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**Science in Paediatric and Neonatal Intensive Care Nursing: International forces providing evidence to change clinical practice**

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Paediatric intensive care (PIC) and neonatal intensive care (NIC) represent a small subspecialty in critical care overall. By way of illustration, in 2016 the Australian and New Zealand Paediatric Intensive Care (ANZPIC) Registry reported just over 11,000 PIC admissions in Australia and New Zealand<sup>1</sup>. However, this small population of PIC and NIC patients and their families represent some of our most vulnerable and present challenging issues in providing high quality nursing care. Some aspects of PIC and NIC nursing care maybe unique but numerous interests are shared with nurses in adult critical care environments.

Despite being a small section of the critical care nursing workforce, our paediatric and neonatal nurse researchers are making a significant contribution to the body of knowledge for PIC and NIC critical care nursing. Over the last 12 months, *Australian Critical Care* published six PIC research articles reporting on topics that reflect the core business for PIC and NIC nursing care: normal saline installation during endotracheal suction<sup>2</sup>, decision making for ETT suctioning<sup>3</sup>, nurse titrated analgesia and sedation in paediatric patients following cardiac surgery<sup>4</sup>, predicting those children who are going to be difficult to sedate<sup>5</sup>, evaluating the impact of standard medication infusion concentrations on patient outcomes<sup>6</sup> and screening for paediatric delirium<sup>7</sup>. These articles represented 13% of the total number of articles published in 2018 in *Australian Critical Care*.

This special issue of paediatric and neonatal research articles, the first in 2019, features nine articles that address issues of importance and relevance to all critical care nurses. Publishing a collection of 15 articles by a truly international authorship in *Australian Critical Care* over the last 12 months and in this special issue, it is timely to reflect on the recently published

international PIC and NIC nursing research priorities. In this respect, four articles presented nursing research priorities in PIC and NIC nursing, using a modified Delphi method with international nurse experts<sup>8</sup>. The Delphi method has been used widely in priority setting and is an appropriate way to seek consensus on quality indicators, education assessment and standards and to identify research priorities<sup>9</sup>.

Research priorities identified in two European Delphi studies<sup>10,11</sup>, an Australasian Delphi study<sup>12</sup> and a world consensus conference<sup>13</sup> are presented in Table 1. Collectively these studies indicate a synergy of the research priorities in PIC and NIC nursing. Overall, the research priorities within PIC and NIC nursing science should focus on pain and sedation management, mechanical ventilation, infection prevention, child and family support, end-of-life care, and nursing workforce issues such as staff stress and education.

In this special issue the nine articles originate from Brazil, The Netherlands, Switzerland, China, Spain and Australia. All included articles are related to the top research priorities as reported by the international PIC and NIC research priority settings. The relationship of the included articles in this special issue is highlighted in Table 1 in the bold marked priorities. This illustrates that international PIC and NIC researchers in this special issue are driving the previously established research priorities forward and building on the current body of evidence. All researchers contribute to knowledge building in various areas where new evidence is needed.

In the PIC and NIC research priority lists, pain and sedation management is listed as one of the top priorities. In this special issue, the lead article by Baarslag and colleagues

prospectively looked at the number of daily painful and stressful procedure in children admitted to a PIC Unit and the perspectives of nurses caring for these children (ref AUCC 2019). Perhaps this study should be a wake-up call for all critical care staff to change practice as some procedures were performed without adequate analgesia or sedation.

Two articles in this special issue are describing one of the priorities related to mechanical ventilation management. Schults and colleagues built on their integrative review<sup>2</sup> published in 2018 to explore the use of lung recruitment and instillation of normal saline with endotracheal suctioning (ref AUCC 2019). The findings of their qualitative study revealed endotracheal suctioning practice variability and uncertainty about best practice among PIC nurses continues. The second article included in this issue is a literature review of the appropriateness of current adult ventilatory associated events (VAE) definitions in the paediatric population by Noor et al (ref AUCC 2019). The results suggest that the current surveillance definition is adequate but may not fully capture the prevalence of VAE in the paediatric population.

Infection prevention remains a priority in many areas of critical care. The article by Belela-Anacleto et al (ref AUCC 2019) report using theory to identify predictors of Brazilian PIC healthcare professionals to perform hand hygiene following a multi-faceted intervention. The results highlight the need to target social influence together with other determinants to achieve and sustain behaviour change.

Supportive interventions to improve outcomes of neonates and parents has been highlighted as a priority area In NIC nursing research. In this special issue two articles are

included that relate to this priority. The first article is a feasibility study by Zwissig and colleagues identifying stress in clinically stable neonates during ambulance transport (ref AUCC 2019). Besides physiological outcome measures the study included the Comfort Behaviour and the Premature Infant Pain Profile-Revised scales. The study found that transport is stressful because the comfort and pain outcomes did not return to baseline values which indicate a level of discomfort. It has been noted that specifically during transfer from the cot into the transport incubator is a stressful event for these neonates. The second NIC article in this issue is a systematic review and meta-analysis of family-centred care interventions by Ding and colleagues (ref AUCC 2019). This review is unique in terms of their inclusion strategy; randomized controlled trials (RCTs) from the English and Chinese literature. Of the 19 included articles, the authors were able to include 15 RCTs in a series of meta-analyses of infant and parent outcomes reporting the benefit of family-centred care in NIC.

In both NIC and PIC, end-of-life care has been listed among the top 10 research priorities. Two qualitative studies from the same research team are included in this special issue. The first article explores the relationship between bereaved parents and healthcare professionals (ref AUCC 2019). The identified themes describe the pathway of how parents feel about their connection to and with healthcare professionals starting from respecting the professional expertise of medical care around the child's admission to relationship behaviours related to the acceptance of the treatment limitations. The second article of this research group is a secondary analysis of the previous qualitative study (ref AUCC 2019). The focus of this study was to explore the experiences of bereaved parents when the police was present in the PIC for routine coronial investigations. The nine interviews with parents

with these experiences revealed a negative experience. Parents found the police visits for the investigations at an early stage of their child's admission stressful and negatively influenced the experiences during the most difficult time of their lives when losing their child.

The final article included in this special issue is related to PIC and NIC staff well-being, which has been addressed as a research priority. Rodríguez-Rey and colleagues address the issue of PIC staff burnout and stress (r ref AUCC 2019ef). Not surprisingly, burnout and stress seem to emerge mostly after the death of a child or conflicts with families. The authors advised to develop interventions that prevent and treat distress among PIC staff. These interventions should ideally focus on encouraging positive thinking, detached concern, solving interpersonal conflicts, and training in end-of-life care.

*Australian Critical Care* is pleased to support the PIC and NIC nursing research community. Our journal is one of several journals in critical care and we acknowledge the increasing numbers of PIC and NIC nursing research reports in other journals documenting the immense progression made by colleagues around the world to improve clinical practice based on science and evidence. The ball is rolling. The challenge is to play the ball between researchers and clinicians in a game that can only be successful if we work together. Our patients and families deserve a winning team delivering the best care based on the best available evidence.

Table 1. Reported top PIC and NIC nursing research priorities

European NICU 2015 <sup>10</sup>	European PICU 2014 <sup>11</sup>	Australian and New Zealand PICU 2012 <sup>12</sup>	World paediatric critical care nursing 2015 <sup>13</sup>
<ol style="list-style-type: none"> <li>1. <b>Identifying effective interventions to prevent or reduce pain or stress</b></li> <li>2. Identifying and evaluating strategies to reduce medication errors</li> <li>3. <b>Improving end-of-life care for neonates and their families</b></li> <li>4. <b>Identifying strategies to support the needs of parents and family members</b></li> <li>5. Identifying interventions to implement evidence into NICU nursing practice</li> <li>6. <b>Identifying best practices for pain assessment</b></li> <li>7. Identifying safe medication administration practices</li> <li>8. Exploring the role of parents in ethical decision making</li> <li>9. <b>Identifying strategies to reduce stress and improve performance in NICU nursing</b></li> <li>10. Identifying best practices in the care of non-invasive ventilation in infants</li> </ol>	<ol style="list-style-type: none"> <li>1. <b>Improving end-of-life and palliative care for children and their families</b></li> <li>2. Communicating and decision making around forgoing and sustaining treatment</li> <li>3. <b>Effective interventions to reduce and prevent pain</b></li> <li>4. The effect of continuous education and training methods on nursing competence and knowledge</li> <li>5. <b>Interventions to reduce healthcare-associated infections</b></li> <li>6. Identifying appropriate nurse staffing levels and recruitment strategies</li> <li>7. 7 Identifying and implementing strategies to improve evidence-based nursing practice</li> <li>8. 8 Improving healthcare team communication</li> <li>9. <b>Identifying best practices for preventing analgesia and sedation withdrawal</b></li> <li>10. <b>Identifying best practices in sedation assessment</b></li> </ol>	<ol style="list-style-type: none"> <li>1. EBP for neuroprotection post hypoxic arrest</li> <li>2. <b>EBP for end of life care</b></li> <li>3. <b>Assessment of drug withdrawal</b></li> <li>4. EBP for the management of post-cardiac arrest patients</li> <li>5. Management of nursing stress/burnout</li> <li>6. <b>Education needs for nurses at different stages of development</b></li> <li>7. <b>Opioids and benzodiazepines weaning strategies</b></li> <li>8. <b>Impact of pain and sedation assessment on patient's comfort</b></li> <li>9. Determine best practice for nurse-led ventilation weaning</li> <li>10. <b>Determine best practice for postoperative and trauma pain management</b></li> </ol>	<ol style="list-style-type: none"> <li>1. <b>What nursing interventions directly impact the child and family's experience during the withdrawal of support in the PICU?</b></li> <li>2. Evaluate the long-term psychosocial impact of a child's critical illness on family outcomes</li> <li>3. <b>Can effective team communication models improve patient and family outcomes in pediatric critical care?</b></li> <li>4. Articulate core nursing competencies that prevent unstable situations from deteriorating into crises in pediatric critical care</li> </ol>

NICU=Neonatal Intensive Care Unit; PICU=Paediatric Intensive Care Unit; EBP=Evidence Based Practice



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