Impact Surgery

Conference abstract

e-ISSN: 3033-4470

Comparing the Carbon Footprint of Energy Consumption in Emergency and Elective Operating Theatres: A Prospective Study

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Abstract

Introduction: Surgical operating theatres are typically 3-6 times more energy intensive than a hospital ward. This study compares the differences in electrical energy consumption and subsequent carbon footprint between emergency and elective theatres. We hypothesise that emergency theatres will consume more energy given the requirement for rapid response to critically unwell patients requiring surgery.

Methodology: A prospective observational study was conducted to measure energy consumption in an elective surgical hub and an emergency theatre complex within the same NHS Trust in September 2024 using a bottom-up approach. An inventory was taken comprising all mains dependent electronical devices together with power consumption over a 24-hour period. The variability in consumption from the heating, ventilation and air conditioning (HVAC) system was estimated using previously published data.

Results: The estimated daily energy consumption of an emergency theatre was 931 kWh compared to 405 kWh in an elective theatre. In addition, the estimated daily carbon footprint of the emergency theatre was equivalent to that of the daily energy use of 35 UK homes (256 $kgCO_2e$). The discrepancy in energy consumption was primarily due to the perpetual use of the HVAC system in emergency theatres (776 kWh vs 323 kWh).

Conclusion: The carbon footprint of electrical energy use in emergency theatres is twice that of an elective theatre due to assumptions regarding the 'always available' requirements of equipment. Substantial carbon reductions can be made by empowering staff to safely turn off environmentally costly HVAC systems confidently without compromising the emergency surgical service provision.

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Cite as: Richardson, P. S., Bashaireh, L., Spence, C., & Chan, A. Comparing the Carbon Footprint of Energy Consumption in Emergency and Elective Operating Theatres: A Prospective Study. *Impact Surgery*, 2(2), 64. https://doi.org/10.62463/surgery.153