

Sustainable Healthcare Requires a Shift Towards a Circular Economy

Shak Gohir

Senior Technology Officer, CPI

High-Value Manufacturing Catapult (HVMC) Theme Lead for Sustainable Materials and Circular Economy

Working with industry, the [High-Value Manufacturing Catapult](#) has started to look at the development of a Design for Sustainability and Circularity Framework that is fit for the 21st century. A framework that will help UK-based businesses design products and services that address today's systemic and global environmental challenges. This includes the development of the next generation of medical equipment and devices that are sustainable by design.

We are hence keen to hear from designers, entrepreneurs, and manufacturers about the challenges and barriers they face in developing and commercialising new sustainable medical and wellness products.



Climate change poses a dual challenge to the healthcare sector. The sector must decarbonise its operations and supply chain to reduce its environmental impact. At the same time, it must also prepare for an increase in demand for healthcare services that will result from climate change-related events, such as extreme heatwaves, floods, storms, and wildfires. For example, individuals with underlying health conditions and the elderly will be more vulnerable during heatwaves. The healthcare sector globally is responsible for around 4% -

5% of the greenhouse gas emissions. In the UK the National Health Service (NHS) accounts for around 4%. Of this around 10% is attributed to the emissions embedded in the supply chains of medical equipment and devices.

To reduce environmental impacts, a shift towards a circular economy is a viable alternative to today's linear "take-make-dispose" supply chains. Circular Economy principles reduce the overall burden industrial activities place on the earth's ecological systems and natural carbon sinks, thereby helping slow, mitigate and reduce the adverse impacts of climate change. Circular strategies not only help address the huge environmental challenges we all face, but combined with advanced digitalisation, precision medicine and preventative care models, it will pave the way for a new era of transformative innovations and sustainable growth for the sector.

As climate-related events intensify, creating more and more harms to society, communities, regions, and the wider economy, "business-as-usual" will become increasingly challenging, undesirable, and unprofitable for most sectors. To remain competitive in the coming years, medical equipment and device manufacturers will increasingly need to embrace sustainability alongside their digitalisation strategies and rethink the design of their

products and service offerings. A key component of which will include the adoption of circular economy principles. There are several challenges and opportunities for the medical equipment and device industry in transitioning towards a circular economy.

Challenges include:

- Infection control: There is a risk of cross-contamination with reused medical devices, especially those that are used for invasive procedures. This is a major concern for healthcare providers and patients, and it can be difficult to ensure the safety of reused devices.
- Regulatory and certification hurdles: The medical device industry is highly regulated, and there are strict requirements for the design, manufacturing, testing and certification of medical devices and their manufacturing processes. This may make it challenging to develop and implement circular economy solutions for medical devices.
- Initial investment: The cost of developing and implementing circular economy solutions for medical devices can be high. This is due to the need for new technologies and processes, as well as the need to comply with regulatory requirements.
- Lack of infrastructure: There is currently a lack of infrastructure in place to support the circular economy for medical devices. This includes a lack of collection and sorting facilities, as well as a lack of markets for recycled devices, components, and materials.
- End-user behaviour: End-users may be reluctant to reuse medical devices, even if they are safe and effective. This is due to concerns about hygiene and infection control.

Opportunities include:

- Designing medical devices for extended life, disassembly, repair, reuse, remanufacturing: Medical devices can be designed to be reused multiple times, which can help to reduce waste. For example, some surgical instruments can be designed to be disassembled and cleaned after each use.
- Combining multiple functions and features into one aesthetic device. Designing medical devices that combine the multiple function and features into a single product. For example, a smart device that measures heart rate, oxygen saturation levels, activities, sleep and more.
- Using circular materials in medical devices: Recycled materials can be used to manufacture medical devices, which can help to reduce the environmental impact of the product. For example, using recycled plastics, metals, and electronic components in medical devices.
- Developing new technologies for recycling medical devices: New technologies can be developed to recycle medical devices more efficiently and effectively. This includes technologies for sorting and cleaning medical devices for reuse, as well as technologies for remanufacturing and processing medical devices for the recovery of materials.

- Building a circular economy infrastructure: There is a need to build a circular economy infrastructure for medical devices. This includes developing collection and sorting facilities, as well as creating cross-sector markets for recycled medical devices, parts and recovered secondary materials.

The medical device industry is at a critical juncture. It can either continue with the status quo, which is unsustainable, or it can transition towards a circular economy. The latter is the more responsible and sustainable path, and it is also the one that offers the greatest opportunities for innovation and business growth. It represents a clear opportunity for new disruptive entrants, who can bring new perspectives, rethink products, and configure more sustainable and reliable circular supply chains.

The transition to a circular economy for medical devices will require a concerted effort from all stakeholders, including investors, manufacturers, healthcare providers, patients, and policymakers.

For further information and to learn more about the Design for Sustainability and Circularity Framework programme at HVMC, please contact shak.gohir@uk-cpi.com.