



Green surgery: time to make a choice

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Abstract

The operating room is a substantial source of pollution, with the major carbon hotspots determined by the use of energy, the procurement, and disposal of consumables and the waste of water. Mitigating the environmental impact of human activities, including surgical practice, to slow down the climate change has now become a priority for the future of the planet. There is a significant challenge ahead to enable surgery to halve carbon emissions by 2030 in accordance with the Race to Zero UN-backed global campaign. Both SAGES and EAES have recently recognized the role they have to play in raising awareness among their members about the need to gradually change our practice to achieve a better balance between technological advancement and respect for the environment. Since any global challenge demands a global response, our two societies decided to create a joint Task Force to address the topic of minimally invasive surgery and climate change. We will develop recommendations and share good practices regarding mitigation of climate risk in the practice of MIS. Strategic collaborations with device manufacturers will also be part of our effort to address this challenge. We wish that this alliance between SAGES and EAES, together representing and serving more than 10,000 members, might help the surgeons to evolve and improve their practice, letting sustainable surgery shape our culture.

Keywords Sustainability · Climate change health · Environmental health

Sustainable development entails meeting our own needs without compromising the ability of future generations to meet their own [1]. The UN weather agency, WMO, reported that 2022 was the eighth consecutive year that global temperatures rose at least 1°C above pre-industrial levels, fueled by ever-rising greenhouse gas concentrations and accumulated heat [2]. Our planet is clearly under threat. Humans are the direct driving force behind the transformation in the natural environment that we see all around us. It is now evident that to protect our future, we must cut our global greenhouse gas emissions and transition to net-zero emissions by mid-century. The “Race to Zero” is the UN-backed global campaign rallying non-state actors to take rigorous and immediate action to halve global emissions by 2030 [3].

The health sector is a significant source of pollution around the world and paradoxically an unintentional contributor to trends that undermine the public health. Since the introduction of minimally invasive (MIS) techniques in the early 1990s, the operating room environment has become the top producer of biohazard hospital waste and energy expenditure, with the estimated carbon footprint of a single operation being equivalent to driving an average gas-powered car for more than 2000 miles [4]. Reliance on disposable equipment and instruments needs to be challenged, together with the use of excess water in the OR and excess waste generation. To approach sustainability as a matter of environmental, economic, and ethical priority, surgical practice should gradually change and the use of MIS technologies such as laparoscopy and robotic surgery will need to be critically appraised from this perspective.

More than at any other time in history, surgeons play such an important part in global health. Surgeons and surgical societies are well positioned to embrace the “Race to Zero” challenge and drive this change. “*Safe and Sustainable Surgery for All*” is the new societal vision of the EAES as stated by its Executive Board in February 2022. The idea of sustainability was purposely introduced to stress the need we

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face to balance the technological advancement in surgical care with respect to the environment. Moreover, one must be aware that the effects of human activity on the planet, however, generated, tend to disproportionately impact poor and marginalized populations, in what is known as climate (un)justice [5]. Industrialized countries, after two centuries of unrestrained fossil fuel consumption, are responsible for the largest fraction of CO₂ emissions, despite representing a minor proportion of the global population. Nonetheless, the effects of the impact on climate change are now felt disproportionately in places that contributed little or not at all to the generation of this problem. By representing and serving the educational needs of over 7000 members who provide MIS gastrointestinal and endoscopic surgical care across the US and beyond, SAGES has recognized the role it needs to play in educating its members, innovating and collaborating with stakeholders to implement strategies to effectively reduce the environmental footprint of MIS practices. The 2022 Energy Security and Climate Change Investment Bill of the Inflation Reduction Act is the single biggest climate investment in US history which aims to achieve a 50% reduction in greenhouse gas emissions by 2030 and net-zero by 2050 [6]. Specific goals include decarbonizing the healthcare supply chain and for hospitals to set criteria for low-carbon and zero-emissions procurement. This societal and environmental imperative has been incorporated into SAGES' recently revised strategic plan as a new goal, in which initiatives will be centered around education and collaboration through strategic partnerships to develop and implement the effective solutions.

Global challenges demand global responses: that's why SAGES and EAES joined together to create a common Task Force to address the impact of MIS on climate change. The Task Force's priority is to explore this problem in depth and create more awareness among surgeons on climate-related risks in the delivery of MIS surgical care. Knowledge of climate-related risks in surgery and opportunities to improve our practice will contribute to the transition toward a better future. We look forward to our two societies taking a leading role in developing recommendations and sharing good practices regarding mitigation of climate risk in MIS. The key challenge is how to translate this collaborative partnership into practical outcomes that will reduce OR emissions and foster a commitment of our members to adaptation to sustainable healthcare. Our strategy is not a one-off document, and our most valuable work will be conducted in long-term partnership, where we can help surgeons to evolve and improve over time, letting sustainable surgery shape our culture. A recent survey indicates that surgeons are generally motivated to improve the surgical sustainability, but change

can only occur when motivation is combined with opportunity (leadership and support) and capability (education) (7). SAGES and EAES will work collaboratively to provide our members with a roadmap to address this challenge. Strategic collaborations with device manufacturers, hospital executives, and other stakeholders will also be needed in order to identify, in a joint effort, the best strategies that the surgical community can implement to effectively mitigate the environmental impact of our practices.

As surgeons today, we must propose solutions and try to adapt to a rapidly changing world. The future generation of surgeons will surely make the difference thanks to the use of two great renewable fuels: endurance and hope!

Declarations

Disclosures Patricia Sylla receives consulting fees from Stryker, Olympus, Medtronic, Ethicon, RedDress, Safeheal, and GI Windows. Andrea Pietrabissa has no conflict of interest or financial ties to disclose.

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