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ARTIGO DE PERSPECTIVA

Research in Sustainability: Highly Needed and Feasible!

Investigação na Área da Sustentabilidade: Muito Necessária e Viável!

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INTRODUCTION

We are currently living in a new geological era: the Anthropocene, where humanity has become the dominant force in the shaping of the Earth's environment.1 The evolving challenges of environmental pollution, climate change, biodiversity loss and the associated health consequences demand that healthcare, itself a polluting sector responsible for 5%-10% of global greenhouse gas emissions, develops sustainable solutions.[2,3]

The European Society for Anaesthesiology and Intensive Care (ESAIC) has put forward the Glasgow Declaration, defining priority areas to mitigate the carbon footprint of anaesthesia.[4] Delivering these goals requires a profound transformation of our profession and the healthcare system in general.

To help us navigate this challenge, we need scientific research to guide us. In the context of 'planetary health', it is crucial to create effective strategies for climate mitigation and adaptation, facilitate their implementation, build relevant datasets to inform policy, and develop innovative approaches to planetary health research.

REDUCING OUR FOOTPRINT: CLIMATE MITIGATION

The measures to achieve carbon neutrality are referred to as 'climate mitigation'. For anaesthesiologists, a primary mitigation focus is to reduce emissions of anaesthetic gases, which are potent greenhouse gases.

This has prompted several avenues of research. Some argue for a comprehensive phase-out of anaesthetic gases, while others advocate for technological innovations, such as volatile capture devices, to prevent emissions while continuing to use these gases. To obtain objective insights into these technologies, scientific research is essential to inform our community. Additionally, a large-scale transition to total intravenous anaesthesia may have unintended consequences, as intravenous drug wastage ranges from 30%-50%. Innovative solutions, like one-way valves in drip systems, could mitigate this, but their safety, effectiveness, and sustainability need to be thoroughly evaluated.[5]

Finally, evidence-based strategies are required to reduce environmental impact through energy-efficient practices and the adoption of reusable equipment.

ADAPTING TO A NEW REALITY

While mitigation efforts may help control global warming, our environment will certainly undergo significant changes. Moreover, environmental pollution, climate change, and health are closely interconnected.[2] Extreme weather events are expected to increase, leading to direct health impacts, such as during heatwaves or heavy rainfall, and indirect effects, such as the spread of vector-borne diseases.

The rise in mortality associated with climate change is predominantly observed in the global south,[6] exacerbating global inequalities. However, Europe is also affected, as demonstrated by the 2024 floods in the Valencia region of Spain. These events underscore the research opportunities in trauma, critical care, and disaster medicine, fields where anaesthesiologists play an active role.

In addition to the direct harm to human health, extreme weather events can also disrupt global supply chains. For instance, the production of intravenous fluids at Baxter's plant in North Carolina, USA, was severely affected by Hurricane Helene in September 2024. Scientific research should guide policymakers in building resilience within local, regional, and national healthcare systems to better withstand these challenges.

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IMPLEMENTATION SCIENCE, DATA AND METHODOLOGY

In addition to understanding what needs to be done, it is crucial to explore how to achieve climate goals and accelerate the transformation of the healthcare system into a sustainable and resilient sector. While shifting from disposable to reusable equipment may appear to be a straightforward measure, it can be challenging to implement in the operating room.[7] Another significant knowledge gap is the lack of data. Paradoxically, we meticulously measure and record every complication in national and European registries, yet we rely on surveys to determine the proportion of general anesthetics that are intravenous versus volatile.[8] Similarly, we remain largely unaware of basic details such as the extent of disposable usage and the composition of surgical trays.

Finally, new scientific methods may be necessary to guide our efforts. The development of Life Cycle Assessments (LCA) and Health Technology Assessments (HTA) for medical procedures is essential. By collecting high-quality data on the environmental impact of operations, transportation, medications, and energy use, healthcare systems can identify critical areas for improvement, balancing these factors against safety, effectiveness, equity, and cost.

CONCLUSION

Research as a Tool for Change

In conclusion, it is our collective responsibility to ensure that healthcare systems are future-proof and capable of supporting both planetary and human health. The way forward for the field of anaesthesiology is, and has always been, research. The sustainability research agenda may focus on environmental factors, it also informs broader health outcomes, improving the long-term resilience of healthcare systems. By prioritizing mitigation, adaptation, and implementation, healthcare professionals can play an active role in addressing the climate crisis and its associated health risks.

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