric intensive care unit (PICU).

Methods: Three SIM-based resuscitations were held in the PICU over a one month period. Both pediatric and infant simulators were used to target different weight ranges for equipment and medications. Resuscitations were run by the multi-disciplinary, on-service PICU team. Post-resuscitation evaluation included team debriefing and a qualitative questionnaire to review the cart implementation strategy.

Results: Twenty-seven questionnaires were collected and analyzed for qualitative themes around participants' perspectives regarding SIM use when implementing new equipment systems. Overall, SIM was perceived as realistic and a valuable tool to increase familiarity and acceptance of the new resuscitation cart. Use of SIM provided an opportunity to evaluate new equipment systems in a safe environment. Additionally, SIM-based resuscitation scenarios reinforced the need for good communication and effective team functioning during a pediatric arrest.

Conclusion: High-fidelity simulation can be an effective tool to introduce new equipment systems in the PICU by facilitating application for the end-user in a clinical environment without compromising patient safety. Further study is needed to determine the superiority of SIM over traditional implementation methods in the PICU and in other hospital environments.

Key words: high-fidelity simulation, Broselow cart, patient safety, qualitative

Background

Recent literature supports using colour-coded, weight-based (Broselow) resuscitation carts to reduce time to locate equipment and improve accuracy in locating the correct equipment during pediatric resuscitations [1]. Medium-fidelity patient simulators were used by Frush et al [2] to evaluate a web-based education program aimed at decreasing medication dosing errors through proper use of the Broselow Pediatric Resuscitation Tape. In orienting staff to new equipment and systems in the patient care environment, various methods have been used to facilitate the process. Kobayashi et al [3] report the use of high-fidelity simulation (SIM) to evaluate the clinical functions of a new emergency department. A competency checklist and educational module to standardize training on Broselow tape usage is another

implementation method described in the literature [4].

The resuscitation committee of a university-based children's hospital identified replacement of traditional resuscitation carts with Broselow carts as an important patient safety initiative. No literature exists to guide the implementation process for the transition from a standard cart to a weight-based resuscitation cart. Lack of familiarity with a new resuscitation cart could potentially result in delays and inaccuracies in locating critical equipment. Pediatric crisis events are infrequent and thus the opportunity to learn by deliberate practice is also rare. Occasionally, new equipment systems are not trialed until an actual critical event. High-reliability organizations use simulation training for complex equipment systems to ensure readiness for critical events. Hospital-based pediatric high-fidelity simulation offers opportunities for health professionals across multiple disciplines to gain experience for events such as cardiopulmonary resuscitation [5].

Further investigation into the process of implementing new equipment systems used for critical events in the pediatric intensive care unit (PICU) is required. Therefore, we conducted a qualitative study to explore the novel use of SIM for the implementation of colour-coded, weight-based Broselow carts in the PICU.

Methods

Study Setting

Over the course of a one-month period between April-May, 2007, three SIM pediatric resuscitation scenarios were conducted in the PICU of a university-based children's hospital. All critical events were conducted with a high-fidelity pediatric or infant simulator (Medical Education Technologies, Inc.). The Broselow Cart was required for every critical event, and the age, height and weight of the infant/child were altered in each scenario to require the team to access different sections of the cart. Scenarios were also designed to be complex, affecting multiple organ systems and requiring the use of respiratory, cardiac, and pharmacologic support. The resuscitation scenarios lasted between 45 minutes to 1 hour and were followed by a team debriefing. Immediately following the debriefing period, a qualitative questionnaire was distributed by a study investigator.

Study Participants

During each resuscitation scenario, an available Registered Nurse (RN) was called into the room to evaluate and provide initial management of the critical event. As the patient deteriorated, the RN called for the Broselow cart and for assistance from other members of the resuscitation team. Additional health care professionals involved in each resuscitation scenario included: respiratory therapists, pediatric residents, fellows, intensivists, pharmacists and pharmacy technicians. Furthermore, an available staff member was called upon to act as a parent of the patient in order to increase the realism of the scenario. All participants were familiar with pediatric high-fidelity simulation. Purposive sampling, with an emphasis on maximum variation sampling, was employed in recruiting participants to answer the qualitative questionnaire; every discipline in the resuscitation team was included. The questionnaire consisted of two open-ended questions that allowed maximum freedom for response and comments (See Table 1).

Analysis

Twenty-seven study participants completed questionnaires. The response rate for questionnaire completion was 79% (34 questionnaires in total were distributed) and the response rate across the three resuscitation scenarios was consistent. Questionnaire responses were transcribed and preliminary analysis of the data was performed by two trained research assistants. The research assistants analyzed the data independently and categorized responses around key themes. Investigator triangulation was incorporated at the next stage as the preliminary themes were independently evaluated by two study investigators. Consensus was reached between all individuals following an iterative process of comparing the original questionnaire responses with the proposed emerging themes. After three SIM-based resuscitation scenarios, the participants' responses appeared to reach saturation of themes.

Results

Table 2 summarizes the key themes identified by participants around the use of SIM to implement the new Broselow cart into the PICU. Three overarching themes emerged from the data analysis.

Table 1: Broselow care implementation questionnaire

Whenever change is introduced to a hospital unit (e.g. introduction of new equipment, implementation of new protocols), clinical simulation can be used as a tool to pilot, implement or evaluate these changes.
Question 1: If you feel that simulation was effectively utilized in this situation, please provide specific examples of how you felt it was effective.
Question 2: If you feel that there were components of this exercise that could be changed/improved/omitted/other, please provide constructive feedback.

Table 2: Summary of key themes

1. Familiarization, through practice, to new equipment, policy and procedures
2. Evaluation of equipment in a realistic situation
3. Importance of effective communication and teamwork

1. **Familiarization, through practice, to new equipment, policy and procedures**

The primary theme identified was that SIM greatly facilitated familiarization to new equipment. *"[SIM was] a good way to practice hands on use in application of patient scenario to identify and [know] where to locate items, what's available on cart"* and *" allowed practice [with Broselow cart] in a critically ill situation ".*

2. **Evaluation of equipment in a realistic situation**

A second consistent theme was that SIM allowed staff to evaluate new equipment in a realistic environment and to determine if any modifications and improvements to the system were necessary.*" [SIM was] effective in showing where we need to improve, what equipment we need that is not available ".* Similarly, other participants noted *" cart is missing arrest board, calculator, med labels, and NS syringes for ETT cuff ".*

At the same time, areas of improvement were noted with SIM use of the Broselow cart. *" [Broselow] cart was useful, but we need to know more about the organization of equipment in the cart "* and *" more information and knowledge about the Broselow cart [is needed]: what is in it and organization of the cart and inventory of missing supplies."*

3. **Importance of effective communication and team work**

Finally, a recurring theme among participants was that the SIM scenarios stressed the importance of collaboration, communication and effective team skills during resuscitation events and within a health care climate where change is regularly encountered, whether

involving new equipment, policies or procedures. *"[SIM was] useful for team communication – good for team leader practice Good communication practice for emergencies and very good to define roles, sequence of events, working together."*

Discussion

Implementing new equipment in a patient care environment can be challenging for health care professionals in many settings. Decisions to purchase and implement new equipment may be based on theoretical benefits or on trials conducted in other centers, and do not always include input from end-users. Regardless of the rationale for the decision, there is no guarantee that these changes will confer the same benefits as in other institutions. While these changes are intended to improve patient care and increase patient safety, there remains the concern that these goals will be compromised during the transitional period and that staff may be unfamiliar with and/or resistant to these changes. However, as patient care practices continue to evolve and research identifies necessary changes in the clinical setting,

consideration is required to determine the most effective change strategies.

This qualitative study identified that SIM can be an effective method for implementing new equipment systems in the PICU. The three key themes identified were that SIM: 1) allowed the staff to gain familiarization with the new equipment systems; 2) provided an opportunity for evaluation of the equipment under realistic conditions; 3) highlighted the importance of effective collaboration and communication during resuscitative events and when implementing change in the patient care environment. Furthermore, SIM-based implementation of new equipment also allowed for identification of staff learning needs and areas for further staff development and support.

The high rate of response for the study questionnaires as well as the consistency with which the themes were reported by the participants served to reinforce the validity of our findings. A limitation to this qualitative study was that member checking was not performed following the identification of themes. However, we attempted to minimize investigator bias during data analysis by culling the key themes directly from the participants' written comments. Further study could explore transferability of the identified themes to other patient populations, equipment systems and/or hospital areas. Lastly, while the primary objective of this study was not to determine the effectiveness of the Broselow cart during a pediatric arrest (e.g. as compared with a standard cart), future studies could use SIM to trial and evaluate proposed changes to equipment, policies or procedures in an environment which does not jeopardize patient safety.

Conclusion

SIM provided the training opportunity to ensure staff readiness to utilize the Broselow cart in a resuscitative event. High-fidelity simulation can be an effective tool to introduce new equipment systems in the PICU by facilitating application for the end-user in a clinical environment without compromising patient safety. Additional studies are needed to determine the superiority of SIM over traditional implementation methods in the PICU and in other hospital environments.

Acknowledgements

The authors wish to acknowledge the support of Dr. Rob Lloyd and Laura Page for the planning and execution of the resuscitative events and to research assistants Dawne Kyowski and Jaime Wentzell for their support with data management.

References

1. Agarwal, S., et al., *Comparing the utility of a standard pediatric resuscitation cart with a pediatric resuscitation cart based on the Broselow tape: a randomized, controlled, crossover trial involving simulated resuscitation scenarios.* Pediatrics, 2005. **116**(3): p. e326-33.
2. Frush, K., et al., *Evaluation of a Web-based education program on reducing medication dosing error: a multicenter, randomized controlled trial.* Pediatr Emerg Care, 2006. **22**(1): p. 62-70.
3. Kobayashi, L., et al., *Portable advanced medical simulation for new emergency department testing and orientation.* Acad Emerg Med, 2006. **13**(6): p. 691-5.
4. Hohenhaus, S.M., *Assessing competency: The Broselow-Luten resuscitation tape.* J Emerg Nurs, 2002. **28**(1): p. 70-2.
5. Weinstock, P.H., et al., *Toward a new paradigm in hospital-based pediatric education: the development of an onsite simulator program.* Pediatr Crit Care Med, 2005. **6**(6): p. 635-41.

5th World Congress on Pediatric Intensive Care
June 24th –28th, 2007, Geneva, Switzerland

Elaine McCall
Clinical Nurse Consultant, PICU, Starship Children's Hospital
New Zealand

I was fortunate to be able to leave the Southern Hemisphere winter behind for a short while to attend the recent 5th World Congress on Pediatric Intensive Care (PIC) in Geneva, Switzerland with several nursing and medical colleagues. The challenge of surviving the 36-hour journey with mind, body and luggage intact was second only to the challenge faced each day on deciding which sessions to attend.

The organisers are to be congratulated on a tremendously successful meeting following on from the success of the World Congress on PIC 2003 held in Boston and the World Congress on PIC 2000 held in Montreal. Having almost two thousand delegates at any event demands a high level of organisation and this congress was superbly organised throughout. Both as a presenter and as a delegate the support, directions and organisation were superb.

The organising committee's aim of facilitating a "dialogue around the world" by bringing together a number of paediatric intensive care experts to share personal experience and global perspectives of paediatric critical care was certainly achieved.

There were four very full days (0800 – 1830) of sessions covering every aspect of paediatric intensive and critical care that you could imagine. The programme was extremely diverse, providing the opportunity for healthcare professionals from across the world to share and further develop knowledge related to paediatric critical care. The conference started with the Day of Knowledge, followed by the Day of Art, Day of Integration and finished with the Day of Future. While the last day had a limited number of track lines, the first three days had at least 12 track lines with sessions on clinical and non-clinical topics including sepsis, pulmonary, cardiovascular, neuroscience, organisational issues, ethical issues, nursing care and nursing innovation.

The quality of nursing speakers was variable with some outstanding presentations, which were well attended and enjoyed by the many nurses who comprised the audience. It was encouraging to see a good number of nursing presentations stimulating lots of discussion among delegates with differing perspectives from across the world. Many of the presenters were vibrant, interesting, and obviously willing to share their knowledge. I was particularly impressed how well nurses articulated the professional issues affecting nursing in their own countries. While some of the issues were very similar to those challenging us here in New Zealand, others definitely put our concerns into a very different perspective ensuring we all came away with plenty of food for thought.

Of the many challenges facing paediatric intensive care services across the globe in the near future, perhaps the most important is maintaining quality paediatric critical care services. The current world wide shortage of nurses, the predicted retirement of the majority of the current nursing workforce within the next 15 years, and the reduction in junior medical staff hours of work will all impact on service provision. There are many different initiatives evolving, such as developments in Information Technology, use of different roles, e.g. nurse practitioners, physician assistants and unqualified assistant staff. Paediatric critical care clinicians need to be actively engaged in defining the roles of the healthcare workforce in the future. It is by attending meetings such as this congress that we can debate these issues together.

Three topics of interest for me were quality, resuscitation and nursing outreach. Quality continues to be a major focus of nursing within Paediatric Intensive Care and there were many initiatives demonstrated in both oral and poster presentations. There were many sessions including simulation workshops on teaching and managing resuscitation of the critically ill child. The issue of how to support ward staff in caring for acutely unwell children continues to be of great interest. It is clear that no matter which side of the globe you work on, whether it is North or South, the challenges are much the same! It was reassuring to realise that we are responding to these challenges similarly to our colleagues overseas.

One of the biggest challenges of the congress was deciding what to attend and what to miss. Even viewing the posters was a major task; about a hundred and fifty to two hundred were displayed each day. The posters were displayed for only one day and a whole new collection was put up the next day. It was extremely beneficial to have some time allocated each day for the poster walk rounds where the authors gave a verbal summary of the poster. These were intimate sessions with ten or twelve people around half a dozen posters hearing each other's stories. These were of a very high standard and the great amount of work in producing the posters was evident.

A verbal presentation session that particularly stood out for me was on Disaster Response. Dirk Danschutter (Belgium) provided an incredible insight into volunteering for emergency relief following a natural disaster and Irene Chan (Singapore) provided a personal and practical account of dealing with an outbreak of Severe Acute Respiratory Syndrome (SARS).

The one page colour calendar was extremely helpful in planning the day. Disappointingly the Scientific Programme book did not include abstracts of the invited speakers presentations, however the book of abstracts for free papers and posters was impressively thick. There was a well attended extensive trade display which provided the opportunity for delegates to assess new technology and products entering the market.

One great aspect of the congress is both renewing and making new friendships and I look forward to renewing friendships established in Geneva in 2007, down under in 2011. I am confident that the organising committee will be working hard to ensure that the 6th World Congress on PICU 2011, in Sydney, Australia carries on the success of this meeting.

http://www.pcc2011.com/

Instructions for Authors

Pediatric Intensive Care Nursing is an international journal which promotes excellence in clinical practice, research, education and management, and provides a forum for the exchange of knowledge and ideas. The editors welcome articles on any topic of interest to pediatric or neonatal intensive and critical care nurses.

Manuscripts submitted to *Pediatric Intensive Care Nursing* must not have been published previously (except in the form of an abstract or as part of a published lecture or academic thesis), and must not be concurrently under consideration by any other journal. Once accepted for publication, manuscripts become copyright to *Pediatric Intensive Care Nursing* and may not be reproduced without permission from the editors.

Format
Manuscripts must be written in English; either American or British spelling may be used but must be consistent throughout. Manuscripts should be typed double-spaced, using Arial or Times New Roman font in at least 11-point, with margins of at least 2 cm or 1 inch. Number pages consecutively beginning with the title page. The preferred length for research, clinical and review papers is 1000-2500 words, excluding references. Submissions to Spotlight on PICU should not exceed 1500 words. The sections of the manuscript should be in the following order.

Title page
- Title should be concise and informative, and typed in bold capitals.
- Names (first name, initial(s) and family names) of authors in the order in which they are to appear. Include a maximum of 4 qualifications for each author
- Institutional affiliation(s) of each author
- Address, telephone and fax numbers and email address of corresponding author

Abstract
An abstract not exceeding 250 words is required for all submissions except those for Spotlight on PICU. For research studies, the abstract should be structured under the following headings: Background, Methodology, Results (or Findings), Conclusions.

Body of text
Use headings to structure the paper. The type of paper will determine the headings, eg for research papers the main headings will be Introduction, Background, Methodology/Methods, Results/Findings, Discussion, Conclusion. Up to 2 levels of headings may be used. Papers reporting research conducted in humans or animals should include a statement that the study was approved by the relevant body or bodies.

References
The list of references should only include works that are cited in the text and that have been published or accepted for publication. References such as “personal communications” or “unpublished data” cannot be included in the reference list, but can be mentioned in the text in parentheses.

References should start on a separate page following the text. They must be numbered in the order in which they appear in the text and listed in numerical order. In the text, designate reference numbers on the line (i.e., in normal text, not superscript) in parentheses. If using Endnote or Reference Manager, references should be formatted using the style *Intensive Care Medicine*.

Examples
Journal article: Tan AM, Gomez JM, Mathews J, Williams M, Paratz J, Rajadurai VS (2005) Closed versus partially ventilated endotracheal suction in extremely preterm neonates: physiologic consequences. Intensive and Critical Care Nursing 21:234-242

Journal article published on-line ahead of print: Duff JP, Rosychuk RJ, Joffe AR (2007) The safety and efficacy of sustained inflations as a lung recruitment maneuver in pediatric intensive care unit patients. Intensive Care Medicine 10.1007/s00134-007-0764-2

Book: McHaffie H (2001) Crucial decisions at the beginning of life: parents' experiences of treatment withdrawal from infants Radcliffe Medical Press, Abingdon

Book chapter: Cordery C (1995) Doing more with less: nursing and the politics of economic rationalism in the 1990s. In: Gray G, Pratt, R. (ed) Issues in Australian Nursing 4. Churchill Livingstone, Melbourne, p 355-374

Conference paper: Copnell B, Tingay DG, Kiraly NJ, Sourial M, Gordon MJ, Mills JF, Morley CJ, Dargaville PA Comparison of the effectiveness of open and closed endotracheal suction. Procedings of the Pediatric Academic Societies' Annual Meeting, San Francisco, May 2006. E-PAS2006:2059:5560.2342.

Electronic source: National Institutes of Health (2004) Program announcement: Improving care for dying children and their families. http://grants1.nih.gov/grants/guide/pa-files/PA-04-057.html Accessed: July 20, 2004

Figures and Tables
All figures (graphs, photographs, diagrams) and tables should be numbered consecutively and cited in the text. Each figure and table should be on a separate page at the end of the manuscript. Tables should have a title above and, if needed, a legend at the bottom explaining any abbreviations used.

Figure legends should be typed on a separate page. They should be concise but self-sufficient explanations of the illustrations.

Illustrations should be supplied in electronic format.

Written permission must be obtained to reproduce illustrations and tables that have appeared elsewhere, even if the work of the author(s). Borrowed material should be acknowledged in the legends. Identifiable clinical photographs must be accompanied by written permission from the persons in the photograph, or parent or guardian for children.

Manuscript submission
Electronic submission is required. Manuscripts should be saved as a Word document and emailed to the editor Franco Carnevale (franco.carnevale@mcgill.ca).

Submissions to Spotlight on PICU can be emailed directly to the column editor, Dr Bev Copnell, at Beverley.Copnell@med.monash.edu.au