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WHAT'S NEW IN INTENSIVE CARE

Create intensive care green teams, there is no time to waste

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Greenhouse gas (GHG) emissions must decrease by 80–90% by 2050 to limit global temperature increases to under 1.5 °C and mitigate climate change consequences [1]. This requires a decrease of 6% each year, the reduction observed in 2020 during the coronavirus disease 2019 (COVID-19) crisis. However, this decrease must occur cumulatively year after year. Any delay will only increase the difficulty of doing so in the future.

Healthcare systems must urgently work towards an environmentally sustainable transition. Within healthcare, hospitals are the largest contributors to GHG emissions. Within hospitals, intensive care units (ICUs) are carbon hotspots contributing three times the GHG emissions as acute care units per bed day [2]. Commitment at all levels is necessary to realise the transition. ICU health care workers (HCW) are well positioned to promote sustainability at all levels from clinical practice changes to influencing healthcare organisations, standards, and policies. Grassroots and formal teams contribute to the success of sustainability initiatives. Teams help to provide legitimacy and permanency to the work [3], increase awareness about individual actions, advocate for unit-level changes, and provide an interface between HCWs, the organisation, and experts to help operationalise sustainable initiatives [3, 4]. There is growing evidence that sustainability teams can use to identify opportunities for increased sustainability and to collect and monitor data including life cycle assessment (LCA) analyses.

We provide action guidance to individuals and groups who wish to promote planetary health in the ICU. We hope this article will soon be redundant with every ICU having an engaged green team promoting sustainability.

How common are environmental sustainability teams?

For the 2020/21 financial year 65% of 20 New Zealand (NZ) ICUs and 40% of 153 Australian ICUs had a clinician or team with responsibility for considering and implementing environmental sustainability initiatives, up from 48% and 36%, respectively for 2019–20. (ANZICS CORE—Further data in electronic supplementary material (ESM)). Other country-wide prevalence data were not found.

How to create a successful green team

The authors asked ICU environmental champions in New Zealand, Australia, Canada, and Belgium for their practical tips for creating successful green teams. These themes emerged which align with advice for effective green teams in general [5].

- Identify multidisciplinary green champions who are passionate about sustainability. Nurses often lead ICU green teams and are key to success at the bedside.
- Do not wait to be asked. Grassroots drive is a necessary condition for success strengthened by the top-down support of leadership. Leadership can strengthen groups by giving them autonomy to problem-solve, positive acknowledgement to the wider unit and appropriate financial resourcing of initiatives. A green team mission statement that aligns with the health care organisation's values will demonstrate fitting as part of the quality framework.
- Map existing initiatives, plan next steps in conjunction with leadership team and set specific, measur-

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able, achievable, realistic, and timely (SMART) goals. Meet regularly and set deadlines for actions.
- Sustainability should not be separate, it should be firmly embedded in quality frameworks [6]. Make daily ICU processes and procedures more efficient, starting with process mapping your day.
- Communicate initiatives widely with regular reminders and updates at ward meetings, on posters, notice boards, in ICU newsletters and social media. Collaborate/ share/ copy ideas from others and get support to achieve targets from roles like hospital sustainability officers.
- Celebrate your success. Promote it. Keep it fun, be creative and show appreciation of all ideas, bring people along with you with encouragement, feedback, and education. If there are financial or health co-benefits, highlight these, and demonstrate how they can be invested back into patient care. Reframe the inevitable barriers encountered into opportunities.

(Further content available in ESM).

What could teams be doing?

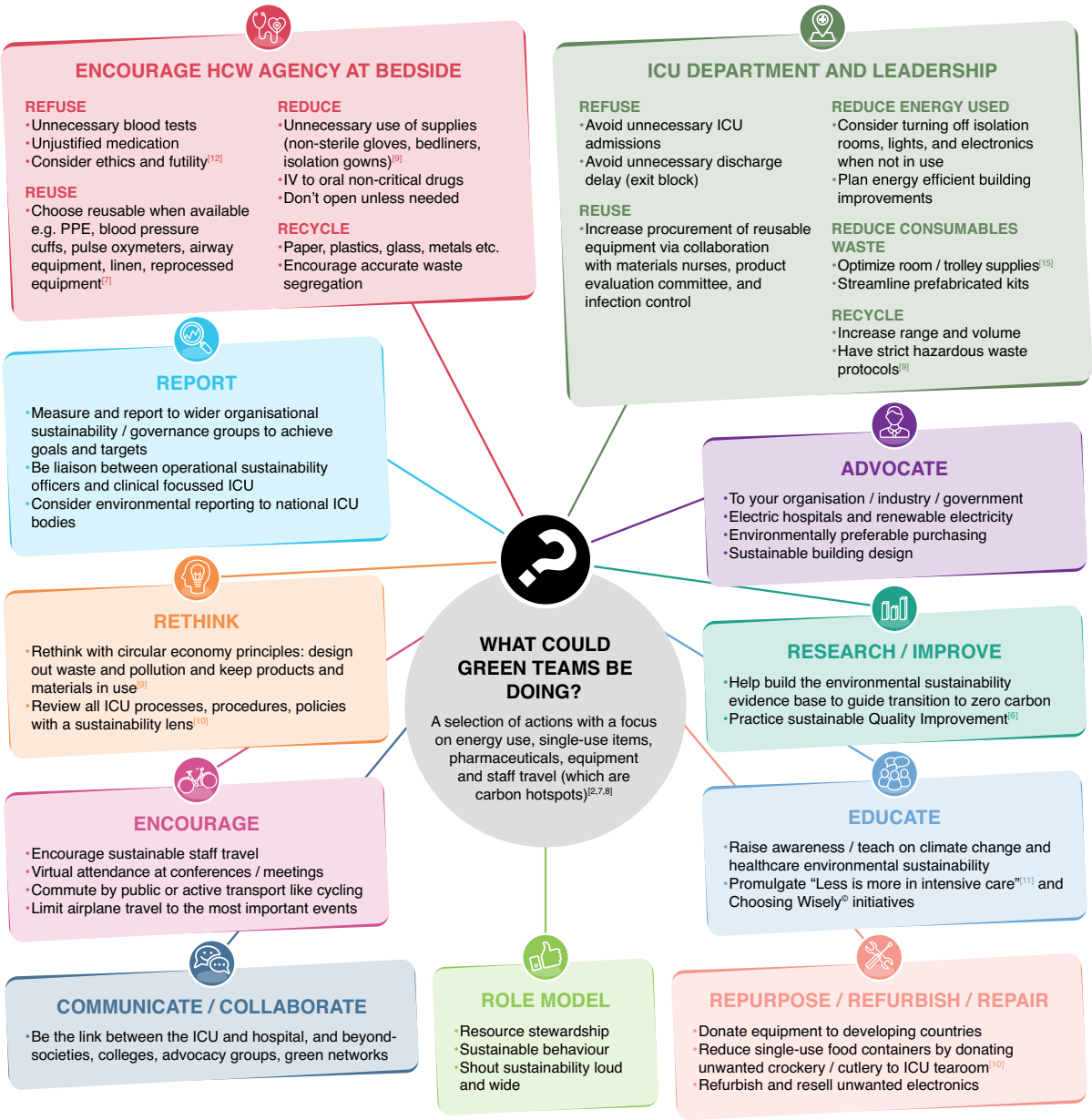
ICU sustainability is a colossal task requiring mass transformation. Choosing a consensual goal that first targets only a few problems is important. Measuring and quantifying actions as much as possible will assist with communication and quality assessments. The authors suggest that green teams focus on these actions initially.

What is easy "low hanging fruit": e.g. a lights and electronics switch-off campaign, recycling, and carpooling.

What is big: a 10% carbon emission decrease in a sector that represents 50% of emissions is a 5% absolute decrease. This would equate to more than a 90% decrease in a sector representing 5% of the emissions. *What is big* includes heating usually made with gas combustion, as reviewed by McGain [7]. In countries like Australia, Germany, China and the United States of America, with highly carbonised power mix, actions that decrease power consumption (via ventilation, air conditioning, lighting and computers) will be helpful along with strong advocacy for fully electric hospitals and renewable electricity. Countries with decarbonised power, like France and Sweden, should focus on pharmaceuticals and medical equipment (which are carbon hotspots and are routinely imported [8]). Regarding equipment, in a material flow analysis, Hunfeld identified five ICU materials hotspots: isolation gowns, bedliners, non-sterile gloves, surgical masks and syringes [9].

What is symbolic: the result will be visible and demonstrate a culture of sustainability (e.g. vegetarian catering for department events and the leadership team choosing active transport).

Then follow the R's waste hierarchy. The order is key and indicates the magnitude of GHG emissions' effect: first, *refuse* and *reduce*, then *reuse, repurpose*, and finally, *recycle*. Recycling has a limited impact, even if it is the easiest to do and implement. We will need more environmental LCAs and translational research on the effectiveness (pollution reduction) of many actions to inform our choices. In the meantime, *reduce* by definition decreases, and there is a multitude of actions that reduce what we do and use in ICU without compromising quality care. Refer, for example, to the ICU specific ANZICS sustainability toolkit [10], "less is more in the ICU" [11] and other helpful reviews [7, 12] (more listed in ESM).



Evidence for effectiveness

The larger goal for ICU green teams is to build sustainability into facility infrastructure and processes. Waste reduction is one area within ICUs that many teams have effectively influenced:

- The introduction of recycling stations resulted in 5 tonnes diverted from the landfill p.a. in a 14-bed ICU in Melbourne, Australia [13].
- Staff education and pharmacy process changes resulted in a 32.3% improvement in proper waste disposal in a 41-bed ICU in São Paulo, Brazil [14].
- Changes in supply stocking resulted in an 80% reduction in the amount of unused equipment waste in a 16-bed ICU in Canada [15].

Many other teams are working towards waste reduction, but metrics are not always measured or monitored. Data are needed to assess progress and effectiveness and

highlight successes. LCA, carbon footprint, and energy efficiency data can support metrics.

Take-home message

ICU Environmental sustainability teams are vital to harnessing employee expertise, motivating, and finding new and better ways to transition. Form or join a team now, there is no time to waste!

Supplementary Information

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Author's contribution

All authors contributed to the literature review, writing and editing.

Data availability

The authors confirm that the data supporting the findings of this manuscript are available within the article and its supplementary materials. Additional data can be requested from ANZICS CORE Registries via a standard data request process.

Declarations

Conflicts of interest

DG received consulting fees from Transgene SA France. LT is an ANZICS Safety and Quality committee member, an author of ANZICS Beginners guide to sustainability in the ICU, and Australian and NZ CICM (College of Intensive Care Medicine) environmental sustainability special interest group co-chair-unpaid roles.

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