



# Pediatric Intensive Care Nursing

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## **Guest Editorial**

### **How visible is pediatric intensive care nursing?**

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In 2007 we celebrated our 5<sup>th</sup> World Congress on Pediatric Critical Care. For four days, pediatric critical care (PCC) nursing practice and science were on display, through the presentation of and discussion around 55 free papers and 163 posters. Conferences are invaluable for the opportunity they provide to engage in dialogue with other nurses (and professionals of other disciplines) from a wide range of settings.

As a means of disseminating either research findings or other information about practice, however, conferences are relatively inefficient. First, they occur fairly infrequently – the World Congress, the premier international event for pediatric critical care, only takes place once every four years. Second, only a limited number of nurses can attend even the largest conference. Thus, it is only through publication that knowledge can be widely disseminated.

It appears, however, that many researchers stop short of this final – and vital – step. In a recent Cochrane review [1], it was found that less than half of all research initially presented at conferences was subsequently published in journals. Publication rate was found to be highest during the first three years following initial presentation, and to decline thereafter. The review did not comment on whether professional background of the researchers influenced publication rates [1]. How do PCC nurses perform? At the 4<sup>th</sup> World Congress on Pediatric Critical Care, held in Boston in 2003, there were 73 presentations, in either oral (platform) or poster format; 30 of these reported research findings and 43 were non-research (Table 1). A search of the Medline and CINAHL databases in mid-2007 identified 7 publications (6 research and 1 non-research) that apparently arose from

these presentations, based on the author list and title. This represents a publication rate of 20% for research presentations, well below worldwide and interdisciplinary figures [1]. Even if some papers were published in journals not listed in these databases, such as non-English journals, the breakdown by country of origin (Table 1) suggests the figures would not be affected to any extent.

This finding should be of concern to us all. Research that is unpublished can make no contribution to the knowledge base of the discipline. Even if the abstract is published (as are those presented at the World Congress) there is insufficient information to enable readers to judge whether the findings can influence practice. At best, failure to publish is a waste of the time and effort researchers put into the study. At worst, it represents scientific misconduct: it results in a bias in available scientific evidence and, if the research involves patients, negates their contribution [1].

Of non-research based presentations, only 1 was published, a rate of 2.3%. It is not known how this figure compares with worldwide trends, but it seems likely that non-research papers are less likely to be published than research studies. There are probably fewer opportunities for this type of publication, and less impetus to publish. However, such presentations – documenting practice innovations, education programs, managerial initiatives and case studies – are often of great interest to colleagues, and may well have more short-term impact than research findings. In nursing in particular, there are many journals in which this type of paper can be published. *Pediatric Intensive Care Nursing* is one such journal.

Publication does not only disseminate knowledge to peers: it makes our work, and thus our speciality, visible. The wider the audience of the chosen journal, the more visible we become. One means of assessing the visibility of PCC nurses is to determine how well they are represented in leading journals. The tables of contents of 13 journals, published between January 2006 and June 2007, were hand searched to identify papers authored by PCC nurses (Table 2). In general critical care nursing journals, an article by a PCC nurse appeared on average once every three issues. Articles were published less often in general nursing journals. Two general critical care journals, despite being the official publications of multidisciplinary societies, contained few articles by PCC nurses. Even the multidisciplinary and speciality-specific *Pediatric Critical Care Medicine* contained only two articles per issue, on average, with a nurse as an author, and only one article per issue with a nurse as a senior author (first or last). The prestigious journal *Pediatrics* was relatively popular, particularly for multidisciplinary papers, though there were fewer articles featuring a nurse as first author. Whether these figures indicate low submission rates, or merely low acceptance rates, is unknown.

Whichever measurement we use, it is clear that pediatric critical care nurses are underrepresented in the literature. Barriers to publishing have been well documented and are similar across nursing specialities: they include lack of time and/or motivation, inadequate knowledge and writing skills, and lack of confidence [2-5]. Even experienced writers are not immune from these factors, particularly time constraints [2]. Many papers can be found in nursing literature that offer suggestions to overcome these barriers [2, 4, 5]. For novice

writers, support from colleagues may be particularly beneficial. The editorial board of *Pediatric Intensive Care Nursing* is committed to assisting first-time authors to publish their work, and can provide this support if it cannot be found elsewhere.

It is not sufficient for pediatric critical care nursing only to be visible for a few days every four years. If something is worth communicating to nurses attending a conference, then it is worth communicating to the rest of the world – at the very least to all PCC nurses, and in many cases to a broader audience. Let us ensure that those 218 presentations from Geneva do not suffer the same fate as their Boston counterparts.

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**NB: See Tables 1 and 2 on following page**

**Table 1. Abstract presentations (combined platform and poster) by nurses at the 4<sup>th</sup> World Congress on Pediatric Critical Care, Boston, 2003, and subsequent publication, by country of origin**

Country of origin	Abstracts – Research		Abstracts – Non-research	
	Presented	Published	Presented	Published
USA	8	1	16	0
Australia	7	3	5	0
UK	6	1	5	1
Canada	2	1	7	0
Ireland	1	0		
Singapore	1	0		
Netherlands	5	0	5	0
New Zealand			4	0
Spain			1	0
<b>Total</b>	<b>30</b>	<b>6 (20%)</b>	<b>43</b>	<b>1 (2.3%)</b>

**Table 2. Number of papers authored by pediatric intensive care nurses in selected journals between January 2006 and June 2007.**

Journal	No of articles	No of issues
Heart and Lung	3	9
American Journal of Critical Care	3	9
Intensive and Critical Care Nursing	2	9
Nursing in Critical Care	3	9
Connect	0	2
Australian Critical Care	2	6
Journal of Advanced Nursing	5	37
Journal of Clinical Nursing	4	19
Nursing Research	0	6
Pediatric Critical Care Medicine	19 (9 with nurse as 1st or last author)	10 (+ OLF)
Intensive Care Medicine	2	18 (+ OLF)
Critical Care Medicine	2 (nurse 2 <sup>nd</sup> author)	18
Pediatrics	17 (6 with nurse as 1st author)	18

OLF: on-line first



## Ventilation and stress in preterm infants: High frequency ventilation is not an additional stressor

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### Abstract

**Aim.** To study the hypothesis that high frequency ventilation (HFV) is an additional stressor compared to conventional ventilation (CV).

**Methodology.** A prospective explorative cohort study in a consecutive sample of 50 preterm infants (<37 gestational age) with Idiopathic Respiratory Distress Syndrome admitted to a Level III Neonatal Intensive Care Unit. During the first three days of ventilation stress was assessed by means of the Comfort scale (CS).

**Results.** 35 Infants received HFV and 15 CV. The HFV group was of significantly lower gestational age ( $p=.003$ ), had a significantly lower birth weight ( $p=.017$ ) and were significantly more severely ill ( $p<.0001$ ). Stress scores between groups were comparable, adjustment for baseline differences revealed no differences in scores during the first 3 days of ventilation. Of all CS assessments, 34.0% in the HFV group and 35.6% in the CV group indicated stress (score  $\geq 20$ ).

**Conclusion.** Stress during the first three days of mechanical ventilation using the CS did not reveal any difference between high frequency and conventional ventilated preterm infants. Routine use of sedatives seems insufficient to prevent high stress scores.

### Introduction

Medical technology within Neonatology has strongly and rapidly developed over the last two decades. A wider range of intense medical treatment became available and current ways of treatment are being improved and refined. The technical possibilities, such as mechanical

ventilation strategies, often result in rather aggressive medical and nursing interventions. The period of mechanical ventilation can be described as a very uncomfortable and stressful period (1-4). Notwithstanding the fact that it is difficult to prove that mechanical ventilation is painful or stressful in itself, mechanical ventilation is accompanied by a lot of potential painful interventions like (re)intubation, endotracheal suctioning, skin lesions as a result of punctures for blood samples, and change of adhesive materials. The less mature the infant the more likely the infant will be dependent on mechanical ventilation and the less mature the infant the more stress and painful procedures are performed. Infants of lower gestational age (GA) are known to be more sensitive to stress and pain (5-8). Repetitive pain may lead to increased cell death in the immature brain, poor neurological outcome, abnormal behaviour as adolescents or adults and increased vulnerability to stress, anxiety and psychiatric disorders (6,9-12). For all these reasons stress and pain should be prevented and minimized as much as possible.

Stress and pain are often used interchangeably in clinical practice as well as in the literature. It is stated that all pain is stressful but not all stress is painful (13).

With the introduction of high frequency ventilation (HFV) in the Neonatal Intensive Care Unit (NICU) of the Emma Children's Hospital / Academic Medical Center (EKZ/AMC), nurses reported an increase in stress in newborn infants. Nurses described stress in terms of discomfort, distress, agitation, restlessness, increase in pain

and decrease in sleep time. Nurses had the impression that the constant vibrations of HFV were an additional source of stress for preterm infants. Consequences of this constant vibration of the body are unknown (14).

In the last two decades the number of ventilated infants increased from 27% for an average time of 4 days to 40% for an average time of 8 days. We wanted to study if HFV could be labelled as an additional stressor compared to conventional ventilation (CV) in preterm infants, during the first 3 days of ventilation.

### **Methods**

An exploratory prospective cohort study with a convenience sample was conducted. Infants born before 37 weeks of gestational age admitted to the level III NICU of the EKZ/AMC in Amsterdam, the Netherlands were consecutively included after informed consent. They were mechanically ventilated due to respiratory distress syndrome (RDS) confirmed by X-ray. Infants with congenital or neurological abnormalities and infants who were ventilated later than 72 hours after birth were excluded. The study was approved by the Research and Ethics Committee of the hospital.

**Clinical characteristics:** Infant characteristics were collected on GA, birth weight, gender, and Apgar score at five minutes after birth. Data on illness related characteristics included cerebral ultrasound findings (subependymal/intraventricular haemorrhage  $\geq$  grade 1), air-leak syndrome (confirmed by X-Ray), sepsis (clinical symptoms and positive blood culture) or death. Treatment related characteristics were measured as therapy-based severity-of-illness by the Neonatal Therapeutic Intervention Score System (NTISS) (15). Infant characteristics, illness, and treatment related characteristics and the mode of ventilation were taken from the medical and nursing charts.

**Procedure:** Infants were ventilated in a CV mode (Dräger Babylog 8000) or in a HFV mode, either high frequency flow interruption (Dräger Babylog 8000) or high frequency oscillation mode (Sensor Medics 3100A). The choice of ventilation mode was made according to existing unit protocols; infants with a gestational age  $<30$  weeks were preferably ventilated in the high frequency mode. Infants of  $\geq 30$  weeks gestational age were, if conventional ventilation had reached a peak pressure of  $>24$  cm H<sub>2</sub>O, treated with HFV as a rescue therapy. All ventilated infants were given a standard loading dose of 0.1 mg/kg morphine IV followed by a continuous IV infusion of 0.25 mg/kg/day morphine as analgesic therapy.

**Outcome:** Data on stress were collected during the first 3 days of ventilation by means of the Comfort scale, an instrument originally used to measure distress in ventilated infants and children. Scores on the Comfort scale are the observed variation of 8 items (alertness, calmness/agitation, respiratory response, physical movement, blood pressure, heart rate, muscle tone and facial tension) on a 1 to 5 scale (16). The total score is the sum of the 8 separate item scores (maximum 40), the higher the score the more the distress. Prior to this study we tested the Comfort scale for its reliability and validity as well as its clinimetric properties in measuring stress in ventilated preterm infants (17). The criterion validity of the COMFORT scale was good (Pearson's  $r$  of 0.84). Inter-observer reliability of each item varied from good to almost perfect (weighted kappa 0.64 to 1.00). The reliability of the total COMFORT scale score was satisfying (intra-class correlation coefficient [ICC] of 0.94). Based on the receiving operator characteristic (ROC) a score of 20 (giving a sensitivity of 100% and a specificity of 77% with an area under the curve of 0.95) was decided to represent the cut off point for stress (17). The Comfort scale is administered (duration  $\pm$  3 minutes) after a 2-minute observation of the premature infant.

The first measurement of stress with the Comfort scale took place immediately after receiving informed consent. Further measurements of stress took place twice a day, before daily care procedures, during 3 days or less if mechanical ventilation was no longer needed. No interventions or handling were performed one hour prior to stress measurement. Observations were performed by observers trained in the Comfort scale.

**Statistical Analyses:** Results are expressed as means, standard deviation (SDs) for normally distributed variables and as medians and ranges in case of non-normal distributions. Chi-square statistics or the Mann Whitney U test, when appropriate, were applied for group comparisons. Subsequently stepwise multivariate linear regression analysis was employed to adjust the effect of mode of ventilation on Comfort scale scores for differences in clinical characteristics at inclusion. As numbers were small, only clinical characteristics that differed significantly between both groups were introduced as independent variables next to the mode of ventilation. All statistical analyses were performed using SPSS 12.0 software (SPSS, Chicago, IL, USA).

## Results

During the study period, 65 of the 74 infants < 37 weeks of gestation admitted to the NICU were eligible for the study. Parents of 56 infants were asked for participation; nine infants were missed due to an estimated short period of ventilation so informed consent could not be arranged before extubation. Six parents refused permission for various reasons: overwhelmed by the premature birth (2), the infant was too sick or too small (3), no reason mentioned (1). In total 50 parents gave permission by written informed consent.

The study group consisted of 50 preterm infants, 35 infants (20 boys) in the HFV group and 15 infants (12 boys) in the CV group (Table I). The HFV group infants had a statistically significant lower mean gestational age  $28.7 \pm 1.4$  weeks, CV group infants were  $31.3 \pm 2.9$  weeks ( $p=0.003$ ). Mean birth weight of HFV infants was significantly lower compared to CV infants,  $1171 \pm 337$  grams versus  $1585 \pm 598$  grams ( $p=0.017$ ). The HFV infants had a significantly higher mean NTISS score 27.6 points compared to 22.4 points of the CV infants ( $p<0.0001$ ). No significant differences were seen in Apgar score or gender. Illness related complications and medications were comparable between both ventilation groups (Table I).

Scores on the Comfort scale were comparable between HFV and CV group infants at the start of ventilation, HFV mean  $16.6 \pm 3.6$  vs. CV mean  $17.7 \pm 3.9$ , or at any of the separate ventilation days or moments (Table II). Comfort scale scores and the change over time of the scores are presented in Figure I. A total of 274 Comfort scale scores were assessed during the study period of which 34.5% resulted in a score  $\geq 20$  points, indicating stress for the infant at that moment (Table II and Figure I). No significant differences were seen in percentages of scores  $\geq 20$  points HFV and CV ventilation, respectively 34.0% versus 35.6%.

Taking the significant clinical variables into account in multivariate analysis, no difference in stress was observed between ventilation modes (mean difference [95%CI] HFV vs. CV:  $-0.40$  [ $-1.52$  to  $0.71$ ] points,  $p=0.475$ ).

## Discussion

This study showed no difference in stress among preterm infants receiving HFV or CV. HFV was primarily given to lower birth weight, lower GA and sicker infants. Adjustment for these differences revealed also no differences in Comfort scale scores.

Research in the comparison of HFV with CV have focused on the acute phase treatment,

complications during treatment, long-term effects and refinement of the method and technique of HFV (18-22). Since we are the first to report on stress during HFV, comparison with other studies is not possible.

The present study involved a non-randomized comparison. Differences in clinical characteristics were accounted for in multivariate analysis. Control for unknown confounders is not possible with multivariate analysis. They may have influenced study outcomes. This type of study can only be done as an observational study. The choice of ventilation mode is dependent on infant condition, and it is not ethical to randomize to one or another mode in order to study stress as a primary outcome. However, stress could be included as a secondary outcome in a randomized study focusing on respiratory and/or neurological outcomes.

Since sample size was small, our results need to be interpreted cautiously and need to be confirmed by larger studies. Next to a small sample size there was a wide range of gestational age. Research in the field of stress is hampered by a still incomplete understanding of stress expression and behaviour in preterm infants of various gestational ages and factors that affect stress. Recently the Comfort scale has been modified to be used in ventilated as well as non-ventilated infants with a gestational age of  $\geq 35$  weeks and a body weight of  $\geq 1500$ g (23). This adapted version has been validated as a pain scoring tool for infants between 28 to 37 weeks during capillary blood sampling with interrater reliability of 0.62 to 0.84 (weighted kappa) and ICC 0.92 (95% CI 0.89-0.96) (24). That study stratified for gestational age and found no differences in pain responses according to maturity (24). However, the Comfort scale is not yet extensively tested to measure stress in preterm infants. The Comfort scale scores seem to be unaffected by maturity of the infant or ventilation mode (17, 24).

Our findings challenged the impression among nurses that the impressive vibrations of the tiny bodies were an extra source of stress for the preterm infants. Using the Comfort scale showed us that this "clinical look", concerning stress, was not accurate. Particularly striking are the high percentages of scores  $\geq 20$  points (34.5%), suggesting stress during the period of mechanical ventilation, although this was not influenced by the choice of ventilation mode. The high percentage of stress could suggest an inadequate analgesic and sedation policy or could reflect the choice in cut-off point (17). A cut-off point with a sensitivity of 100% results in a low cut-off point and more false positive findings.

Routine sedative medication as used in this study may have interfered with Comfort scale scores. As the current use of analgesics and sedatives seems insufficient to prevent high stress scores a more effective analgesic and sedative policy during ventilation is needed.

In the near future we plan to study mechanical ventilation and stress with a randomized allocation to routine use of morphine or morphine based on stress scores. Hopefully, that study will provide us with a more adequate analgesic and sedative protocol for preterm infants during mechanical ventilation. In the meantime we recommend assessment of stress by means of the (adapted) Comfort scale on a routine basis during mechanical ventilation and the provision of non-pharmacological pain interventions along with routine medications.

Further, ways to prevent and reduce stress among preterm infants in a period of life in which brain development is so important have to be explored. A study on Newborn Individualized Developmental Care and Assessment Program (NIDCAP®) could be highly relevant and worthwhile (25). NIDCAP is known as a method to assess (stress) behaviour of the preterm infant at an individual level. Adjustment of care and individually appropriate interventions are provided to prevent stress and to enhance comfort.

In conclusion, in preterm infants during the first three days of ventilation, there is no difference in stress, as measured by means of the Comfort scale between HFV and CV.

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**Table I Clinical Characteristics of Study Infants**

Characteristics	HFV (N=35)	CV (N=15)	p
<i>Infant related characteristics</i>			
Gender (m)	20	12	0.123
Mean birth weight (grams)	1171 ± 337	1585 ± 598	0.017
Mean gestational age (weeks)	28.7 ± 1.4	31.3 ± 2.9	0.003
Median Apgar score at 5 min	8 (0-10)	8 (2-10)	0.218
<i>Illness related characteristics</i>			
Complication present	42.9%	40.0%	0.529
≥ grade 1 cerebral haemorrhage	31.4%	33.3%	
Air-leak syndrome	8.6%	0%	
Sepsis (positive blood culture)	2.9%	6.7%	
Medication (analgesic/sedative)	100%	93.4%	0.458
Standard morphine	60.0%	66.7%	
Extra medication	40.0%	26.7%	
<i>Treatment related characteristics</i>			
Mean NTISS	27.6 ± 3.1	22.4 ± 2.7	<0.0001
Ventilation day 1	29.5 ± 5.1	24.4 ± 5.1	0.002
Ventilation day 2	26.7 ± 3.8	22.2 ± 2.0	0.001
Ventilation day 3	26.8 ± 3.2	19.4 ± 2.5	0.001

Values represent either mean ± SD or median and range

CV= conventional ventilation, HFV= high frequency ventilation, NTISS=neonatal therapeutic intervention score system

**Table II Comfort scale scores and percentage of infants with stress during first three days of ventilation**

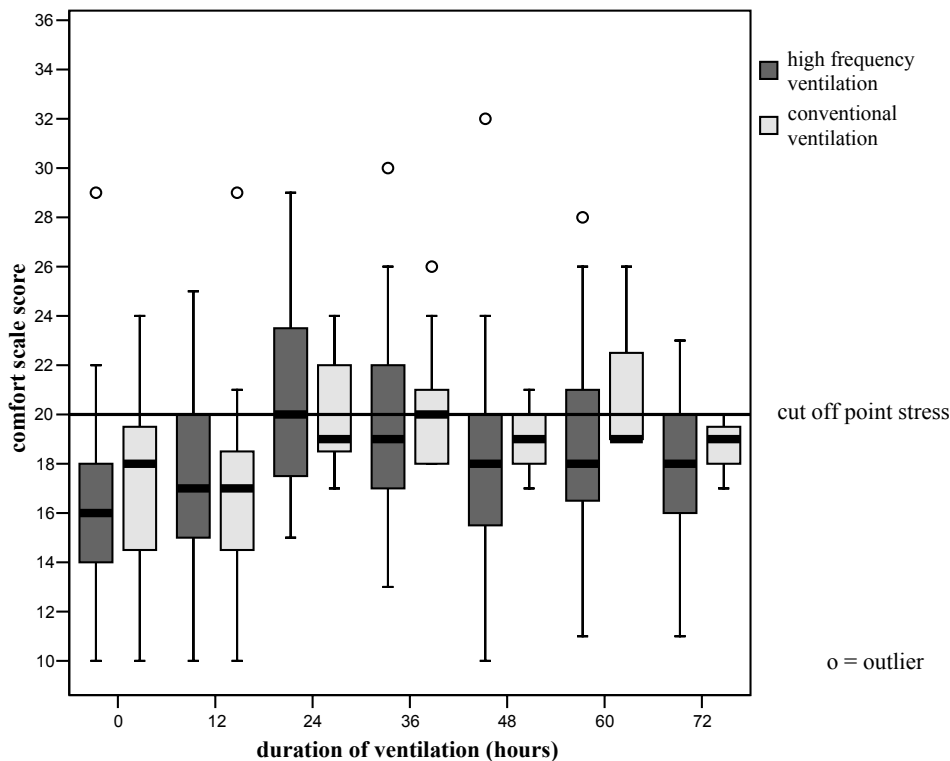
Time of Assessment	HFV N*	CS mean ± SD	stress†	CV N*	CS mean ± SD	stress†	p
Start of ventilation	35	16.6 ± 3.6	11.4%	15	17.4 ± 3.9	26.7%	0.237
Ventilation Day 1							
After 12 hours of ventilation	33	17.5 ± 3.6	30.3%	12	17.3 ± 4.7	16.7%	0.699
After 24 hours of ventilation	32	20.7 ± 4.0	59.4%	11	20.1 ± 2.5	45.5%	0.685
Ventilation Day 2							
After 36 hours of ventilation	31	19.3 ± 3.8	41.9%	10	20.3 ± 2.8	60.0%	0.344
After 48 hours of ventilation	29	18.3 ± 4.2	35.7%	6	17.4 ± 1.6	40.0%	0.434
Ventilation Day 3							
After 60 hours of ventilation	27	18.6 ± 3.9	33.3%	4	21.3 ± 4.0	33.3%	0.200
After 72 hours of ventilation	26	18.0 ± 2.9	26.9%	3	18.7 ± 1.5	33.3%	0.613
Total ventilation period		18.5 ± 2.1	34.0%		18.7 ± 2.1	35.6%	0.766

CV= conventional ventilation, HFV= high frequency ventilation, CS = Comfort scale score

\* CS scores were omitted after extubation

† CS score ≥ 20 indicates stress

**Figure I Comfort scale scores during the first three days of ventilation**



Box plot illustrates the median, the interquartile range and the range that contains the central 95 % of the Comfort scale scores for the HFV and CV group



## **Utilizing a Performance Improvement Team to Plan and Implement a Rapid Response Team for Pediatric Oncology Patients**

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### **Abstract**

Medical Emergency Teams (METs) also referred to as Rapid Response Teams (RRTs) were introduced more than a decade ago to rapidly identify and manage ill patients at risk for cardiopulmonary arrest or conditions requiring more advanced care. The Institute for Healthcare Improvement's (IHI) Saving 100,000 Lives campaign advocates the implementation of in-hospital medical emergency teams as a means to rescue patients and reduce hospital mortality.

At St. Jude Children's Research Hospital an inter-disciplinary performance improvement team was chartered to plan and implement a RRT for our pediatric oncology patient population. Mortality reduction was not an appropriate aim for our RRT. Patient scenarios that could be impacted by the RRT were identified and criteria for team deployment were developed.

### **Introduction**

Medical Emergency Teams (METs), also referred to as Rapid Response Teams (RRTs), were introduced more than a decade ago in Australia and the UK to rapidly identify and manage ill patients at risk for cardiopulmonary arrest or other conditions requiring more advanced care. (1) Alarmed by statistics that showed an increase in mortality

and morbidity secondary to gaps in patient safety, the United States Congress mandated that US hospitals develop a culture of safety in the early 2000's. In March 2003, The Agency for Healthcare Research and Quality developed national patient safety indicators. One indicator identified was the need to avoid failure to rescue, a condition defined as a death due to complications from a hospital stay rather than a primary diagnosis. (2) In January 2005, The Institute for Healthcare Improvement (IHI) launched its 100,000 Lives campaign. One of the initiatives advocates the implementation of in-hospital medical emergency teams as a means to rescue patients and reduce hospital mortality. (3) The Joint Commission's 2008 National Patient Safety Goals include a standard requiring healthcare organizations to "select a suitable method that enables health care staff members to directly request additional assistance from a specially trained individual(s) when the patient's condition appears to be worsening." (4)

Failures in planning (including assessments, treatments, and goals), failures in communication (patient to staff, staff to staff, staff to physician, etc.) and failure to recognize deteriorating patient conditions lead to failure to rescue. RRTs and METs are meant to address these issues. In adults, the

implementation of these teams has been shown to decrease incidence of cardiac arrests outside the ICU by 50% and can decrease hospital mortality by as much as 26%. (5-10)

While studies have shown that a MET/RRT improves outcomes for adults, there are only a few studies that report outcomes in pediatrics. The incidence of in-hospital pediatric cardiopulmonary arrests (including those in the ICU) varies between 0.7% and 3% of all hospital admissions. Of those children that arrested, the survival to discharge rate varies between 15% and 27%. Cardiopulmonary arrests occurring outside the ICU account for 8.5% to 14% of all in-hospital cardiopulmonary arrests in children. Of those children, mortality rate varied from 50% to 70%. Given the dismal survival and mortality rates, this seems to be an area where METs/RRTs could make an impact on outcomes of hospitalized children. (10, 11)

However, providing this service to children is not simple. Event detection and triggering mechanisms in adults usually include 5 to 8 physiologic parameters such as pathological alterations in vital signs, deteriorating level of consciousness, and clinician "worry or concern." In children, establishing these criteria provide unique challenges because the parameters must be adjusted to age-specific normals. (11)

Studies have shown that implementing pediatric METs/RRTs can decrease out of ICU cardiac arrests from 0.19-0.27/1000 admissions to 0.11/1000 admissions. A trend toward reduction in the risk of death was shown (0.12/1000 admissions to 0.06/1000 admissions). Lack of statistical difference was in part due to overall low incidence of cardiac arrest in the pediatric population. (10-12)

Other positive effects recognized by the implementation of METs/RRTs in children's hospitals were that an immediate response for children whose clinical condition is deteriorating is available; children do receive significant care through the RRT; and nurse response has been very favorable. RRT programs are a vital component of the safety net for children's hospitals and data provided assists quality improvement efforts and further research. (12)

St. Jude Children's Research Hospital is a 62 bed tertiary care pediatric hospital specializing in care of pediatric hematology/oncology patients. The average yearly admission is 2600 patients and the average daily census is 44. The institution also serves a large outpatient population with an average of 20,000 outpatient visits per year. At St. Jude Children's Research Hospital the incidence of unexpected deaths and cardiac arrest is minimal. Even though the incidence of arrest is minimal, our institution began discussions of how a Rapid Response Team could benefit our patient population. The purpose of this performance improvement project was to develop a plan and implement a Rapid Response Team.

### **Methods**

After reviewing the IHI initiatives, the Vice President of Patient Care Services in collaboration with the Quality Patient Safety Committee and Medical Executive Committee chartered a performance improvement team to develop and implement a RRT. The institution's senior leadership believed that a RRT could benefit our patient population even though mortality reduction was not anticipated.

In July 2005, an interdisciplinary performance improvement (PI) team was selected that included representatives from Critical Care Medicine, Nursing (CNS and QI expert), Cardio/pulmonary Services, Professional Development Education and Nursing Research.

The PI team initially met weekly to review literature, benchmark with other pediatric institutions, and brainstorm to identify possible patient care scenarios that could be impacted by a RRT. Permission as an expedited review was granted by the Institutional Review Board (IRB) of St. Jude Children's Research Hospital. Informed consent was waived.

The PI team conducted a retrospective review of the ICU patient care database and paper and electronic medical records of patients experiencing emergency events, transfers to ICU within 24 hours of hospital admission, and intubation within 8 hours of ICU admission. The sample included 75 patients experiencing emergency events between January 2003 and December 2005, 54 patients transferred to the ICU within 24 hours of hospital admission between January 2002 and December 2004,

and 51 patients intubated within 8 hours of ICU admission between January 2002 and December 2004. Data collection parameters included patient demographics, diagnosis, type of incident, and physiological parameters six hours prior to the event (blood pressure, pulse, perfusion, oxygen saturation, work of breathing, and mental status). The data were analyzed using descriptive statistics and Pareto charts.

### **Results**

There were no identifiable trends or patterns in physiological parameters during the six hours prior to the emergency event. The majority of emergency events were precipitated by patients having seizure activity. (See Table 1).

The mean time of transfer to ICU within 24 hours of hospital admission was 7 hours 20 minutes  $\pm$  5 hours 28 minutes. The mean time to intubation post ICU admission was 2 hours 56 minutes  $\pm$  9 minutes.

After reviewing the data analysis, the PI team determined that the following patient scenarios could be positively impacted by RRT deployment: (1) unstable outpatients, (2) patients with early signs of distress or change in condition, and (3) assessment support to healthcare staff uncomfortable with a patient's condition. Identified potential positive outcomes of the utilization of the team included: (1) patient admission to the proper level of care leading to a decrease in patient transfers during the first 24 hours of hospital stay, (2) quick and timely interventions and treatments when the patient's condition begins to deteriorate or quick transition to a higher level of care when necessary, and (3) increased healthcare staff satisfaction and comfort level.

### **Team Development and Implementation**

After identifying patient scenarios and potential outcomes, the PI team developed the structures and processes necessary to impact them. These included RRT composition, development of policies and procedures, methods to ensure buy-in from all healthcare and clinical staff, and staff education efforts. We determined that the RRT would consist of an ICU clinical coordinator, ICU registered nurse and registered respiratory therapist.

The team is available on all shifts to any healthcare provider. The team is activated by

a call to the operator (See Figure 1 – When to call the RRT). The operator sends an alpha page to RRT members. Team members are expected to arrive at the designated area within 10 minutes. Upon arrival to the designated area, the team receives report of the patient status and reason for the call from the initiator of the RRT. The team assesses the patient and develops recommendations for a plan of care in conjunction with the initiator of the call. The assessment is recorded on the RRT documentation flow sheet and is placed in the medical record. Recommendations may range from continued monitoring of the patient's condition at the current level of care; specific treatment modalities such as fluid boluses, aerosol treatments, oxygen therapy, or immediate transfer to the ICU. The attending physician is notified of the team's assessment and recommendations to ascertain any necessary orders.

Because this was a new initiative, there was a need for customized education tailored to each group of healthcare clinical staff impacted by the process. The RRT members were given education specific to their roles on the team. All other healthcare clinical staff were provided education on the roles and functions of the team, the process to deploy the team and the expectations of the RRT and the initiator of the call. The education initiative included flyers, a computer-based learning module, face to face in-services, periodic updates in the institution's weekly newsletter, and email reminders. A letter of support for the RRT was also sent to all clinical staff from the Chief of Critical Care Medicine.

### **Solutions to Implementation Barriers**

One of the biggest challenges facing the PI team was finding a model for RRT implementation that met the needs of pediatric oncology patients. Many RRTs identified in published literature focused on decreasing the number of cardiopulmonary arrests with early intervention resulting in a reduction in patient mortality. Because the incidence of cardiac arrest was found to be minimal at St. Jude, the RRT PI team was challenged with the task of finding a model that would fit our pediatric patient population.

One strategy used to overcome this challenge was spending a great deal of time

brainstorming possible pediatric oncology patient scenarios that could be impacted by a RRT. Also, a significant amount of time was spent collecting and analyzing data regarding these identified scenarios.

Another barrier that the RRT PI team faced was clinician “buy in”. Since the RRT would consist of one ICU RN, one ICU clinical coordinator, and one registered respiratory therapist, the team was challenged with explaining how this would be a significant help to the physicians in charge of patient care. This challenge was met by giving current evidence based information to the physician leadership at St. Jude. The chairperson of the PI team, along with the Chief of Critical Care Medicine, met with the Medical Executive Committee to present the background information for forming a RRT, significant findings of the data collected from retrospective chart reviews, educational information and the factors that would be monitored to measure success. Initially there were questions and slight opposition, but by the implementation date there was overwhelming support for the RRT. After implementation, the first two RRTs were called by a nurse practitioner and faculty attending primary physician.

The PI team met six months post-implementation to address concerns regarding incomplete or poor documentation, a decrease in RRT calls, and possible disinterest in the process. The PI team determined that there was a need for continued education and revision of the RRT documentation flow sheet.

The committee sent updated education and RRT helpful reminders via e-mail to all clinical and nursing staff to reiterate the purpose of the RRT and its benefit to patient care. To increase access to the flow sheets and enhance documentation, revised RRT flow sheets were placed on all emergency carts. Staff and RRT members were educated that any RRT member could document on the flow sheet. After these interventions, RRT calls increased and have remained consistent; averaging three calls per month (see Table 2).

### Discussion

Implementation of Rapid Response Teams is difficult in the pediatric patient population,

especially in the pediatric hematology/oncology population. Limited information is published on pediatric RRT outcomes and most adult literature focuses on mortality reduction as the primary aim of a RRT. The St. Jude Children’s Research Hospital experience suggests that Rapid Response Teams can be used for reasons other than mortality reduction. The goal for St. Jude’s Rapid Response Team focused on ensuring patients receive the appropriate level of care as quickly as possible and providing nursing and clinical staff additional assessment support and review of a patient’s status. Mortality reduction was not an appropriate aim for our Rapid Response Team. Taking the time to thoroughly evaluate where improvement in patient care is possible and developing the team with that guiding principle will contribute to a successful experience. Our experience has been very positive. A Rapid Response Team is an excellent way to improve patient outcomes by early intervention. Future plans for our PI team include a formalized review and analyses of the RRT.

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**Table 1**

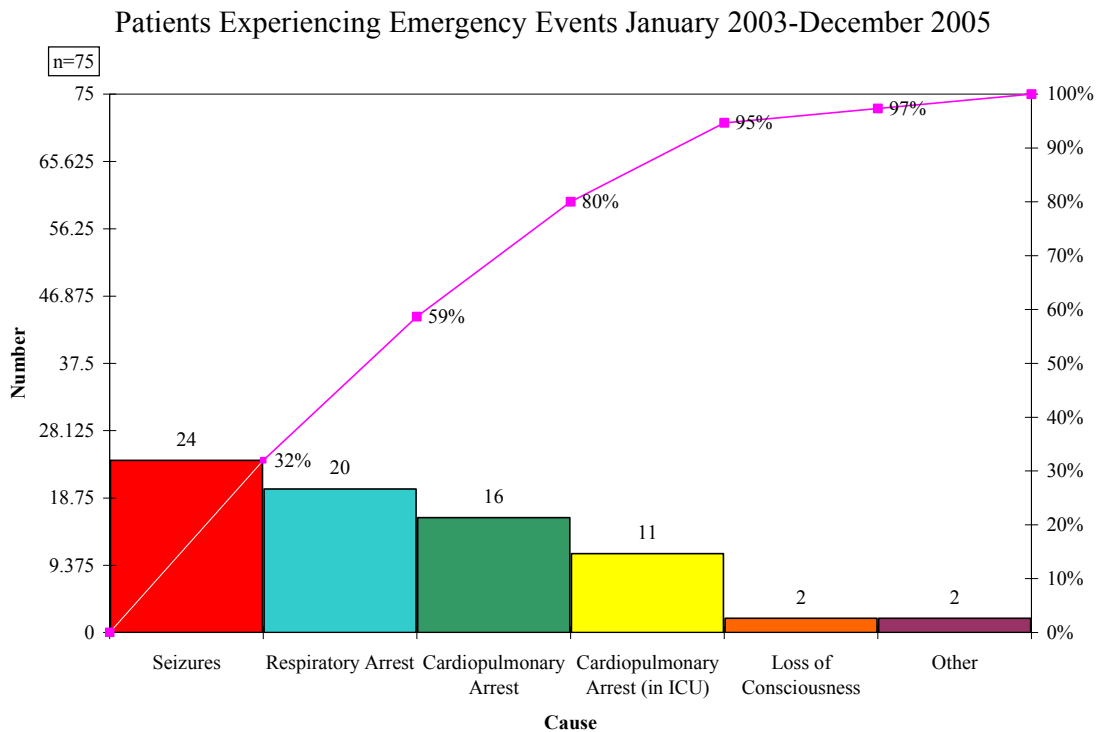


Figure 1

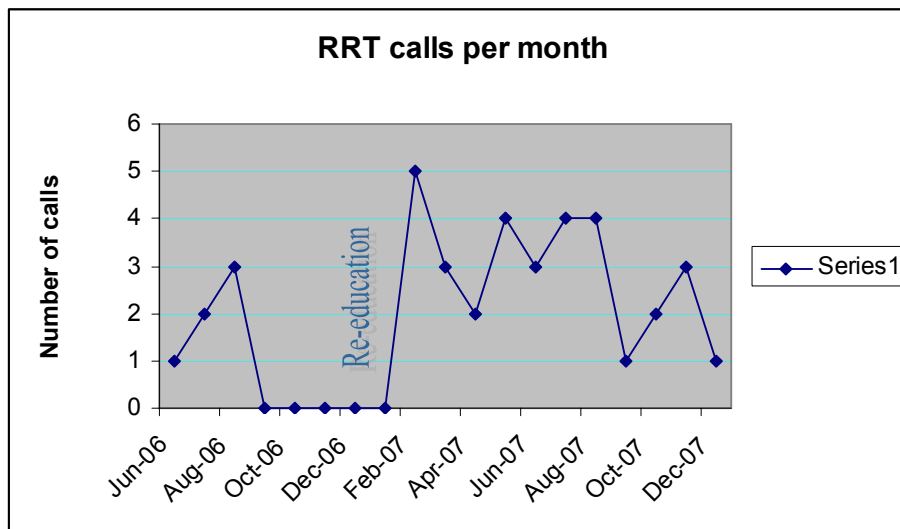
# Rapid Response Team



## Top 5 Reasons to Call the RRT

5. My patient is having hemodynamic changes.
4. My patient is having respiratory changes.
3. My patient is having cardiac changes.
2. My patient is having perfusion changes.
1. Something is going on and I am not sure what it is and I want someone else to look at my patient.

Table 2







## Questions & Answers from PICU-Nurse-International

### Column Editor

*Pang Nguk Lan, RN, INCC, MSc  
Coordinator – The KK International Disaster Response Committee  
Assistant Director of Nursing, KK Women's and Children's Hospital (KKH)  
Singapore*

*This column features particular dialogues that unfolded on the PICU-Nurse-International egroup that were particularly pertinent, stimulating, generated significant interest, and provided particularly informative replies.*

### Filters for Central Venous Lines (CVLs)

#### Question

Our latest central venous catheter policy states that there is no evidence for using filters to reduce the risk of infection. I was interested to know if filters should be used to avoid air embolism especially for infants and children with congenital cardiac lesions involving right to left shunt. I have been unable to find any information. Does anyone use filters for this purpose or have any information about this topic? Thanks.  
Brisbane, Australia

#### Answers

We filter all central lines, which would include all intracardiac lines. We use the filters to reduce the risk of air not infection. However, I'm not sure of any literature to stand behind it.  
Ohio, United States

Here at University of Minnesota Children's Hospital, Fairview in Minneapolis. We use the filter micro tubing with all CVLs. We use it to help eliminate the possibility of air embolus. We use it on all of our inflows, including the intraflow of our pressure monitoring.  
Minneapolis, United States

### Family Centered Care Practices

#### Question

As part of the Family Centered Care (FCC) committee I am wondering if any of your units include parents in rounds. How do rounds occur in your unit? Are parents routinely invited to attend and/or participate? If so, do families tend to participate? Does it seem to increase their satisfaction with care? Any other information you could give on family centered care in your unit would be greatly appreciated.  
Ohio, United States

#### Answers

We currently ask families to leave our unit for morning rounds. We had a forum for staff and families and listened to experts regarding their family centered care practices. Subsequently we decided to look at our practice regarding rounds via a research study using surveys of staff and families to collect information on the issues surrounding this. We almost finished collecting the data and will then use this information to make recommendations in a change in practice. I would be happy to share the proposal, the survey and eventually the results with you.  
Vancouver, Canada

Parents are invited to participate in rounds in our unit. We give them the option so that if they choose not to be present they know the physician will meet with them later in the day to answer questions. I find most parents want to hear the discussion at rounds and will voice questions or comments. The feedback to the FCC Committee is that they feel like a part of the team and that they are contributing to their child's care.

We have multidisciplinary rounds in the morning and smaller “tuck-in” rounds in the evening. Our FCC Committee is very active and their responsibilities include personal care packages for families that arrive without basic necessities, providing guidance to the staff on FCC policies and practices, and ensuring our parent rooms are adequately stocked with amenities families may need. They also sit on a centre-wide committee as well as implementing our Bereavement Care Program in the PICU.  
Nova Scotia, Canada

### **Family Presence during Procedures and or Cardiopulmonary Resuscitation**

#### Question

Does anyone have PICU specific policies you would be willing to share for family centered care and family presence during procedures and or Cardiopulmonary Resuscitation?  
Memphis, United States

#### Answers

We have no written policies. It is an expectation to allow the family to be present during a resuscitation of their child.  
Memphis, United States

We have no written ‘policies’ but rather guidelines. We strongly encourage staff to offer parent opportunity to stay during resuscitation. However in my PhD work, parents were often found to feel astray throughout the resuscitation despite their need to leave and return. In reality, staff were still preventing parent staying at times. The inability to correctly assess parents’ coping compounds staffs’ decisions in making choice for them. Recommendations should consider not only parents’ individual needs and open opportunity for discussions about leaving and returning without question, but also further education in nurses’ and coping abilities.  
Edinburgh, Scotland

### **Flolan (Epsprostenol) Standard**

#### Question

We are seeing an increase in the use of Flolan via I/V infusion for the treatment of pulmonary hypertension. We are currently working on revising our standards on the use of Flolan and the CADD pump. Does anyone have any standards or feedback regarding the use of Flolan (such as zeroing the CADD pumps, availability of a backup cassette, monitoring infusion, etc).  
Ohio, United States

#### Answer

I am a RN in the PICU at University of Minnesota Children’s Hospital, Fairview. When we are using Flolan via I/V route, we have the drug on a Medfusion syringe pump. When the patient transfers to the general floor, they transition to the CADD pump. They use the CADD at home. We have a policy that the syringe of Flolan must have a second syringe in reserve at all times. We change the old syringe out before it is near empty for safety reasons. If the new syringe is mixed incorrectly, we always have a reserve of the old syringe to put back emergently.  
Almost all of our nurses are anxious when they have to use the CADD pump for a short time, such as admission and before transfer. We have had patients for observation during changes in doses, and they remain on the CADD during this time. Similarly to the medfusion, there is a backup cassette available in the refrigerator at all times. We almost never zero out the CADD pump, our patients always have two pumps, so the second pump is started, the tubing is primed and the switch is made. The first pump is left running for a short time to insure a quick return of medication if there is a problem with the new cassette.  
Minneapolis, United States

### **Moveable Headwalls (Service Pendant)**

#### Question

We are in the process of planning a new unit and we are looking at moveable head walls. Does anyone out there use/have them and do you like them? Do you use the motility of them or do you fix them into place/ any information would be gratefully appreciated. Thanks.  
Ohio, United States

### Answers

We have articulated arms in all of our closed rooms and our cardiac beds. We probably don't use the flexibility like we should but it has been very nice to be able to offer different arrangements for long-term kids and their families as well as the teenagers/adults that we see. One woman in particular, loved being able to lie sideways beside her husband's daybed rather than back facing him. It is so much easier to arrange CVVH/ECMO with the flexibility of the arms. We have two arms at each bedside and have the detachable arm for all of our I/V pumps with transporter carts but we do not use those much if at all.

Texas, United States

Having worked with both, I think I'd have to give the nod to the permanently placed head wall. The tower for the moveable head wall takes up a great deal of space in the room. I have found that it is fairly infrequent that we have to re-arrange the room. I suppose if you're lucky enough to have a great deal of space for each room, the moveable head wall tower wouldn't be as much of an issue.

Georgia, United States

### **Bio-patch for Non-tunneled Central Lines**

#### Question

I am wondering if any of you are using the Bio-patch on your non-tunneled central lines. If you are, how are you getting them under the hub of the line? We are having trouble due to the hub being so tight to the skin. I am also looking for information from the adult side too.

Marshfield, United States

#### Answer

We are using Bio-patch in our adult and pediatric patients on all tunneled and non-tunneled lines. There was a definite learning curve for the staff that places these lines to allow for a little more "slack" at the insertion site than they would have allowed previously. This allows for room to fit the Bio-patch over the insertion site without putting any tension on the line.

New York, United States

### **Pressure Bag Setups**

#### Question

Just wondering what type of setups do hospitals used for infusing on arterial, Central Venous Pressure (CVP), Left Atrium Pressure (LAP), and any other type of pressure lines. Right now we use 500 units of heparin in 250 mls/Normal Saline (NS) for patients below 5 kg to run at 1 ml/hr and 500 units of heparin in 500 mls/N/S for patients above 5 kg to run at 3 mls/hr. We are debating on changing our parameters to greater than and less than 10 kg to help with fluid restricted patients. Any information would be helpful.

Ohio, United States

#### Answers

Currently we run pressure lines for children below 30 kg on syringe pumps at 1 ml/hr. Arterial line at 5 units/ml heparin in Sodium Chloride 0.9% (NaCl 0.9%) and central venous line at 1 unit/ml in 5% dextrose. For children above 30 kg, we use Sodium Chloride 0.9% with a pressure bag set at 300 mmHg.

Auckland, New Zealand

At the Academic Medical Center in Amsterdam, our regime is the same for the arterial and central venous lines.

- Below 15 kg: Heparin 1 unit/ml NaCl 0.9%, 2 ml/hr running on syringe pump.
- Above 15 kg: Heparin 1 unit/ml NaCl 0.9%, 3 ml/hr running on pressure bag.
- In case of fluid restriction: The central venous line goes to 1 ml/hr with 2 units of heparin/ml.

Occlusion of catheters has a very low incidence.

Amsterdam, The Netherlands

Our unit uses 125 units of heparin in 250 mls of NS. For below 10kg, we run it at 1 ml/hr on a syringe pump and if the patient is above 10 kg, we use a pressure bag at 300 mmHg.

Nova Scotia, Canada

We run NS with heparin 2 units /ml at 2 mls/hr on most patients. We sometimes add Papavarine. On CVP, we run NS with heparin 2 units/ml and 100 mg Lidocaine/500 mls at 2 mls/hr. Texas, United States

### **Closure of Sternum Wound Post Cardiac Surgery**

#### Question

How many of your units close sternums wound of post cardiac surgery in the unit rather than the Operating Room (OR)? If you do this, do you have a special closed room in which to do the closure or do you have it performed out in the general unit? Does PICU staff scrub in or is it handled all by OR staff? Do you have any data on what you rate of sternum wound infection is?

#### Answers

Now we always close the sternum in the OR. Few cases would have closure in the ICU for particular reasons but we are trying to avoid any sternum infections and were finding mandating the closures in the OR reduced this. I do not have the exact numbers. There are a few things we have instituted as we belong to the National Association of Children's Hospitals and Related Institutions (NACHRI) which participates in research and benchmarking to provide the best outcomes in the PICU/CICU.

We do sometimes decannulate patient off ECMO in the patient room depending on the patient condition and what is safer i.e. to take them on ECMO to the OR to just do it in the room. If we do it in patient room, all staff must wear OR scrubs, caps, shoe covers and masks. The room is closed and no one allowed out or in during "surgery". OR staffs are called in to assist and only essential PICU staff allowed.

Seattle, United States

We close all sternum wounds on the PICU on the open unit. The OR staff or if we can spare, a trained member of our team scrub. All staffs behind the curtain wear masks and caps. We do not close the unit or restrict visiting to other families during this time, although everything and everyone, has to squeeze behind the curtains.

Birmingham, United Kingdom

### **Re-infusing Blood Withdrawn**

#### Question

Do any of you have a policy on re-infusing the blood taken off arterial or central lines before sampling blood is withdrawn? Or have any articles to support doing it or not doing it?

#### Answer

We switched to the VAMP Jr. System several years ago which needle free and blood is conserving within the tubing that can be re-infused. As you are drawing the heparinized solution as well, clots are not an issue if re-infused within the time recommended by the manufacturer. It works very well and can forward more information if interested.

Saskatoon, Canada

### **Swan-ganz Placement and Monitoring**

#### Question

Does anybody have a competency on pediatric swan-ganz placement and monitoring for nursing that they are willing to share? We have seen a great increase in the use of this type of monitoring and any help would be greatly appreciated.

#### Answers

In United Kingdom, we have seen quite the opposite with virtually no one ever using Swan-ganz and even Pulmonary Arterial (PA) lines are not nearly as common now.

Liverpool, United Kingdom

The same with Belgium, Swan-ganz has become obsolete.

Brussels, Belgium

I will send you our competency sign off that we use during our yearly required competency via your email. We do occasionally use Swan-ganz here when necessary and appropriate.

Seattle, United States

## **Dry Chest Drainage Systems**

### Question

We are looking at converting over to a dry chest drainage system from a wet system and I am wondering what other centers are using. Is your hospital using the Dry Chest Drainage System? If so which brand (Pleurevac, Atrium) do you use and did you have any issues with converting over from the wet system to a dry system.

Vancouver, Canada

### Answers

We are currently in the process of changing over our systems as well. We have changed from the Atrium Ocean (wet) to the Atrium Oasis (dry), although we still get some Atrium Ocean coming through while we get rid of old stock.

The only problem we encountered with the Atrium Oasis in the very early days was it not being connected to wall suction or if it was, it wasn't turned on. We put this down to a couple of factors and the main one being staff were accustomed to listening for the water bubbling in the suction chamber. Intensive education resolved this oversight fairly quickly and easily though.

The only disadvantage that I've encountered is that the Atrium Oasis doesn't allow for anything under 10cmH<sup>2</sup>O, otherwise great system.

Western Australia

I've used both Atrium and Pleurevac dry suction systems. They both have a handy dandy little indicator that tells you when you've applied enough suction. They're quick and easy to set up, come with both the required volume of sterile water to fill the water seal and a beefy slide clamp on the silicon tubing that allows for safe and easy clamping for transport or whatever. The Atrium has self-sealing tubing on the collection set that allows for sampling of fluid without needing to find a specific spot on the system. A 20 gauge needle will not leave a leak. They've also introduced a needle-less port that is an add-on. The connection is a two-pronged clamp that needs no taping to ensure security. The newer Atrium also has feature that allows for full recovery of the water seal if the chamber is tipped. The Pleurevac is similar, but comes with a five-in-one connector (adult) or a very small narrow connector (infant) that require taping to ensure no leaks or disconnects. Really, other than some nice to haves, there's not much difference.

Alberta, Canada

## **Pediatric Rapid Response Team**

### Question

I would love to get some feedback on any Pediatric Rapid Response Teams out there. We are currently setting up one at our institution. This information will help a lot.

Seattle, United States

### Answer

Our Pediatric Rapid Response Team (RRT) was implemented one year ago. Our team composed of the Transport Nurse, and/or a designated ICU nurse and the lead Respiratory Therapist. Our RRT is separate from our Code Blue team. We have had a total of 43 activations over the one year period. There was no change in the level of care in 20 patients, 8 were transferred to our step down, 14 came to PICU, and 1 returned to the NICU. There have been 0 deaths over the year on the units utilizing RRT. The families are not able to activate the RRT, but if family is concerned about the patient and expresses this to their nurse, then nursing activates RRT. We do not usually use our charge nurse unless transport is out and even then, we usually designate ICU nurse, we have no negative responses from the call that were made. As the matter of fact, they are thrilled with this service.

Orlando, United States



## Spotlight on PICU

*This regular column will provide readers with an opportunity to learn about fellow PICUs in various parts of the world.*

### **Column Editor**

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### **Paediatric Intensive Care at The Evelina Children's Hospital London, United Kingdom**

*Fiona Lynch RGN, RSCN, Dip HE, BSc, MSc.*

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I am sure when you think of London, England you think of the Houses of Parliament, Buckingham Palace and Tower Bridge. Well, our hospital, the Evelina Children's Hospital (ECH) is only a stone's throw from all of these and more (I can hear Big Ben chiming as I am writing this).

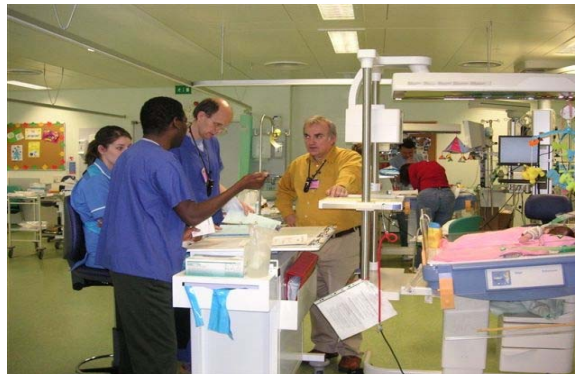
The ECH was officially opened in October 2005. This multi-award winning building (People's Choice RIBA Stirling Award 2006) aimed to combine state-of-the-art health care with an environment which is child, family and staff friendly. As the first children's hospital to be built in London in 100 years, the ethos of the design was to create a hospital that, from the beginning of its creation, involved the children and their families in its construction.



**ECH at night**

The PICU is a 20-bedded combined general and cardiac intensive care unit. We provide care for approximately 1,100 critically ill children per year. As the Lead Centre for the South Thames Region we also provide the South Thames Retrieval (transportation) Service (STRS). The types of patients cared for include: pre and post operative cardiac surgical cases; neurological dysfunction (non-

surgical); respiratory illness; sepsis; ear, nose and throat; and spinal surgical cases. We offer advanced therapies such as bronchoscopy, high frequency ventilation and continuous veno-venous haemofiltration. Children are accepted into the unit from birth up to the age of 16 years.



We deliver family-centred care, allow unrestricted access to parents and offer accommodation to any parents who wish to stay close to their child. Siblings and other family members are also supported and encouraged to be actively involved.

### **The Team**

We have over 130 nurses working in our unit, a team which is dynamic, committed, enthusiastic, diverse and friendly. The team is led by Louise Dewsbury, Modern Matron, supported by myself, the Nurse Consultant, ward managers, deputy ward managers and staff nurses.

We have developed specialist roles in our unit to ensure standards are maintained and to facilitate the development of staff. These roles include research and audit nurse, clinical education team and a retrieval coordinator.

We provide in-house training days and are affiliated with King's College London University, delivering the PICU course at degree level. We recognise the importance of ongoing education for staff and offer a variety of specialist study days and update days throughout the year. Degree and Masters level education is encouraged and supported. We also provide placements for pre-graduate level nurses.

A recent innovation has been the role of Clinical Support Nurses (CSN). These post-PICU course nurses are seconded into this role for six months. The aim of this role is for junior nurses to work at the bedside with the CSN, further developing their skills and importantly their confidence. Concurrently, the CSNs have the opportunity to extend their knowledge and skills.

The significance of staff support is never underestimated and we facilitate regular team meetings, peer away days (when nurses of similar grades get together) and social activities. We also offer debriefing sessions, especially after a particularly difficult situation or time.

Developing a strong nursing research agenda is a priority for us. The current areas of investigation

include a quantitative study exploring the strategies to reduce altered skin integrity, and qualitative research exploring the experiences of the nurses, doctors and families exposed to the retrieval process. Our research and audit nurse also has a responsibility to ensure that the team investigates and manages any adverse incidents appropriately, an area which is essential to the provision of safe, evidence-based patient care.

Our medical team is led by Dr. Ian Murdoch, our Clinical Director, and six consultant intensivists. Other professionals working with us include physiotherapists, health care assistants, play specialists, psychologists, nurse councillor, chaplaincy, PICU technician, dieticians, pharmacists and teachers. You can see we have a huge team to ensure delivery of excellence in care.

### **South Thames Retrieval Service (STRS)**

Our integrated transport service provides clinical advice and support to the referral hospital. We offer telephonic advice at point of referral and, using our dedicated ITU ambulances, will travel to the referral hospitals, stabilise and safely transport the critically ill child and one parent back to our PICU or one of the other two PICUs in our region (1). Regular feedback and outreach educational support to the hospitals within the region that refer to us is also provided.



***Dedicated PICU transport ambulances***

The integrated nature of the service means that the medical and nursing team are part of the PICU team, working on the unit rather than separate to it. The retrieval team is made up of a doctor or Retrieval Nurse Practitioner (RNP) who leads the process, a trained retrieval nurse and an ambulance driver.

The RNP role has embraced the Canadian and USA model of developing advanced nursing skills to transport the critically ill child to a PICU. We are the first unit in Europe to develop this innovative service (2). This group of dynamic nurses are also using their skills and knowledge on the unit to promote and advance nursing by providing formal and informal education, clinical support and promoting service development through audit and research. One of my roles as PICU Nurse Consultant is to lead this group professionally.



***Sasha Herring (RNP)***



### **Other Activities**

Our two cardiac surgeons; Mr David Anderson and Mr Conal Austin, lead multidisciplinary teams from PICU and the cardiology ward to carry out cardiac surgery in developing countries such as Kenya and Sri Lanka. These charity funded missions are not only valuable to the children and adults operated on but also allow opportunities to exchange knowledge and skills between the visiting nurses and the local nursing team.



**Jo Ward in Kennatta Hospital, Kenya.**

When asked to write this piece for *Pediatric Intensive Care Nursing* it really made me stop and think about the unit I work in and what it means to me. I am so very proud to have “grown-up” here. Of course the unit has had difficult times but through imagination, strong leadership, investment in the team and hard work we have risen to these challenges. Even after 13 years of being part of this fantastic team, I still feel excited and look forward to coming to work in an environment where I and others strive to do the best we can for the children and the families we care for.

More information can be found on the Guy’s & St Thomas website: [www.guysandstthomas.nhs.uk](http://www.guysandstthomas.nhs.uk) and the STRS website: [www.strs.nhs.uk](http://www.strs.nhs.uk)

### **References**

1. Davies J, Tibby SM, Murdoch IA. (2005) Should parents accompany critically ill children during inter-hospital transport? *Arch Dis Child* 90: 1270-1273
2. Davies J, Lynch F. (2007) Pushing the boundaries in paediatric intensive care: training as a paediatric retrieval nurse practitioner. *Nurs Crit Care* 12: 74-80



### **WFPICCS Nursing Update: 2008**

*Maureen A. Madden RN MSN PNP-AC FCCM  
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The World Federation of Pediatric Intensive and Critical Care Societies (WFPICCS) integrate different national societies into an international organization. At present all regions of the world are represented through regional and national societies. The most recent Board Meeting of WFPICCS was conducted during the 5<sup>th</sup> World Congress on Pediatric Critical Care held June 24-28, 2007 in Geneva, Switzerland.

A change in the configuration of the WFPICCS Board of Directors was approved during this meeting. This change directly impacted the level of nursing representation on the Board and provided for nursing representation for every region of the world. This provides for an increase from three nursing representatives to six representatives. This change was implemented following the 5<sup>th</sup> World Congress. The current Nursing Board Members are: Bev Copnell (Oceania), Minette Coetzee (Africa & Middle East), Mavilde LG Pedreira (Latin America), Maureen Madden (North America), Yuko Shiraishi and Pang Nguk Lan (Asia), Françoise Martens and Jos Latour (Europe).

Bev Copnell, RN PhD is a Senior Research Fellow at the NHMRC Centre of Research Excellence in Patient Safety at Monash University in Melbourne, Australia. Bev is serving as a Board Member for her second four year term and will be directly involved in the development of the 2011 World Congress in Sydney, Australia.

Jos Latour is a nurse scientist at the Erasmus MC – Sophia Children's Hospital in Rotterdam, The Netherlands. Jos has completed on term as the Vice President of Nursing Affairs and will serve a second term as the treasurer of the World Federation Pediatric Intensive Critical Care Societies (WFPICCS). He is past president of the European Society of Pediatric and Neonatal Intensive Care (ESPNIC) Nursing.

Minette Coetzee PhD RN joins the Board as a representative of the Africa and Middle East Region. Minette is resident of Cape Town, South Africa and is currently an Associate Professor of Child Nurse Practice Development in the School of Child and Adolescent Health at the University of Cape Town.

Mavilde LG Pedreira RN PhD is a researcher for the National Council for Scientific and Technological Development (CNPq) at the Ministry of Science and Technology (MCT, in Brazil). Mavilde has previously been very active with WFPICCS as the regional representative from Latin America and now joins the Board as part of the Latin American representation.

Maureen Madden RN, MSN is an Assistant Professor of Pediatric at the UMDNJ- Robert Wood Johnson Medical School in New Jersey, USA. Her clinical practice is as a pediatric critical care nurse practitioner and remains on the Board of Directors for a second term as the North American representative. She will serve as Vice President of Nursing Affairs during this term.

Yuko Shiraishi RN is from Tokyo, Japan and is a lecturer for the Institute for Graduate Nurses at the Center of Nursing Education and Research while pursuing her doctoral studies.

Pang Nguk Lan RN is from Singapore and is new to the WFPICCS board. She currently is at the KK Women's and Children's Hospital in Singapore. Yuko and Pang will jointly represent Asia on the Board.

Françoise Martens RN is the new European nursing representative for the Board. She is from Belgium and is a staff member in the PICU of the AZ-VUB.

The new configuration for nursing representation is a very positive step for WFPICCS. In that manner, there has been development of several initiatives by the nursing representatives. The facilitation of a collaborative relationship(s) between a PICU nursing staff in a more developed country and partnering with a "Sister PICU" in a developing country to offer educational, emotional and technical support. Second, the development of an educational

undertaking to promote the development of educational programs and courses for PICU's in areas with the need for knowledge, skills and support secondary to the scarcity of resources. A task force on Ethics is currently being configured with medical and nursing representation from all regions. The next Board Meeting will be this coming April in Vina del Mar, Chile where discourse and the push for continued progress on all initiatives will occur.

## 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](mailto:franco.carnevale@mcgill.ca)



## Instructions for Authors

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*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. Proceedings 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](mailto:franco.carnevale@mcgill.ca)).

Submissions to Spotlight on PICU can be emailed directly to the column editor, Dr Bev Copnell, at [Beverly.Copnell@med.monash.edu.au](mailto:Beverly.Copnell@med.monash.edu.au)