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Health Technology Assessment in the Circular Economy of Medical Devices

webinar 5

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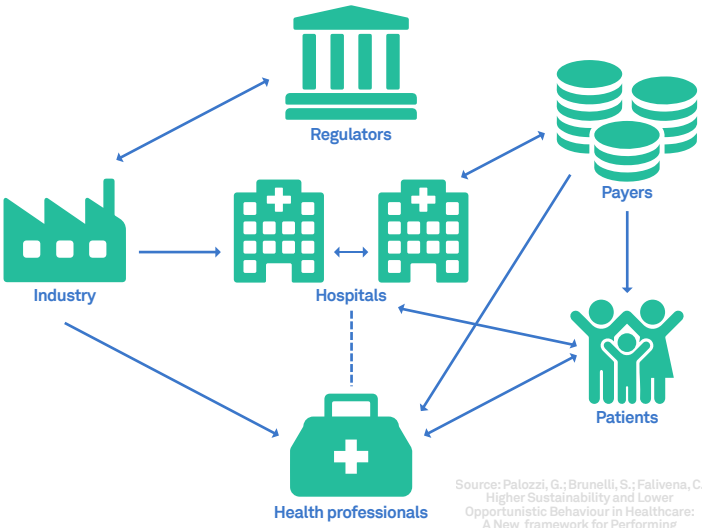
2022 CMF WEBINARS SERIES # 3

intro

AS WASTE MANAGEMENT, POLLUTION AND CLIMATE CHANGE ARE GLOBAL ISSUES AT ALL LEVELS, CIRCULAR ECONOMY IS, FOR ALL SECTORS INCLUDING HEALTHCARE, A NECESSARY SOLUTION AND AN OPPORTUNITY FOR SUSTAINABILITY. THE SUCCESS OF CIRCULAR ECONOMY MODELS IN HEALTHCARE REQUIRES, IN ORDER TO BE DEVELOPED AND ADOPTED, A JOINT EFFORT ON THE PART OF INDUSTRY, POLICY MAKERS AND USERS.

Role of Health Technology Assessment (HTA) in healthcare circular economy

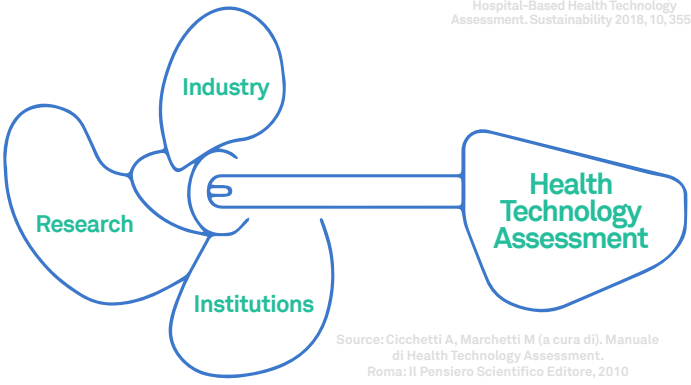
HTA is a multidimensional evidence based approach for investigating the effects of a technology (not only drugs, devices or equipment, but also procedures and organizational interventions)[1,2,3], it is therefore a comprehensive tool in evaluations relative to circular economy in healthcare. HTA can guide institutions, industry and research[4] in the adoption of circular economy solutions by providing evidence on the impact compared to current practices.



Source: Palozzi, G.; Brunelli, S.; Falivena, C. Higher Sustainability and Lower Opportunistic Behaviour in Healthcare: A New framework for Performing Hospital-Based Health Technology Assessment. Sustainability 2018, 10, 3550

> *"HTA can guide institutions, industry and research in the adoption of circular economy solutions."*

HTA is a tool for making evidence based decisions.



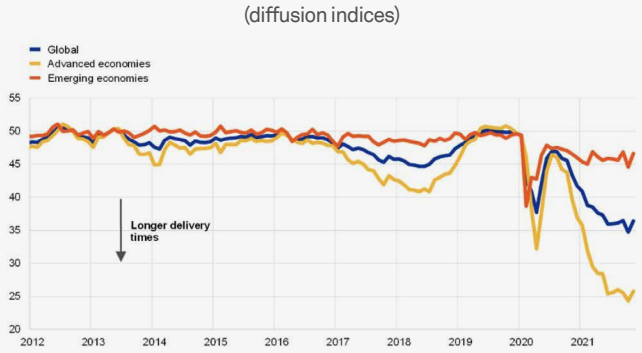
Source: Cicchetti A, Marchetti M (a cura di). Manuale di Health Technology Assessment. Roma: Il Pensiero Scientifico Editore, 2010

Context: supply chain and service requirements

Supply chains in all markets are suffering stock outages and back orders due raw material scarcity and demand exceeding availability[5,6,7]; all these factors are exacerbated by current geopolitical conditions. The growing imbalance between demand and availability of raw materials is causing supply chain disruptions are to be avoided in healthcare. The management of material resources in healthcare according to circular economy models is crucial not only for its economic and environmental sustainability but also in order to deliver diagnostic and therapeutic services.

Suppliers' delivery times

a) PMI SDT across regions

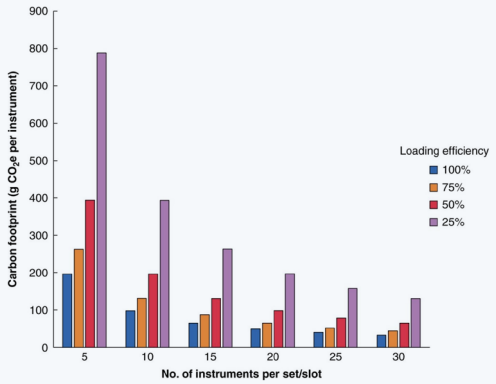


Source: https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.ebbox202108_01~e8ceebe51f.en.html

> *The growing imbalance between demand and availability of raw materials is causing supply chain disruptions are to be avoided in healthcare."*

Circular economy business models are essential for the upkeep of supply chains.

Carbon footprint of decontaminating instruments under different loading scenarios.



Source: 21. C Rizan, R Lillywhite, M Reed, MF Bhutta, Minimising carbon and financial costs of steam sterilisation and packaging of reusable surgical instruments, British Journal of Surgery, Volume 109, Issue 2, February 2022

Stakeholder involvement: priority setting and balancing

In healthcare the application of circular economy principles such as reuse, reduce and recycle must be carefully assessed and applied to changes in practices in order to maintain current standards in patient safety and outcomes. Just as in the general population, awareness of environmental issues is growing among healthcare professionals; there is growing attention to CO_2 emissions and waste management associated to clinical activity[8,9,10]. The advance of circular economy should be driven by all stakeholders: from the institutions, policy makers, organizations and single professionals.

Circular economy models must ensure adequate clinical standards and outcomes."

The change toward circular economy needs to be promoted both top-down and bottom-up.

single use vs reusable

Image: https://www.freepik.com/free-photo/digital-screen-with-environment-day_12976397.htm#query=reusable&position=4&from_view=search&track=sph

WHICH AND HOW TO CHOOSE?

The carbon footprint of medical activity is determined by the choice between single use and reusable devices[11, 12]; the selection must take into account every aspect of their employment (logistic[15], ecological, organizational, clinical). The most appropriate type of device to be employed depends on management and setting: staffing, activity volumes, distances, structures and infrastructures. In the case of surgical or endoscopic instruments, reprocessing method selection[14] and planning also play an important role: their optimization[13, 14] (equipment loading, set composition) can sensibly reduce emissions and costs.

Organizational variables are always key in the choice of reusable vs. single use.

The most appropriate type of device to be employed depends on management and setting."

Image: iStock photo database accessed on 20220914: iStock-1298626492

Resume

HTA allows a comprehensive and evidence based approach to circular economy applications in healthcare, it can help appraise whether devices or solutions that are proven environmentally sustainable are also clinically effective and acceptable.

It is important to assess how circular economy models (with smaller CO_2 footprints) compare to current practice in terms of clinical outcomes and effectiveness, as well as efficiency and organizational factors. Life cycle analyses and economic evaluations alone do not provide conclusive evidence to decision makers.

Due to supply chain disruptions, increase in energy costs and raw material shortages circular economy is becoming not only the goal in new business models but also the means to achieve economic sustainability and meet service requirements.

take home messages

01 HTA is a multidimensional approach for supporting evidence-based decisions in the application of circular economy solutions.

02 Circularity is to be practiced in healthcare for environmental and economic sustainability but it also a necessity in order to prevent supply chain disruptions in a scenario of growing imbalance between demand and availability of material resources.

03 Life cycle analyses and carbon footprint calculations should always be accompanied by the assessment of outcomes in order to ensure adequate clinical standards.

04 The choice of reusable vs. single-use devices depends on many direct and indirect variables but operations elements may result in being decisive.

1. EuNetHTA Core Model, https://www.eunethta.eu/hta-core-model/ 2.The International Network of Agencies for Health Technology Assessment (INAHTA), 2014, https://www.inahta.org/ 3. O'Rourke B, Oortwijn W, Schuller T, the International Joint Task Group (2020). The new definition of health technology assessment 4. Cicchetti A, Marchetti M (a cura di). Manuale di Health Technology Assessment. Roma: Il Pensiero Scientifico Editore, 2010 5. P. Lacy, J Keeble, R McNamara et al. - Circular Advantage, Innovative Business Models to Create Value in a World without Limits to Growth - Accenture Strategy, 2014 6. https://www.ecb.europa.eu/pub/economic-bulletin/focus/2022/html/ecb.ebbox202108_01~e8ceebe51f.en.html 7. https://www.statista.com/chart/25960/supply-chain-disruption-index/ 8. K Siau, B Hayee, S Gayam,Endoscopy's Current Carbon Footprint, Techniques and Innovations in Gastrointestinal Endoscopy, Volume 23, Issue 4, 2021 9. R Haddock; R de Latour,; K Siau, Keith; B Hayee,; S Gayam, Swapna. Climate Change and Gastroenterology: Planetary Primum Non Nocere and How Industry Must Help. The American Journal of Gastroenterology: March 2022 - Volume 117 - Issue 3 10. https://www.statista.com/chart/25960/supply-chain-disruption-index/ 11. LV Hernandez, N Nhat Thu Le, C Patnode, O Siddiqui, O Jolliet. Comparing The Impact Of Reusable And Single-use Duodenoscopes Using Life Cycle Assessment - Clinical Endoscopic Practice 1: Lecture| Volume 93, Issue 6, Supplement , Ab29, June 01, 2021 12. A Burguburu et al. - Comparative life cycle assessment of reusable and disposable scrub suits used in hospital operating rooms - Cleaner Environmental Systems, Volume 4, March 2022, 100068 13. C Rizan, R Lillywhite, M Reed, MF Bhutta, Minimising carbon and financial costs of steam sterilisation and packaging of reusable surgical instruments, British Journal of Surgery, Volume 109, Issue 2, February 2022 14. C Rizan, T Brophy, R Lillywhite, M Reed, MF Bhutta - Life cycle assessment and life cycle cost of repairing surgical scissors - The International Journal of Life Cycle Assessment (2022) 27:780–795 15. Relocating Sterile Processing Activities to an Off-Site Facility: Cost, Design, and Project Management Considerations April Cardone; Carolyn A. Grous,– AORN Journal, July 2020, Vol. 112, No. 1, pp 30-38

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