



Case Study

Waste Segregation Practice in Operating Theatres and Endoscopy Suites Survey in Australasian Hospitals: A Perspective from Anaesthesia and Gastrointestinal Endoscopy Nurses

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Abstract

Objective: Healthcare services globally face a pressing need for environmental sustainability due to their significant resource usage and greenhouse gas emissions. Effective waste management depends on waste services and facility commitment. **Aim:** This project about workplace practice of waste segregation from the point of view of gastrointestinal endoscopy and perianaesthesia nurses aims to assess current sustainability practices to guide future initiatives. **Methods:** A survey was developed by the Australasian College of PeriAnaesthesia Nurses (ACPAN) and Gastroenterological Nurses' College of Australasia (GENCA) and distributed by email to their members. **Results:** There were 98 respondents who worked in 88 different departments. Many of the hospitals (58%) had a sustainability committee with often a representative from the operating theatre/endoscopy department (72%). 56% of departments reported the use of biodegradable items, 44% used compostable items and 35% disposed of medication in an environmentally friendly manner. 7% of the responders were confident in their knowledge about waste segregation, and this increased if waste segregation was implemented at a hospital level. Engagement and compliance in waste segregation were different among team members with medical professionals scoring less than nursing staff. Environmental sustainability regarding supplier or consumable selection was considered in respectively 22% and 48% of the departments. Barriers and enablers for waste segregation were reported. **Conclusions:** There is an urgent need for comprehensive education for all healthcare staff members. The support and engagement of higher management are essential for success as such enablers are difficult to establish at a unit/department level. We advise the introduction of a national framework to address waste segregation challenges and provide a practicable pathway to allow hospitals to implement segregated waste streams, regardless of their scale and location.

Keywords: waste segregation; nursing; operating theatres; endoscopy; environmental sustainability.

Abbreviation list: ACSQHC: Australian Commission on Safety and Quality in Health Care, ACPAN: Australasian College of Perianaesthesia Nurses, BPI: Biodegradable Products Institute, CFP: carbon footprint, CO₂: carbon dioxide, GENCA: Gastroenterological Nurses' College of Australasia, HP: healthcare professional, LCA: life cycle assessment, PACU: post-anaesthesia care units, PEF: product environmental footprint, PPE: personal protective equipment, SPSS: Statistical Package for the Social Sciences, USA: United States of America.

Introduction

Environmental sustainability has emerged as a pressing imperative for healthcare services worldwide, given the industry's substantial resource consumption and contribution to greenhouse gas emissions. Healthcare facilities are responsible for approximately 4.4% of global greenhouse gas emissions, highlighting the urgent need for sustainability initiatives [1]. Recommendations for environmental sustainability encompass a broad spectrum of strategies aimed at reducing greenhouse gas emissions, including the optimisation of care delivery, supplier selection, and waste management practices [2].

In recent years, the healthcare sector has witnessed a significant surge in the use of single-use items, driven in part by the COVID-19 pandemic. The proliferation of personal protective equipment (PPE) during the pandemic has led to a substantial increase in medical waste generation, with some reports indicating up to a 350% rise [3]. Despite efforts to mitigate waste, a considerable portion of hospital waste remains hazardous, further exacerbating environmental concerns [4]. Notably, Australian health services contribute significantly to the nation's total carbon dioxide (CO₂) emissions, underscoring the urgency of addressing sustainability within this sector [4-6].

The paramount strategy for waste reduction lies in the elimination of low-value care, albeit necessitating significant behavioral shifts among healthcare professionals, policymakers, and consumers, as highlighted by Haddock [7]. In the interim, waste segregation stands as a pivotal measure, offering an immediate and tangible solution to mitigate waste generation. Waste streams in healthcare facilities encompass various materials, including metals, paper, and plastics, all of which possess potential for reuse or recycling. Guidelines advocate for the integration of reduce, reuse, and recycle principles, alongside robust segregation, and processing policies, to minimize the healthcare sector's carbon footprint [8-10].

However, the successful implementation of these strategies is contingent upon factors such as available services for waste management and the commitment of healthcare facilities to sustainability principles. The evolution of waste segregation practices and the availability of carbon-neutral alternatives offer promising avenues for enhancing environmental sustainability in healthcare. Suppliers play a crucial role in providing financially viable and environmentally friendly solutions, including biodegradable and compostable products [11,12].

Internationally, certification standards for industrially compostable products exist, allowing suppliers to affix specific logos only upon independent certification. Products meeting compost ability criteria according to European (EN 13432), USA (ASTM D6400 / D6868), or Australian (AS-5810 and AS-4736) standards boast internationally recognized certifications, although with slight variations. For instance, the Seedling logo, owned by European Bioplastics and employed in Europe, Australia, and New Zealand, signifies independent certification, and assures compliance with compost ability criteria [13,14]. Similarly, in the United States of America (USA), the Biodegradable Products Institute (BPI) certifies compostable products against the ASTM D6400 standard and features its own BPI compostable logo [15].

Informed decision-making regarding the selection of consumables and equipment is paramount for reducing the environmental impact of healthcare operations. Assessing the carbon footprint (CFP) of products through life cycle assessments (LCAs) or product environmental footprint (PEF) evaluations enables healthcare facilities to make more sustainable procurement choices [11-13]. Additionally, considerations such as resource usage, recyclability, and transportation logistics should inform supplier selection processes [8,9,16,17].

Despite the availability of resources and guidelines promoting environmental sustainability in healthcare [17,18]. Practical implementation often faces challenges such as space limitations, staff engagement issues, and inadequate waste management infrastructure. Consequently, there is a critical need for ongoing efforts to assess and improve environmental sustainability practices within healthcare facilities.

This manuscript presents the findings of a survey aimed at establishing a baseline of the current state of environmental sustainability practices in gastrointestinal endoscopy and perianaesthesia departments in Australian and New Zealand hospitals as perceived by perianaesthesia and gastrointestinal endoscopy nurses. By identifying key focus areas and challenges, the survey results provide information for future initiatives aimed at advancing environmental sustainability within these healthcare settings.

Materials and Methods

A survey on environmental sustainability was devised jointly by the Australasian College of Perianaesthesia Nurses (ACPAN) and the Gastroenterological Nurses' College of Australasia (GENCA) to ascertain the status concerning waste management, potential barriers, hospital engagement, and staff involvement. The survey encompassed five demographic inquiries, 38 inquiries about environmental sustainability rated on five-point Likert scales, and one open-ended question for additional comments. It was disseminated among 647 ACPAN members and an estimated 1395 GENCA members functioning within gastrointestinal endoscopy units or peri-anaesthesia environments.

During October 2023, the survey was distributed via email to GENCA and ACPAN members across Australia and New Zealand, with a six-week window for completion. Two subsequent email reminders were dispatched to facilitate participation.

Statistical analysis

Data acquired were processed and analysed employing a specialised statistical software package (IBM® Statistical Package for the Social Sciences, SPSS® 27.0, Armonk, New York, USA). Descriptive analysis was employed for categorical data, presented as counts and percentages, while Pearson correlation was utilized to explore any associations between variables. Statistical significance was deemed present when the P value was less than .05.

Results

The survey yielded responses from a total of 98 participants, comprising 41 from GENCA and 57 from ACPAN. These individuals were affiliated with 88 separate departments across 75 hospitals in Australia, 4 in New Zealand, and 2 with undisclosed locations. There were 60 departments with 1-10 operating theatres/procedure rooms, 23 between 11 and 20, and 5 had more than 20. Forty-two departments had 1-10 recovery bays, 32 had between 11-20 bays, and 14 departments had more than 20. Among the respondents, 61 were based in metropolitan areas, 17 in regional areas, and 14 in rural or remote settings. The distribution of respondents across various departments included 36 in post-anaesthesia care units (PACU), 33 in anaesthesia, 29 in endoscopy, 26 in operating theatres, 25 in day surgery, 9 in sterilisation departments, and one in a Catheter Laboratory, with the latter excluded from further analysis due to misalignment with the survey's focus.

Only 5% of the hospitals were affiliated with the Global Green and Healthy Hospitals Network (Health Care Without Harm), with negligible representation in the GESA/GENCA sustainability network. Additionally, 9% were part of the ANZCA network, and 1% were affiliated with another environmental sustainability

network. Over half, 58% of hospitals boasted a "sustainability" or "green" committee and 72% of departments had team members actively participating, with a positive correlation observed between the number of theatres/procedure rooms and the presence of a hospital sustainability committee ($p < 0.01$) and membership thereof ($p < 0.05$) (Table 1 and Table 2).

Regarding environmentally sustainable water utilization, the use of grey and black water was very limited. However, 23% of respondents confirmed the use of environmentally friendly energy resources (e.g., wind, water, sun) in their hospitals and waste segregation took place in some degree in most hospitals (Table 2). Among hospitals that had implemented waste segregation, only 4% received rebates. Waste segregation at the hospital level exhibited a positive correlation with knowledge about different waste segregation options ($p < 0.01$) and waste treatment options ($p < 0.01$) (Table 1).

Apart from mandatory segregation of clinical, cytotoxic, and sharps waste, 91% of departments segregated other waste streams, including paper/cardboard (59%), batteries (34%), hard plastic (32%), PVC (26%), medication/drugs (22%), soft plastics, commingled, and polypropylene wrap (blue or steri wrap) (18%), food (7%), stainless steel and compostable (6%), copper (3%), and other materials (9%). The majority of the departments reported the use of biodegradable items, but compostable items were utilized by less than half of the departments (Table 2). The use of compostable items correlated negatively with the number of theatres/procedure rooms ($p < 0.01$) and recovery bays ($p < 0.05$), as well as with the presence of a hospital "green" committee ($p < 0.01$) and staff membership therein ($p < 0.05$) (Table 1).

Only 35% of respondents reported using an environmentally friendly solution for medication/drug disposal, with a positive correlation observed with waste segregation at the hospital level ($p < 0.05$) (Table 1). The utilization of inhalational anaesthetics varied, with 5 departments abstaining from their use. Among those using these anaesthetics, sevoflurane was most prevalent (92%), followed by nitrous oxide (84%), desflurane (45%), and isoflurane (15%). Notably, the use of inhalational anaesthetics correlated negatively with knowledge about waste treatment options ($p < 0.05$) (Table 1).

Tables 3 and Table 4 enumerate environmentally sustainable considerations in the decision-making process for selecting new consumables and provide an overview of biodegradable and compostable items used in departments, respectively. Levels of engagement and compliance in waste segregation varied among healthcare professionals but not significantly. PACU nurses had the highest engagement $M = 3.21(1.18)$ and compliance scores $M = 4.05(1.36)$ and medical the lowest, respectively $M = 2.55(1.04)$ and $M = 3.27(1.34)$ (Table 5).

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The majority of respondents (93%) expressed low confidence in their knowledge regarding waste streams and their treatments, with only a small fraction (7%) claiming full confidence.

Twenty-four percent of respondents were aware that The Australian Commission on Safety and Quality in Health Care (ACSQHC) would publish a Sustainable Healthcare Module in 2024. As the latter will be voluntary as part of hospital accreditation, the researchers asked the participants whether they thought their department would use the ACSQHC module to improve their environmental sustainability in their department, with 31% confirming they would (Table 2).

Awareness of the upcoming Sustainable Healthcare Module by the ACSQHC in 2024 correlated positively with knowledge about different waste segregation options ($p < 0.01$) and treatment options ($p < 0.05$) (Table 1).

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Rooms	1													
2. Bays	.76**	1												
3. Inhalation agents	0.19	.31**	1											
4. Segregation hospital waste	-0.03	-0.17	-0.1	1										
5. Segregation department waste	0.18	0	0.09	.24*	1									
6. Use biodegradables	-0.11	0.02	0.04	0.09	0.17	1								
7. Use compostables	-.30**	-.22*	-0.02	0.08	0.16	.34**	1							
8. Segregated drug waste	-0.09	-0.12	-0.1	.25*	0.08	0.13	0.01	1						
9. Procurement	-0.17	-0.07	-0.04	0.13	0.04	0.2	0.12	0.11	1					
10. Green hospital committee	.30**	.21*	-0.03	0.09	0.01	-.27**	-.35**	0.1	-0.06	1				
11. Green committee member	.22*	0.17	0.11	0.14	0	-0.2	-.27*	0.06	-0.02	.67**	1			
12. Aware ACSQHC module	-0.04	0.05	0.14	0.14	0.08	-0.07	-0.17	-0.09	0.01	0.02	-0.01	1		
13. Use ACSQHC module	0.09	0.14	-0.06	0.2	.21*	0.09	0.07	.25*	0.08	0.11	0.09	.28**	1	
14. Knowledge segregation	0.09	-0.03	-0.17	.47**	.36**	0.19	-0.07	0.19	0.2	0.11	0.15	.30**	.34**	1
15. Knowledge treatment	-0.18	-0.19	-.27*	.28**	0.17	0.2	-0.1	0.06	.22*	-0.16	-0.12	.24*	0.1	.63**

** Correlation is significant at the 0.01 level (2-tailed)

* Correlation is significant at the 0.05 level (2-tailed).

Table 1: Pearson Correlation between variables: number of operating theatres/procedure rooms (rooms), number of recovery bays (bays), usage of inhalation anaesthetics (inhalation agents), waste segregation practice at hospital level (segregation hospital waste), waste segregation at department/unit level (segregation department waste), use of biodegradable items in the department (use biodegradables), use of compostable items in department (use compostables), segregation of medicine/drug waste (segregation drug waste), Environmental sustainability applied in procurement decision-making process (Procurement), hospital has a “green” committee (Green hospital committee), a team member of the department is member of the hospital’s “green” committee (Green committee member), awareness of the ACSQHC sustainability module (Aware ACSQHC module), participants will use the ACSQHC sustainability module to improve knowledge (Use module), Knowledge about different waste segregation options (Knowledge segregation), knowledge about the treatment of the different waste streams (Knowledge treatment).

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	Yes	No	Not aware
Hospital membership environmental sustainability network	12	13	73
Green Committee in hospital	56	24	20
Department member of Green Committee	40	60	0
Waste segregation at organisational level	83	5	12
Waste segregation at department level	89	9	2
Electricity obtained from wind, water, sun	25	43	32
Use of grey water	3	46	51
Use of black water	0	57	43
Use of biodegradable items	56	23	21
Use of compostable items	44	29	27
Rebates received for waste collection	4	23	73
Rebates included in department's budget	0	19	81
Awareness ACSQHC module	23	77	0
Use of ACSQHC module	32	6	62

Table 2: Practices as perceived by the participants.

Characteristics new consumable	% of departments
No considerations	22
Re-usable	43
Recyclable	38
Biodegradable	30
Compostable	31
Not known	30
Selection of supplier	% of departments
No considerations	34
Delivery travel distance	10
Sustainability profile of the supplier	20
Production with sustainable resources	14
Not known	44

Table 3: Environmentally sustainable considerations when selecting new consumables.

	Biodegradable (%)	Compostable (%)
Cups	39	17
Kidney dishes	27	23
Denture cups	23	9
Gowns	8	5
Aprons	6	3
Gloves	8	3
Bin liners	11	2

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Cleaning or detergent wipes	7	5
Trays	16	11
Absorbent pads	13	9
Others	7	9

Table 4: Percentage of departments that use biodegradable or compostable items

Healthcare professionals	Engagement	Compliance
	M (SD)	M (SD)
PACU nurse	3.21 (1.18)	4.05 (1.36)
Nurse Anaesthetists	3.09 (1.11)	3.97 (1.33)
Scout nurse	3.04 (1.24)	3.89 (1.45)
Endoscopy nurse	2.97 (1.16)	3.93 (1.33)
Physician anaesthetist	2.95 (1.11)	3.75 (1.29)
Porterage/cleaners	2.82 (1.12)	3.70 (1.43)
Medical (surgeon/proceduralist)	2.55 (1.04)	3.27 (1.34)

Table 5: Engagement and Compliance scores of the different healthcare professional groups (1= poor, 2=fair, 3=average, 4=good, 5=excellent).

Reasons for the limited implementation of waste streams in departments are elaborated in Table 6, while respondents highlighted several factors influencing environmental sustainability, including important disablers and enablers.

	% of respondents
Lack of understanding	39
Not enough space for bins	38
Staff not interested	27
Not a priority	25
The hospital does not offer the option	25
Takes too much time	21
Not aware of possibilities	20
No capacity to introduce	14
Too expensive to introduce	8

Table 6: Reasons for not implementing waste segregation in the unit/department.

Discussion

These survey results provide an initial exploration of the current knowledge and attitudes of perianaesthesia and gastrointestinal endoscopy nurses regarding waste management practices in high-flow, high-waste areas such as theatres, endoscopy units, and recovery rooms-locations notorious for generating substantial waste in healthcare settings.

Assessment of waste segregation compliance levels revealed that the majority of team members exhibited adherence rates of 50% or lower, indicating suboptimal engagement across various healthcare professional roles. Notably, nurses, particularly those in anaesthesia, demonstrated higher levels of engagement compared to physicians, with porters and cleaners exhibiting relatively lower levels of involvement. Similarly, Meyer et al. [19] noted that only 43% of surveyed surgeons recognized immediate opportunities for reducing surgical waste.

In our study, it was observed that none of the departments where our respondents worked, received any incentives or rewards to encourage the initiation of environmentally sustainable practices. Previous research has indicated that incentivizing green solutions can serve as a significant motivator for the workforce to embrace environmentally sustainable practices [4,20,21].

Several barriers were identified that hindered the adoption of environmentally sustainable solutions. Practical concerns regarding the allocation of additional space for accommodating various waste segregation bins, as well as the time required for waste segregation, were commonly cited. Additionally, factors such as lack of education and direction from higher management were noted as important barriers.

Not only is the importance of engagement and commitment by senior management confirmed by our study and highlighted by others [22,23], but there has been previously noted an association between gender-diverse health executive boards, and enhanced compliance and sustainability performance [22]. This suggests that diverse leadership structures may contribute to fostering a culture of environmental responsibility and adherence to sustainable practices within healthcare organizations.

Furthermore, negative feedback during the initiation phase and poor compliance from colleagues can lead to demotivation among staff, particularly if they perceive that their efforts in waste segregation are not yielding meaningful outcomes. Moreover, smaller, and regional hospitals may face limitations in waste stream options due to their location or may struggle to generate sufficient waste volume to justify the financial feasibility of waste collection. Additionally, initiatives may encounter challenges if hospitals are part of larger healthcare organizations and are bound by their procedures. Lastly, potentially higher costs associated with biodegradable and compostable items compared to non-environmentally friendly alternatives present a barrier to switching to more sustainable options. Similar obstacles have been reported in previous studies, including issues related to bin placement, increased workload due to segregation tasks, insufficient knowledge and incentives, absence of effective leadership, inadequate data, negative staff attitudes, resistance to change, and cost considerations [24-29].

Fortunately, respondents offered a plethora of ideas to facilitate waste segregation initiatives which were confirmed by others [20,28]. For instance, changes to waste disposal processes, the size of waste bins, informative posters addressing waste reduction and waste stream options, prevent the unnecessary opening of items, offering incentives for the use of soon-to-expire equipment, and implementing energy-saving measures such as light sensors, timers, and motion sensor lighting. Moreover, respondents proposed various environmental sustainability initiatives mainly based on the reuse of resources in creative manners, setting benchmarks and

audit e.g., the use of inhalation anaesthetics. The importance of management support and procurement assistance was emphasized.

In the context of consumable selection, our survey findings revealed that merely a third of the departments integrated environmentally sustainable considerations into their procurement processes for new consumables. This lack of awareness concerning procurement cannot be solely attributed to healthcare professionals (HCPs).

The terminology surrounding environmentally sustainable products often proves confusing and misleading, while labelling practices exhibit variability and further obfuscation. Regrettably, the proliferation of counterfeit logos by certain companies complicates matters, making it arduous for HCPs to discern between officially recognized logos and similar, albeit fraudulent ones. Although respondents provided information on the biodegradability and composability of various products, it would be worthwhile to validate these assessments following targeted education on the criteria for classifying products into these categories. Many products may initially appear to meet these criteria but may contain plastics that render them impermeable to liquids, thereby making them non-compostable or only partially compostable. Without regulations for logos proclaiming sustainable production, 'greenwashing' occurs. Such instances contribute to the proliferation of micro plastics that pose significant harm to the environment.

Procurement selection processes should entail a comprehensive evaluation encompassing energy efficiency, environmental impact, safety considerations, and quality standards for all quoted equipment and consumables. Although not presently mandated, transparent disclosure by suppliers regarding their environmental sustainability commitments and practices would significantly enhance the process of supplier selection. Our survey respondents expressed positive attitudes toward the introduction of national standards applicable to both healthcare facilities and suppliers. Additionally, there was a noted demand for a centralized resource that consolidates information on environmentally sustainable healthcare products. Such a resource could serve as an initial point of reference for evaluating new or alternative products and should ideally become a desirable platform for featured suppliers.

The adoption of compostable items was more pronounced in smaller departments and hospitals lacking a dedicated "Green" committee. This phenomenon may stem from the intricacies involved in recognizing compostable products, bureaucratic hurdles, and the accessibility of companies facilitating waste streams of this nature.

Gasciauskaite et al. [30] identified the choice of anaesthetics as the most critical factor in anaesthetists' efforts toward environmental sustainability, with a preference for intravenous anaesthesia over inhalation anaesthetics. Our study corroborated this finding,

revealing that some hospitals have phased out desflurane (55%) and nitrous oxide (16%). Desflurane and nitrous oxide are known to emit significantly higher levels of carbon dioxide compared to gases like sevoflurane and isoflurane, highlighting the importance of discouraging the use of inhalation gases with enduring environmental impacts [31]. Intravenous anaesthesia, often employing propofol, presents an alternative. While propofol does not emit greenhouse gases, its production involves soybean oil and the use of ampoules or vials, contributing to its environmental footprint, and propofol poses a significant toxic threat to aquatic life [31,32].

Therefore, it is advisable to dispose of propofol in specific bins designated for incineration. Regrettably, our study indicates that only a third of hospitals have adopted environmentally friendly methods for the disposal of medication/drugs.

The average levels of engagement and compliance among personnel underscore the pressing need for a comprehensive overhaul in staff education. It is imperative to equip all team members with a thorough understanding of the risks associated with contaminating clean waste with dirty waste, which renders entire containers or loads non-recyclable, ultimately destined for landfill. Responses indicated a deficiency in understanding, awareness of available options, and supplier involvement, underscoring the necessity for education and exposure to concepts aimed at reducing the carbon footprint in healthcare. Consistent with findings from various studies, our research underscores the critical role of education in promoting environmental sustainability and enhancing waste segregation practices [26,30,33].

Prioritising waste segregation training is essential and can yield significant benefits in terms of compliance, particularly concerning sharps waste bins, and substantial cost savings. Additional strategies to enhance waste segregation include conducting regular waste audit [24, 25, 27-29, 33-35].

Ho et al. [27] surveyed HCPs working in endoscopy units regarding the concept of Green Endoscopy [36]. They found widespread acceptance of the concept, particularly regarding waste segregation, albeit with limited implementation. Their findings highlight a robust correlation between understanding and acceptance, further emphasizing the pivotal role of education in driving change [7, 27].

The survey faced several limitations. Despite there being 535 public and 587 private hospitals in Australia (excluding psychiatric hospitals), we only received input from 88 hospitals, representing a mere 8% of the total. This may reflect the level of knowledge and consequently confidence to complete a survey related to waste segregation. However, it is noted that some private hospitals belong to the same provider and often adopt similar practices across all their

facilities. Additionally, the dissemination of the survey through GENCA and ACPAN members may have inadvertently excluded other interested parties. Furthermore, our survey results were not verified on-site and solely reflect the individual knowledge and perceptions of anaesthesia or gastroenterology nurses working in endoscopy suites or operating theatres within public and private hospitals. It is recommended that a similar survey be repeated subsequent to the provision of comprehensive education and access to guidelines for implementing a reduce, recycle, and reuse program. This iterative approach will allow for a more informed and nuanced understanding of waste management practices among healthcare professionals.

Conclusion

This survey highlights the ongoing need for comprehensive education for all staff members and the imperative to bolster engagement, particularly among physicians, as evidenced by its inadequacy in our findings. While change processes are often successful when initiated from the bottom-up, the support and involvement of higher management are crucial for success, given the challenges in establishing certain enablers at the unit or departmental level. Education and staff involvement are paramount in driving commitment towards achieving optimal environmental outcomes. Urgently needed is the introduction of mandatory requirements for labelling practices of environmentally sustainable equipment and consumables, a national framework and practical pathway to facilitate the implementation of segregated waste streams in hospitals, irrespective of their scale or location. Such measures would address the aforementioned challenges, reduce ambiguity in outcomes, and enhance transparency in the delivery of sustainable healthcare services in endoscopy sites, operating rooms, and post-anaesthesia care units.

Declaration of interest

The authors declare that they have no conflicts of interest.

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