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EDITORIAL

### BACN Nursing in Critical Care

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# Environmentally sustainable critical care: Special issue introduction

The triple planetary crisis of climate change, air pollution and biodiversity loss are harmful to public health. These three planetary issues are also worsened by the enormous carbon footprint and vast amount of waste generated by healthcare organizations. There is an urgent need to address the environmental sustainability of healthcare to be more responsible in how healthcare supplies are produced, procured and used, along with the associated waste management, for healthcare delivery to not damage planetary health. Nurses and other healthcare disciplines share the responsibility to maintain and safeguard the natural environment from depletion, pollution, degradation and destruction.<sup>1</sup> Otherwise, the current reliance on single-use plastics to limit the spread of infection, energy consumption from nonrenewable sources and poor waste management in hospitals will continue to cause such a large and detrimental environmental footprint, subsequently impacting public health by further exacerbating the triple planetary crisis from healthcare delivery.

Intensive care units (ICU) are resource-demanding departments; therefore, becoming an environmentally sustainable critical care nursing practice is crucial. As guest editors, we prepared this special issue of *Nursing in Critical Care* to collate articles from a range of topics addressing the environmental sustainability of critical care. We are nurses with a passion for supporting ICUs to become 'green' and 'earth-friendly'. Guest editing has been an excellent opportunity to draw from our previous experiences in clinical practice, education and research to facilitate a special issue focused on this important topic of reducing healthcare delivery's environmental footprint.

An editorial by Schenk<sup>2</sup> explains how critical care nurses need to 'think big' to understand more about the interconnectivity between planetary health issues (greenhouse gas emissions, climate change, weather-related natural disasters, air/water/soil pollution, microplastics and resource depletion) and human health. This editorial also encourages critical care nurses to embrace a sense of stewardship through the WE-ACT framework, which stands for waste, energy and water, agriculture and food, chemicals and transportation.<sup>2</sup>

Another editorial presents a position statement by the European federation of Critical Care Nursing Associations (EfCCNa), which calls for every nurse to advocate and action sustainable practices in critical care.<sup>3</sup> As the largest healthcare profession that also provides 1:1 bed-side care of critically ill patients, nursing has an opportunity to make a significant impact on reducing the environmental footprint of ICUs. The EfCCNa also encourages Green Teams and educational initiatives to optimize resource efficiency and embrace eco-friendly actions while maintaining quality care.<sup>3</sup>

There are four research articles in the special issue and one evidence-based review. The bibliometric analysis by Özkan<sup>4</sup> quantified and showed trends, citations, key terms and countries of studies on intensive care's carbon footprint. A prospective observational pilot study by Soong et al.<sup>5</sup> evaluated the carbon footprint of sedation practices in intensive care and identified the potential for carbon and financial savings by reducing drug wastage. Qualitative research by Sürme, Maraş and Aydin Akbuğa<sup>6</sup> explored Turkish surgical intensive care nurses' perspectives on medical waste management, energy and medication consumption, providing insight into the need for education to raise awareness and provide knowledge and the value of a teambased approach to sustainability initiatives. Even though Van Der See et al.'s<sup>7</sup> pre- and post-study found that nudges did not reduce unnecessary apron usage in an ICU, their article shares methodological challenges of research about ICU staff behaviour change for sustainability to offer insight for other researchers planning similar studies. The evidence-based review by Raurell-Torreda<sup>8</sup> considers two bloodsparing techniques to prevent anaemia (small volume tubes and closed-blood sampling devices) using a sustainability lens to appraise the environmental and financial implications.

Ireland et al.<sup>9</sup> present the 'plan' stage of a quality improvement initiative using a PDSA (plan-do-study-act) approach to evaluate energy usage before and after introducing an energy-saving programme, focusing on lighting, heating and temperature control and ventilation in the ICU. The protocol explains the data collection and analysis methods to measure environmental and financial savings for this nurse-led energy project developed in collaboration with the hospital estates. A completed quality improvement project from Grey et al.<sup>10</sup> explores their multi-disciplinary approach to improving sustainability efforts in an ICU related to recycling single-use plastic enteral feed bottles. The authors recognized that recycling is only one aspect of environmental stewardship and the final 'R' in the waste hierarchy, with a need to prioritize reducing and reusing. However, their pre- and post-intervention staff survey recognized further cobenefits, such as how a focused sustainability quality improvement project can lead to initiating an ICU Green Team and generate interest in the relevance of the climate emergency to daily ICU clinical practice.

Limitations in recycling healthcare products and the implications of relying on single-use plastics are explored in a critical commentary by a materials scientist. Sarker<sup>11</sup> provides an overview of key scientific concepts for knowledge that will help ICU nurses be better equipped for sustainability projects, such as understanding

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greenhouse gases, global warming potential, recyclability, plastics and bioplastics. This materials science lens on ICU sustainability offers a novel approach to encouraging multi-disciplinary engagement beyond the hospital with a call out for nurses to liaise with researchers working on redesigning clinical supplies to be more sustainable.

The critical commentary by Cervera-Jackson et al.<sup>12</sup> demonstrates teamwork within a multi-site approach to ICU Green Team collaboration that included clinicians from different hospitals within the same organization and estates colleagues. They used the 'Onion Model<sup>,13</sup> to reflect on a human factors and systems approach to planning initiatives across a range of topics for their ICU to reduce its carbon footprint. Similarly, the report by Markus-Rodden<sup>14</sup> showed partnership working when an ICU building renovation gave an opportunity for sustainability improvements, bringing together architects, engineers, building contractors and ICU clinical staff.

The concept of 'low-value care' is appraised by Nielsen et al.<sup>15</sup> recognizing the links with environmental, financial and social sustainability and advocating that ICU nurses are well placed to lead and participate in environmental programmes within their departments and hospitals. Another critical commentary by Arasen<sup>16</sup> reflects on collaborative working between physiotherapists, nurses, doctors and occupational therapists to champion early mobilization, improving patient physiological and psychological health outcomes related to ICU survivorship and bringing environmental, financial and social co-benefits from minimizing ICU-acquired weakness. Finally, the critical commentary by Meddick-Dyson, Cartwright and Pattison<sup>17</sup> evaluates how end-of-life care interventions in intensive care also have environmental implications, emphasizing that the primary aim should be goal-concordant care for patients and families and connection to an ethical framework.

The Nursing in Critical Care journal of the British Association of Critical Care Nurses (BACCN) produced this special issue, purposefully covering a range of relevant topics, to add to the growing collection of publications<sup>18,19</sup> and networks<sup>20</sup> supporting nurses and their multidisciplinary teams with sustainability efforts. Professional associations and societies related to critical care are also now engaging with environmental sustainability. For instance, the European Society of Intensive Care Medicine (ESICM) produced a 'Green Paper' with strategies for clinical practice, research, education and how it functions as an organization, recognizing the joint responsibility of all ICU stakeholders to become environmentally responsible.<sup>21</sup> The United Kingdom will soon have national environmental sustainability recommendations for all ICUs and a 'Recipe Book' for the ingredients and methods to lowering intensive care's carbon footprint.<sup>22</sup> The Australia and New Zealand Intensive Care Society (ANZICS) have a Sustainability Toolkit and Choosing Wisely suggestions.<sup>23</sup> The Society of Critical Care Medicine in the United States,<sup>24</sup> Choosing Wisely Canada<sup>25</sup> and Choosing Wisely Italy,<sup>26</sup> amongst other countries, also have resources and recommendations to avoid unnecessary investigations and interventions in ICUs while maintaining quality care. ICU conferences are more and more including environmental sustainability keynote talks, oral presentations, posters and workshops-see the EfCCNa's March 2025 congress scientific programme as an example.27

The planetary health crisis is a public health emergency requiring an urgent change in how all aspects of society function, including hospitals and ICUs, that should immediately alter practices to become a net zero critical care<sup>28</sup> service. However, a small number of individuals attempting to become more sustainable in isolation cannot achieve the scale of change required. Therefore, teamwork, collaboration and working in partnership with internal and external colleagues are themes threaded throughout the special issue. We hope this collection of articles focused on environmental sustainability provide the critical care community with motivation, knowledge and recommendations to become green ICUs.

#### CONFLICT OF INTEREST STATEMENT

Heather Baid received a grant from SBRI Healthcare Competition 24 for 'Delivering a Net Zero NHS for a Healthier Future'. Fredrika Sundberg-Nothing to declare.

#### DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no new data were created or analyzed in this study.

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