VIEWPOINT

Sustainability in Surgery—Reinvesting in People Over Things

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Sustainability is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs.[1] It includes a focus not only on the environment, but also on the quality of life and quality of the economy for those in that environment.

As early as 2009, *The Lancet* called climate change the greatest threat to human health.[2] The negative health effects of increasing heat, pollution, waste, and extreme weather events are well documented in the literature. What is less well known is the large role the health care system plays in contributing to climate change.[3]

The US creates 27% of global health care carbon emissions, which is more emissions annually than the entire United Kingdom, despite the US treating only 4% of the world's population.[4] A main driver of these carbon emissions is the supply chain, which accounts for the entire life cycle of supplies, including their creation, packaging, sterilization, transport, use, and disposal, often incorrectly, as biohazardous waste.[4]

Carbon emissions are calculated using life cycle assessments (LCAs). LCAs are an assessment tool that analyze the environmental impacts of a product or process by aggregating the emissions at all stages of the life cycle, including the extraction of raw materials, manufacturing, use, end-of-life disposal, and any processing, cleaning, sterilization, or transportation between these steps. While used in engineering and manufacturing for many years, LCAs are becoming increasingly important in understanding the environmental impact of medical processes. LCAs have consistently shown an environmental benefit of reusables over disposables in medicine—in a 2015 study on laparoscopic surgery,[5] for example, up to 70% of carbon emissions could be attributed to single-use materials, while as little as 7% to 8% of emissions came from reusable instruments. This was mostly related to production rather than cleaning and sterilization.

Reinventing the Current Practice of Medicine

Over the past 30 years, the transition of health care supplies from reusable to single-use petroleum-based plastics in the name of theoretical infection prevention and efficiency has created a throwaway culture in medicine wherein we consume and waste to the detriment of our environment, our finances, and our workforce.[4,6] A study from the University of California, San Francisco, showed that in 1 surgical service line, disposables that were opened for cases and never used amounted to $2.9 million annually in losses.[6]

Stewardship principles of sustainability include respect for the health of the local environment and natural resources, assurance that benefits of the economy are shared equitably, and prioritization of the well-being of patients, employees, and visitors alike. Labor has traditionally been the most expensive cost in health care, with supply chain costs coming in second. Because of our growing dependence on single-use supplies and the shortages that occurred during the SARS-CoV-2 pandemic, supply costs went up by as much as 2000%.[4] Today, we spend more money on things than people.

Investments prioritizing single-use items not only make everyone less healthy by increasing the carbon footprint of the health sector, but also put pressure on the remaining workforce and processes that help systems run. For example, a frequent rationale given for not using a reusable procedural item is that the central processing unit is short-staffed and cannot handle the extra load, so single-use supplies are required. A 2023 survey of sterile processing departments[7] showed that more workers were being asked to work overtime, despite wages remaining stagnant or decreasing in the past few years.

As surgeons, we have tremendous opportunity to reinvent the supply chain. We can pause and ask ourselves questions, like "Do I need this single-use product opened right away, or should I first see if I need it?" or "Can this device be safely reprocessed instead of thrown away?" Asking these questions allows us to rethink our current practices and consider the materials and supplies that are opened automatically in the name of efficiency. Considering the health harms of unnecessary health care emissions, a wasteful culture is no longer in the best interest of the communities we are trying to protect.

Educating and empowering every team member in the operating room to be champions of planetary health is also essential to creating an environment where questions like these are asked and answered and where decisions regarding value analysis can incorporate sustainability. Surgical team members can engage with hospital leadership to request reusable equipment and vendor contracts that allow reprocessing of instruments and recycling programs, as well as work with environmental services to better understand how unnecessary waste can be minimized and appropriately triaged. This simple process of collaboration and education is an investment in a workforce that champions sustainability and is key to reinventing a greener practice of medicine.

Where to Go From Here: Macro and Micro Mitigation Techniques

Regulatory policies have largely contributed to the health care industry shift toward single-use disposable items. While the US Centers for Disease Control and Prevention determines the level of disinfection and sterilization needed for a product based on infection risk, it allows manufacturers themselves to determine the level of infection risk.[8] A product with a high level of risk requires more complex reprocessing, which might prompt a health care system to opt for a disposable version of the item rather than assume the risk of reprocessing. Furthermore, US Food and Drug Administration rules make it easier for manufacturers to develop single-use, disposable items rather than meet

the requirements of developing reprocessable items.[8] As such, manufacturers have an incentive to overclassify infection risk, which in turn allows them to sell more single-use devices. This system is a win-win for manufacturers' finances.

Additional regulatory burden comes from hospital accreditation. For many organizations, The Joint Commission (TJC) accreditation satisfies Centers for Medicare & Medicaid Services requirements and standards, thus tying accreditation to reimbursement and revenue. Fear of citations related to improper equipment cleaning, sterilization, and reprocessing has prompted many health care organizations to transition to single-use, disposable items. While TJC's voluntary Sustainable Healthcare Certification encourages health care systems to decarbonize, they can do much more to make their regulatory guidance greener while continuing to prioritize patient care and safety. TJC has stated they support sustainability and that the choice to use reusable instruments over disposables is a supply chain issue, in line with a hospital's own policies.[9] TJC and institutions should work together to minimize the unnecessary use of single-use supplies when there is no scientific evidence supporting their superiority regarding patient safety and outcomes.

To achieve health care systems that prioritize the well-being of patients, employees, and communities, a commitment from hospital leaders is needed. As of spring 2024, 15% of US hospitals have signed the Department of Health and Human Services Pledge to reduce carbon emissions to net zero by 2050. It is imperative the remainder of the health care sector make the same commitment. Within their organizations, leaders need to incorporate sustainability into the strategic vision and mission. Furthermore, clear communication of these values throughout the organization will encourage workers at all levels to engage in sustainable practices. Sustainable investments may have higher up-front costs but are likely to have a greater long-term return on investment—money which can be reinvested in patients and hospital care through a fully staffed, engaged workforce. Investments in sustainability are about more than the environment; they are investments in health, resiliency, and the future.

ARTICLE INFORMATION

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Published Online: November 20, 2024. doi:10.1001/jamasurg.2024.4515

Conflict of Interest Disclosures: Dr Wright reported personal fees from Hologic and Karl Storz. No other disclosures were reported.

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