Redefining sustainability in healthcare

A holistic approach to medical technology assessment

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Executive summary

Ensuring the long-term sustainability and resilience of healthcare systems is a shared priority across Europe. As the sector faces increasing complexity, resource constraints and environmental challenges, there is a growing need for a more holistic and harmonised approach to evaluating the sustainability of medical technologies. This paper argues that sustainability assessments must go beyond narrow environmental metrics and instead integrate environmental, human and economic impacts across the entire life cycle of medical technologies and patient pathways.

Current evaluation practices are fragmented and often rely on incomplete or poor-quality data, limiting the ability of healthcare providers and policymakers to make informed, evidence-based decisions. In particular, overreliance on life cycle assessments that focus solely on greenhouse gas emissions can lead to unintended consequences, including risks to patient and staff safety, increased strain on healthcare professionals and overlooked economic costs.

This paper calls for the development of a common European framework for sustainability assessment that supports consistent, transparent and data-driven decision-making. It outlines foundational elements for such a framework, including the need for improved data sharing, collaborative mechanisms, capacity-building for procurement professionals and the integration of sustainability into value-based healthcare models. By adopting a holistic approach, stakeholders can ensure that sustainability efforts enhance patient outcomes, workforce wellbeing and the resilience of healthcare systems.

1. Introduction

An overarching priority in improving healthcare systems is the need to make them more sustainable and future-proof while fostering access to innovation for patients. In this context, the three pillars of sustainability — environmental, human and economic — should serve as guiding principles in efforts to enhance patient-centric care, tackle emerging health threats and address healthcare workforce shortages while reducing the sector's environmental footprint.

While the demands on healthcare providers have become increasingly complex and resource-intensive in recent years, opportunities to strengthen the healthcare systems and their resilience are also expanding. With the development of the European Health Union and joint actions in areas ranging from the digitalisation of healthcare to tackling cancer and preparing for future threats, a common European approach and better coordination at the EU level are increasingly recognised as essential to addressing the healthcare demands facing Europeans[1]. However, despite this growing convergence at the EU level, there is still room for improvement — particularly in critical areas such as sustainability assessment, where approaches remain fragmented and unaligned across Member States.

A unified approach to assessing sustainability should explicitly include medical technologies, as these solutions can support healthcare professionals in delivering high-quality care, improve patient outcomes and contribute to the resilience of health systems. Ensuring access to such innovations also fosters the development of a dynamic, patient-oriented medical industry, better equipped to meet evolving healthcare needs.

In the absence of harmonised frameworks to assess the overall environmental, human and economic impacts, healthcare providers have limited options and often rely on inconsistent evaluation tools with incomplete and poor-quality data.

The focus of this paper — medical technology sustainability evaluation — is a case in point, highlighting how an overreliance on a single set of considerations and metrics, combined with the absence of a holistic approach and shared perspective, can impede evidence-based decision-making and potentially lead to unintended or even negative outcomes.

The path towards improving sustainability in healthcare from an environmental perspective has been largely defined by the EU's goal to reach net zero emissions by 2050, driven by the Green Deal[2], presenting both opportunities and challenges for the healthcare sector. Initiatives such as the Circular Economy Action Plan have led healthcare providers to rethink their sustainability practices across various areas, from waste management and hazardous materials handling to procurement criteria and use of medical devices.

While these efforts have advanced sustainability and circularity in some areas of healthcare, they have also led to decision-making trends that lack sufficient evidence in others.

Currently, approaches to evaluating medical technology sustainability are fragmented across Europe. As healthcare providers face growing pressures to reduce greenhouse gas emissions and waste, they often rely on life cycle assessments to guide decisions to minimise their environmental footprint. However, these assessments are frequently based on insufficient evidence, relying on assumptions and averaged data that do not consider the specificities of medical technologies and the healthcare setting[3,4]. They focus mainly on the greenhouse gas emissions of individual devices, overlooking broader considerations throughout the entire life cycle of medical technologies and patient pathways.

These gaps can be seen in several published life cycle assessments[5,6,7], which do not account for all relevant environmental impacts. These impacts include water and chemical use, pollution and wastewater contamination associated with medical devices and their reprocessing. Moreover, human and economic impacts – such as patient safety risks, staff wellbeing, device maintenance and costs associated with adverse events - are often overlooked in the overall evaluations[8]. In addition, existing assessments are rarely comparable to one another due to a lack of a consistent and sufficiently stringent methodology to allow for comparison.

When decision-making is fragmented and not fully informed, it could pose risks to patient and healthcare practitioner safety while also contributing to emerging challenges. For example, lack of consideration for hospital wastewater may contribute to antimicrobial resistance (AMR) development[9], while growing water demand in hospital environments can contribute to water scarcity[10].

This paper argues that a holistic, data-driven approach, supported by a harmonised framework, is essential for assessing sustainability in medical technologies. A sustainability evaluation that goes beyond life cycle assessment, incorporating relevant impacts and consistent and stringent criteria, would help drive genuine progress toward sustainability goals while maintaining safety and quality of care.

A holistic approach should:

Integrate environmental, human and economic impacts across the entire value chain.

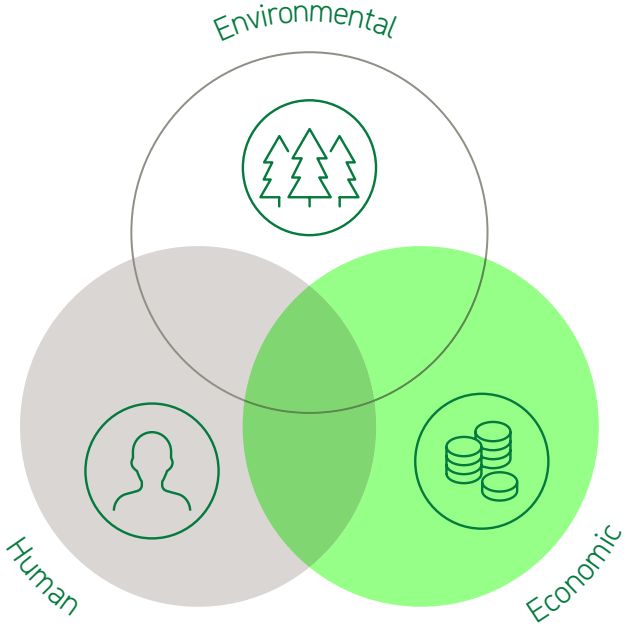
Prioritise the safety and wellbeing of patients and healthcare practitioners.

Preserve patient-centric care and consider the importance of innovation in healthcare.

In the following chapters, this paper proposes foundational elements for a holistic and evidence-based approach to assessing sustainability in healthcare settings. Aiming to guide discussions toward a common understanding of key criteria and parameters, we present recent research on environmental, human and economic impacts. The paper concludes with recommendations for policymakers and stakeholders aimed at reducing fragmentation and moving towards a common European framework for medical technology sustainability evaluation.

2. Environmental, human and economic impacts

Advancing sustainability goals in healthcare while prioritising patient outcomes and ensuring safety requires a holistic approach that considers all relevant environmental, human and economic impacts. This chapter examines impacts and considerations often overlooked in existing assessments, providing a basis for discussions on what a more comprehensive, data-driven sustainability evaluation should entail.



Environmental impacts

This section explores key environmental impacts, highlighting considerations that are inadequately studied or not always taken into account when assessing the environmental impact of different medical devices.

Greenhouse gas emissions

Globally, healthcare systems are estimated to contribute approximately 4.4% of total greenhouse gas emissions[11], highlighting the need for all stakeholders — including governance bodies, hospital management and medical device manufacturers — to work together in understanding the full spectrum of emissions across the healthcare system and in mitigating their impact through evidence-based decision-making.

When it comes to medical technology evaluation, the currently available sustainability assessment tools, such as life cycle assessments, focus on the emissions of individual devices while overlooking emissions from the healthcare-specific life cycle, including device manufacturing processes, packaging and transport, as well as device reprocessing activities[12]. The available data on the share of greenhouse gas emissions associated with the entire life cycle of medical technologies is limited and requires further research. However, some starting points exist regarding their share of emissions in operating rooms, which are the most energy-intensive areas of hospitals. A one-year study conducted across three academic hospitals in Canada, the US and the UK revealed that 80-88% of greenhouse gas emissions in operating rooms stem from energy consumption and anaesthetic gases, with the remaining 12-20% being linked to supply chain impacts and waste[13]. Notably, no more than 4% of operating room emissions per surgical procedure were linked to the disposal of waste materials and equipment[14].

A more holistic and evidence-based approach to sustainability evaluation should include considerations of greenhouse gas emissions throughout the entire healthcare-specific device life cycle.

Waste

Waste from healthcare facilities is estimated to make up 1–2% of total urban solid waste, with 85% of it consisting of non-hazardous materials such as cardboard, packaging and food waste[15].

To gain an accurate picture of waste in healthcare facilities and inform footprint reduction measures, it is essential to thoroughly assess waste generated by medical technologies—both inside and outside the operating room. However, existing assessments rarely consider waste generated outside the operating room, particularly during the device reprocessing activities.

Waste generated by reprocessing activities includes a wide range of single-use components, in addition to transport containers and packaging. For example, reprocessing endoscopes requires cleaning kits, including cloths, detergents, brushes, valves and wipes and personal protective equipment (PPE) materials such as hair covers, face shields, scrubs and gloves. Additionally, various test kits and swabs are needed for re-validation, along with materials for drying and storage, such as towels, syringes and labels[16].

Sustainability assessments should, therefore, consider all waste generated throughout the life cycle of medical technologies, including during their reprocessing.

Water resources

Water scarcity affects 34% of EU territory and climate change is expected to intensify the frequency and severity of droughts in the coming years[17]. Water scarcity occurs when water demand frequently exceeds the available supply in river basins or when pollution reduces the availability of clean water[18]. Droughts and water scarcity can have a wide range of environmental, social and economic impacts. These include deteriorating air quality, wildfires, crop loss, food insecurity, increased risks of food-, water- and vector-borne diseases and other consequences[19]. As a result, sustainable water use and management are increasingly recognised as environmental priorities.

Available data on the healthcare sector's share of water use in the EU is limited. In the United States, water use in healthcare facilities accounts for 7% of the total water consumption in commercial and institutional facilities[20]. In the UK, the National Health Service (NHS) is considered to be one of the largest consumers of water, using between 40 and 50 billion cubic litres annually[21].

When it comes to medical technologies, water use can vary among devices designed for the same purpose. For instance, research suggests that replacing single-use medical devices with multiple-use ones significantly increase water consumption[22]. The increase is attributed to the higher water demand required for extensive cleaning activities and sterilisation processes after every use. This links to a considerable environmental impact, as the increased water consumption places additional strain on local water resources.

At the same time, water quality is crucial for certain medical devices. Insufficient water quality may lead to breakage of reprocessing equipment, reduced detergent effectiveness and buildup of deposits on devices, damaging their passive layer and increasing the risk of microbial contamination[23]. Therefore, the quality of water used in healthcare facilities should be taken into account when assessing the sustainability of medical devices in cases where it applies.

Wastewater pollution

Urban wastewater can be one of the main sources of water pollution if it is discharged into natural water bodies without adequate treatment to remove harmful contaminants, such as bacteria, viruses and chemicals. Since the adoption of the EU's Urban Wastewater Treatment Directive in 1991, major improvements have been achieved in the collection and treatment of urban wastewater, significantly reducing the discharge of harmful pollutants[24].

Despite notable progress, challenges remain, including in hospital wastewater management. The recent revision of the EU's Urban Wastewater Treatment Directive highlights the limited understanding of water pollution from non-domestic establishments, such as 'hospitals and other medical facilities' and their impact on the deterioration of the treatment process, pollution of receiving waters and the reuse of treated wastewater. This is, at least in part, due to the presence of pollutants in such wastewater that fell outside the scope of the Directive[25].

Hospital wastewater can contain significantly higher levels of toxic compounds compared to municipal wastewater, including pharmaceuticals and their metabolites, sterilisation products, specialised detergents for medical devices and metals found in diagnostic agents[26]. Additionally, hospital wastewater contains higher levels of antimicrobial resistance determinants compared to domestic wastewater[27]. However, it is sometimes treated in the same treatment plants as municipal wastewater or discharged without adequate and effective pre-treatment[28].

Medical devices can contribute to wastewater pollution. For instance, the reprocessing activities of reusable devices generate wastewater that contains chemicals, cleaning agent residues, biocides and pathogens, which may harm the natural ecosystem[29].

Sustainability assessments should consider the impact that different medical technologies may have on wastewater contamination, particularly when wastewater treatment systems are not adequately adapted to manage increased toxicity.

Human impacts

Human impacts are a key element to consider in sustainability evaluation, encompassing patient safety risks, healthcare workforce wellbeing and influence on the development of antimicrobial resistance (AMR).

Antimicrobial resistance

Antimicrobial resistance has been declared one of the top ten global public health threats by the World Health Organisation. Drug-resistant infections are already estimated to cause at least 700,000 deaths worldwide each year, a number projected to increase up to 10 million annually by 2050 if current trends continue[30].

Addressing antimicrobial resistance requires a comprehensive strategy incorporating robust infection prevention and control measures, as efforts to tackle infections reduce the need for antibiotics and help slow the development and spread of antimicrobial-resistant infections[31]. By lowering the incidence of infections, prevention strategies also decrease the overall demand for healthcare services, thereby reducing the environmental footprint associated with additional resource use.

Healthcare systems play a significant role in AMR emergence, with more than 81% of cases studied revealing hospital wastewater contains higher levels of antimicrobial resistance determinants compared to community wastewater[32]. Hospital wastewater contains resistant microorganisms, antimicrobial residues and other pollutants that amplify selection pressure on local microbial communities[33]. Over time, this process may facilitate the spread of difficult-to-treat infections[34].

However, wastewater is not the only relevant vector for AMR transmission. Recent studies have demonstrated that hospital-derived pathogens can also be found in external laundry facilities, vehicles and even on healthcare staff, forming additional transmission pathways into local communities beyond direct patient contact. For instance, clinical laundry facilities processing soiled hospital linens have been identified as potential reservoirs of AMR pathogens such as Clostridium difficile, methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant enterococci (VRE)[35]. These pathogens can persist on contaminated textiles and surfaces, raising concerns about infection control protocols within and beyond hospital environments[36].

Similarly, hospital transport vehicles that move patients or contaminated materials have been reported to carry resistant microorganisms, further highlighting the need for robust infection prevention measures across the entire healthcare ecosystem[37].

Medical technologies can inadvertently contribute to AMR in several ways. The reprocessing cycle of reusable medical devices – which includes cleaning, disinfection and sterilisation – generates a significant volume of wastewater that contains high concentrations of pathogens, antibiotic-resistance genes (ARGs) and antibiotic-resistance bacteria (ARB)[38]. Furthermore, if the reprocessing of reusable devices is inadequate or ineffective, resistant microorganisms may persist on these devices, increasing the risk of transmission within healthcare settings[39].

As highlighted by a 2020 study, ensuring medical devices are properly designed, adequately sterilised, maintained and stored is essential in preventing multidrug-resistant bacterial outbreaks in hospital settings[40].

Taking AMR considerations into account and recognising the interconnectedness of factors contributing to its development should be an essential element of sustainability assessments.

Workforce wellbeing

Healthcare systems globally are facing increasing strain due to persistent staff shortages and rising burnout rates, with recent reports estimating that over 50% of healthcare workers experience symptoms of burnout[41]. In this context, protecting the health and wellbeing of healthcare practitioners is a critical consideration.

The use of medical devices can also impact the wellbeing of the healthcare workforce. For instance, the routine reprocessing of medical devices adds complexity to their workload due to the numerous tasks involved. The device reprocessing cycle typically involves detailed cleaning, disinfection, packaging and sterilisation[42]. These tasks can be physically demanding and have been associated with musculoskeletal issues such as repetitive strain injuries[43]. One survey indicated that up to 30% of Central Sterile Services Department (CSSD)* nursing professionals had been placed in CSSD roles as a form of functional readaptation — yet many reported significant physical efforts associated with these tasks[44].

Beyond physical strain, operating room efficiency also plays a crucial role in the wellbeing of healthcare workers[45]. A recent study found that delays in OR turnover and scheduling inefficiencies significantly impact surgeon stress levels, potentially increasing the risk of burnout and impairing performance[46]. These disruptions can also negatively affect patient outcomes, including an increased likelihood of surgical complications and adverse events[47].

Additionally, healthcare-associated infections (HAIs) also play a significant role on wellbeing of healthcare staff. These not only increase patient load and prolong hospital stays but also intensify strain on already overstretched staff and hospital resources. Such pressures have been linked to higher staff turnover rates, which in turn are associated with increased patient mortality, especially in surgical and general medicine wards[48]. Sustainability assessments should consider the impact of activities associated with medical technologies on the health and wellbeing of the healthcare workforce. Further research could also improve understanding of how sustainability practices can be balanced with this critical aspect of healthcare services.

Safety: Healthcare-associated infections (HAIs)

Healthcare-associated infections (HAIs) pose a significant challenge to patient and healthcare staff safety across Europe. Each year, more than 4 million patients in EU/EEA hospitals acquire at least one HAI during their stay, leading to approximately 16 million additional hospital days and over 37,000 deaths annually[49]. Surgical site infections (SSIs) are among the most common HAIs, accounting for about 20% of all hospital-acquired infections[50].

Contaminated shared medical equipment is one of the primary routes for the transmission of infectious pathogens causing HAIs[51]. Recent findings from the CLEaning and Enhanced disiNfection (CLEEN) study revealed that dedicated cleaning time, training, auditing and feedback mechanisms across ten hospital wards resulted in a 34.5% reduction in HAIs[52]. A separate three-year study in England found that the surfaces of all 3000 examined reprocessed instruments harboured residual contamination[53].

These findings highlight the critical need for healthcare facilities to reassess infection prevention measures and continuously enhance reprocessing, cleaning and disinfection protocols to effectively minimise the risk of HAIs[54,55]. Sustainability assessments should include considerations for HAI transmission risks associated with medical technologies and measures to address them.

Safety: Medical device degradation

Risks to patients and healthcare practitioners include medical device degradation, which may sometimes occur before reaching its expected number of safe reuses, due to repeated reprocessing.

Reprocessing protocols that do not account for potential wear-and-tear could leave microdamage undetected, increasing contamination risks for patients[56]. Patients undergoing surgery or receiving critical care are particularly vulnerable to the risks associated with degraded medical devices. Even minor defects - such as microscopic fissures or surface degradation - can contain harmful pathogens, increasing the likelihood of post-procedural infections and complications[57]. Additionally, impaired functionality in medical devices may affect treatment efficacy, from surgical precision to the reliability of monitoring and diagnostic equipment, potentially leading to suboptimal patient outcomes[58]. Over time, minor surface defects can make instruments harder to clean or disinfect effectively, potentially contributing to pathogen survival in reprocessed devices[59].

Sustainability assessments should consider the risks associated with medical device degradation and the efforts required to mitigate them.

* CSSD refers to the Central Sterile Services Department, the hospital unit responsible for the decontamination, sterilisation and distribution of reusable medical devices and surgical instruments.

Economic impacts

This section examines economic impacts that are rarely considered in sustainability assessments but are essential for data-driven decision-making in healthcare settings.

Adverse events

Globally, the WHO estimates that the direct costs of patient harm in primary and ambulatory care settings — such as costs for additional tests and treatments—amount to at least 2.5% of total health expenditure. In OECD countries, patient harm experienced in these settings leads to more than 6% of hospital bed days and over 7 million admissions annually. Additionally, the social costs — referring to the broader economic impact on society, including reduced productivity and lost economic output — of patient harm are estimated to be between 1 and 2 trillion USD annually worldwide[60].

The European Commission estimates that 8-12% of patients admitted to hospitals in the EU experience adverse effects[61]. Recent OECD estimates suggest that approximately 12.6% of total health expenditure is spent on managing the consequences of unsafe care across all healthcare settings, with around 8.7% attributable to preventable adverse events[62]. The economic burden is significant, especially considering that around half of adverse events are preventable[63].

Patient safety risks associated with medical devices include adverse events that may result from device reprocessing and reuse failures. For example, inadequate cleaning or disinfection can lead to cross-contamination[64], increasing the risk of healthcare-associated infections — one of the leading causes of adverse events[65]. This results in significant costs for healthcare providers, including additional treatments, extended length of stay, litigation and reputational damage. Therefore, costs associated with patient safety risks should be considered when evaluating the sustainability of medical technologies.

Costs of device purchase

Device costs are a crucial consideration, requiring accurate data to make informed purchasing decisions. Currently, cost assessments in healthcare are based on data provided by technology providers regarding the average number of uses and the range of uses, indicating when failure is likely to occur[66]. However, evidence shows that reused devices can fail at the lower end of the range and need to be replaced sooner to avoid potential risks[67]. In addition, operating room delays due to unavailable or unsterilised sets contribute to the overall cost of reprocessed sets. A US study estimates that such delays occur in approximately one out of every 100 cases, resulting in significant additional costs[68]. Consequently, overall costs may be underestimated when based solely on average use assumptions. This highlights a gap in cost assessment practices and the need to improve data quality[69].

Costs of device use over the life cycle

When considering costs associated with the use of medical technologies, it is essential to calculate the full range of lifetime expenses. These include the costs of capital goods, transportation, chemicals for cleaning and sterilisation and end-of-life treatment, as well as labour costs relating to reprocessing activities, maintenance and repair, inspection and validation and inventory management.

Studies suggesting the economic efficiency of reusable medical devices over single-use products are often limited in terms of the lifetime costs considered. When a more comprehensive range of costs is taken into account, competing devices can be cost-comparable, or single-use devices may prove to be more cost-effective.

For example, a recent Italian study comparing single-use and reusable cystoscopes found that procedures performed with single-use devices resulted in per-procedure cost savings of 112.27 EUR when factoring in repair, reprocessing, labour and environmental costs. In addition to reduced repair and reprocessing costs, the study reported improved organisational efficiency: following continuous use of single-use endoscopes, procedures could be scheduled every 20 minutes instead of every 30 minutes, enabling up to 15 daily procedures within the same shift — compared to 10 with reusable devices[70]. This points to the need for a more comprehensive approach to calculating the costs of device use over its life cycle.

3. Case study: Improving efficiency and sustainability through Custom Surgical Procedure packs

Hospitals across Europe are continuously seeking ways to enhance surgical efficiency, reduce environmental impact and improve workforce wellbeing. Studies from Royal Liverpool & Broadgreen University Hospitals NHS Trust (RLBUH) and a multi-center evaluation in France, Sweden and Germany provide compelling evidence of the benefits of Custom Surgical Procedure packs (CSPs). CSPs are pre-assembled sets of sterile, single-use medical devices and supplies tailored to the specific needs of a surgical procedure.

At RLBUH, transitioning to procedure packs led to a 47% increase in knee replacement surgeries over six months, driven by reduced setup times and improved resource management[71]. Similarly, a large-scale study across France, Sweden and Germany found that CSPs reduced surgical preparation times by 40–59%, allowing for greater procedural throughput and improved operating room efficiency[72]. These operational gains translate into lower stress levels for surgical teams and reduced physical strain, as staff spend less time manually handling individual sterile instruments[73].

From an environmental perspective, CSPs significantly reduce waste and resource consumption. RLBUH reported a 90% reduction in packaging waste, eliminating 2.6 tonnes of material annually[74]. Similarly, the multi-country study found that CSPs reduced procedural waste by 60–96%, highlighting their role in minimising environmental impact[75].

The economic impact is equally significant. At RLBUH, CSPs resulted in annual cost savings of 175,000 GBP, largely due to reduced staff time and improved inventory management[76]. Meanwhile, hospitals in France and Germany saw procedure volume increase by up to 37%, allowing facilities to optimise resource utilisation and generate additional revenue[77]

These findings highlight how streamlined, single-use devices such as Custom Surgical Procedure packs can help reduce surgical waste and packaging materials, thereby supporting more environmentally sustainable practices in operating rooms.

4. Recommendations

We believe that policymakers, healthcare providers and the industry share responsibility for shaping sustainable healthcare that prioritises patient and staff wellbeing, enhances the resilience of healthcare systems and reduces the long-term environmental impact.

To achieve sustainable healthcare, we must move beyond fragmented decision-making in medical technology evaluation and embrace a holistic approach that considers all aspects of sustainability.

We call for:

1. Establishing a **common framework** for the sustainability assessment of medical technologies.

Establishing a harmonised European framework is an essential step in enabling a consistent and evidence-based approach to the sustainability evaluation of medical technologies. Currently available sustainability assessment tools are fragmented, often relying on incomplete and poor-quality data while overlooking the full spectrum of sustainability considerations throughout the life cycle of medical technologies and patient pathways.

A common framework should integrate considerations for all relevant impacts - environmental, human and economic - and consistently apply harmonised criteria and parameters. A unified framework would support more informed, evidence-based decision-making and harmonise sustainability metrics across hospitals in Europe, thereby enhancing knowledge sharing, facilitating research and supporting the development of best practices.

We call on the European Commission to initiate a pilot project to support evidence generation and data collection across the product life cycle, laying the groundwork for the development of a common sustainability assessment framework for medical technologies. This initiative should bring together national authorities, hospitals and healthcare providers, industry, HTA bodies, procurement authorities and patient representatives, ensuring the framework is collaborative and adaptable to the diverse healthcare systems and their needs across Europe. The pilot could be implemented through an existing EU funding programme, such as Horizon Europe, to ensure comprehensive data collection and test the framework in a real-world environment.

This would lay the groundwork for a practical and widely accepted methodology, ultimately supporting more transparent, consistent and sustainable approaches to the use of medical technologies across Europe.

2. Developing collaboration mechanisms that enable and encourage stakeholders to contribute data to ensure an **evidence-based understanding** of the environmental, social and economic impacts of each medical technology throughout its life cycle.

The lack of consistent and accessible data is a key challenge to shaping evidence-driven sustainability practices in healthcare. Establishing common data-sharing channels, alongside guidelines for data quality and transparency, could facilitate better understanding and decision-making.

To capture and assess data related to the sustainability of medical technologies, stakeholders such as healthcare providers and medical device manufacturers need a collaborative mechanism to facilitate data exchange. Incentivising stakeholders to contribute data based on harmonised criteria related to the different impacts of medical technologies could be a key step towards scaling a more holistic approach to sustainability evaluation across Europe.

We call for the inclusion of sustainability assessment components in future public-private research initiatives, such as the next Innovative Health Initiative (IHI) programme under the upcoming Multiannual Financial Framework. These platforms could serve as a vehicle for testing collaborative models, building shared data infrastructure and advancing common indicators for sustainability evaluation.

A more structured and incentivised approach to data sharing will help fill existing knowledge gaps, improve the quality and availability of sustainability data and support the development and implementation of a unified framework for the sustainability assessment of medical technologies.

In addition, the information collected could help inform further research where data is limited or fragmented, filling knowledge gaps and contributing to the development of future guidelines and practices.

3. Providing training and sharing best practices to help procurement professionals and hospital managers in **adopting holistic evaluation methods**.

The adoption of a holistic approach to sustainability evaluation requires appropriate training and support for procurement professionals and hospital managers. Ensuring that those responsible for evaluating medical technologies are equipped with the right tools to comprehensively assess environmental, human and economic impacts is crucial to embedding a holistic approach to sustainability across the system.

Tailored training and capacity-building programmes can help procurement teams understand and apply holistic sustainability criteria in a consistent and informed manner. These should be complemented by opportunities to share practical knowledge and lessons learned from across Member States, supporting the uptake of successful models and practices.

We call for the establishment of capacity-building and best practice sharing and training initiatives, coordinated by the European Commission and Member States, collaborating with networks active in innovation procurement and sustainability and integrating with relevant projects.

In light of the revision of the EU Public Procurement Directive, it is important to strengthen the capacity of healthcare procurers to integrate holistic sustainability criteria into their procurement decisions.

European associations focused on healthcare procurement provide a solid foundation to expand collaboration, facilitate peer exchange and deliver targeted training activities. Additionally, projects like InnoHSupport are dedicated to enhancing the ability of healthcare procurers to adopt innovative and sustainable solutions through collaboration between public and private stakeholders.

Such efforts would promote more consistent implementation of sustainability evaluation methods in healthcare procurement, contributing to the broader goal of resilient, efficient and patient-centred health systems.

4. Recognising the **wellbeing**, **working conditions** and **retention** of healthcare practitioners as fundamental to the resilience of healthcare systems and promoting best practices to meet their needs.

In light of the growing shortage of healthcare professionals, combined with high levels of stress and the risk of burnout they face, any healthcare sustainability initiative must prioritise improving their working conditions, as healthcare workforce retention is crucial to the resilience of healthcare systems.

For medical technology sustainability evaluation, workforce wellbeing aspects could be incorporated by considering how the use of specific medical technologies affects daily workload, physical and mental strain, safety and the ability of healthcare professionals to focus on patient care.

Recognising that working conditions directly affect both the capacity of healthcare systems and patient outcomes, it is essential to support the development and uptake of best practices that improve healthcare workforce wellbeing. Existing initiatives — such as the WHO Europe Nursing Workforce Project, the EU Pact for Skills in the health sector and the BeWell project on green and digital upskilling — demonstrate the importance of cross-sector collaboration in addressing healthcare workforce challenges.

We call on the European Commission and Member States to integrate workforce wellbeing indicators into medical technology sustainability assessments and to promote knowledge exchange by supporting EU-wide initiatives that engage professional associations, hospital managers and procurement stakeholders.

5. Promoting the transition from traditional price-based purchasing and tendering models to **value-based healthcare as a key enabler** of sustainable healthcare, ensuring clinically appropriate and patient-centred outcomes.

Value-Based Healthcare (VBHC) is a well-established approach that aims to improve the performance of healthcare systems by focusing on outcomes that matter to patients and on the efficient use of resources. Supported by the European Commission through initiatives such as the 2019 report Defining Value in Value-Based Healthcare, this approach continues to provide a valid and relevant framework for aligning investments with long-term value.

However, in light of growing environmental and societal challenges, a sustainability-oriented perspective is needed to enrich and expand the concept of value. A sustainable healthcare model should build on the foundations of VBHC by integrating environmental, human and economic impacts into the assessment of value, ensuring that healthcare systems are equipped to deliver high-quality outcomes while remaining resilient and responsible over time.

It is essential to ensure that sustainability is not used as a shortcut to cost reduction. Sustainable solutions should be assessed on the basis of their long-term contribution to safety, quality of care and clinically appropriate outcomes. As highlighted in value-based frameworks, the most appropriate options are not always the least expensive, but those that deliver optimal outcomes for both patients and health systems over time.

We call on the European Commission and Member States to revitalise and expand the value-based healthcare agenda by integrating sustainability into the definition of value. This should include the development of shared criteria and evaluation methods that reflect environmental and societal considerations, while maintaining the central focus on patient outcomes. A renewed and inclusive dialogue with healthcare providers, payers, industry and patient representatives will be key to supporting this evolution.

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Mölnlycke Health Care AB, P.O. Box 6, Entreprenörsstråket 21, 431 21 Göteborg, Sweden. Phone +46 31 722 30 00.