ENKORE: Designing a sustainable future for the European Healthcare Sector

- **Supported by IHI**: With a duration of 48 months, the project has a total budget of €18,88 million; €7,74 million is funded by the Innovative Health Initiative (IHI JU) under grant agreement No 101166707. The remaining €11,14 million is contributed by the consortium's industry partners (€9,10million) as well as the associated countries partners (€2,04 million).
- **ENKORE,** a consortium of 39 public and private partners and 13 affiliated members, led by the Universidad Politécnica de Madrid, from the public side and Medtronic from the industry side, embarks on a mission to revolutionize the environmental sustainability of the healthcare sector across Europe by implementing cutting-edge eco-design solutions for single-use medical devices and packaging.
- **More sustainable medical devices and pharmaceutical packaging**: Solutions ranging from biodegradable materials to advanced recycling strategies for single-use devices and packaging will be developed, demonstrated and evaluated.
- **Public-private collaboration**: a multistakeholder and cross-sector group of organisations, including Healthcare companies, technology firms, hospitals, and research centres, from the public and private sectors will work together implementing four demonstrative use cases in five European healthcare systems to accelerate the transition to a circular economy.

Belgium, March 2025 - The healthcare sector significantly impacts the environment through resource consumption and waste generation, accounting for 5% of global carbon emissions. Single-use medical devices and packaging, particularly plastics, are major contributors. Implementing 'circular economy' principles in this sector could mitigate these impacts, but it is challenging. Strict regulations ensuring device sterility and safety currently hinder the adoption of circular economy principles, as processes like recycling are complex and challenging to implement. To address these environmental concerns, the ENKORE project seeks to develop an eco-design framework for single-use medical devices and packaging.

Context

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economy principles, as processes like recycling are complex and challenging to implement. To address these environmental concerns, the ENKORE project seeks to develop an eco-design framework for single-use medical devices and packaging.

To address this scenario, the Innovative Health Initiative (IHI JU), a public-private partnership between the European Union and the European life science industries, represented by the industry associations COCIR, EFPIA (including Vaccines Europe), EuropaBio, and MedTech Europe, the ENKORE project is funded alongside a contribution of €11.14 million from the consortium's industry partners (€9.10 million) and associated countries' partners (€2.04 million) over the next four years. ENKORE aims to open a new chapter in healthcare sustainability through an eco-design framework that addresses the full lifecycle of medical devices and pharmaceutical packaging, from design to recycling.

What is ENKORE?

ENKORE will develop a collaborative approach to design an innovative eco-design framework encompassing the entire lifecycle of medical devices and pharmaceutical packaging. This framework aims to reduce the healthcare sector's ecological footprint by incorporating sustainable practices into design and manufacturing processes while ensuring product safety and efficacy.

Key innovations include:

- **Catalogues of Key Enabling Materials (KEM) and Key End-of-Cycle Solutions (KES):** Designed to minimise waste and optimise resource use, ensuring devices and packaging are safe and functional.
- **Digital Product Passport (DPP):** A tool that centralises product information to enhance traceability and can support adequate waste management.
- **Environmental and Social Life Cycle Assessments (ELCA/SLCA):** To measure environmental and social impacts at every stage of the product lifecycle.

Innovation Applied to Real-World Cases

The project plans to test the eco-design framework through use cases in five regional healthcare systems across Europe. The eco-design framework will be evaluated through demonstrative use cases in five regional healthcare systems across Europe: The initiative aims to implement and assess an eco-design framework through practical examples in five regional healthcare systems across Europe. This framework will undergo evaluation based on demonstrative case studies within these healthcare settings.

Drug injection devices

This case addresses the environmental impact of devices such as autoinjectors and pre-filled syringes, widely used in outpatient settings. Key activities include evaluating

end-of-life options like collection and recycling programmes and developing alternative eco-friendly materials without compromising device safety and efficacy.

Single-use products for dialysis and intravenous therapies

This case focuses on sustainable options for essential products in critical therapies, including recyclability of existing single-use products and exploration of new design for recycling guidance. Recyclable materials that meet safety, functionality and efficacy demands while balancing economic considerations for large-scale adoption will be evaluated

Sustainable plastic materials for packaging

This case investigates and validates materials derived from more sustainable plastic feedstocks and designed for recycling while meeting strict requirements for performance for performance, safety, compatibility, sterility, durability, and sterilisation compatibility. The feasibility of integrating these solutions into healthcare workflows will also be assessed.

Cellulose-based materials for packaging

This case develops cellulose-based packaging materials designed to be compostable or recyclable, reducing reliance on non-renewable resources.

Hospital waste recycling

This case seeks to implement solutions for scaling up the recycling of medical devices and packaging, including contaminated waste. Key initiatives include improving collection, sorting, and decontamination processes.

Expected Impact and Words from the Project Leaders

"Achieving at least 25% recycled content in global packaging by 2030 is a formidable challenge, one that demands innovative thinking and collaboration across sectors. It is a privilege to coordinate the ENKORE project, which addresses these challenges by developing a breakthrough eco-design framework for the next generation of circular-driven medical devices. By bringing together key partners to tackle regulatory, technical, infrastructural, economic, and pollution barriers, I believe ENKORE will be pivotal in creating lasting circular value and driving sustainable transformation in healthcare", stated María Fernanda Cabrera-Umpiérrez, coordinator of the project.

“Medtronic is proud to lead the industry as part of the ENKORE consortium, contributing to the environmental sustainability of the healthcare sector in Europe. By collaborating with key stakeholders, we aim to drive innovation and implement solutions that support a healthier

planet and improve patient outcomes", stated Jorge Posada, Head of External Funding at Medtronic.

An International Consortium

The ENKORE project comprises 39 partners, including universities, research centres, technology companies, and healthcare companies, as well as public bodies. The complete list includes:

1. Universidad Politécnica de Madrid (UPM) (Spain) - Coordinator
2. Medtronic (US, France, Spain)- Project Lead
3. Predictby Research and Consulting S.L. (Spain)
4. Università Campus Bio-Medico di Roma (Italy)
5. Universiteit Leiden (Netherlands)
6. Politechnika Poznanska (Poland)
7. Institute of Biomedical Technology (INBIT) (Greece)
8. UDG Alliance (Switzerland)
9. Charité - Universitätsmedizin Berlin (Germany)
10. Fondazione Policlinico Universitario Campus Bio-Medico (Italy)
11. Universytet Medyczny w Lodzi (Poland)
12. Consorcio Mar Parc de Salut de Barcelona (Spain)
13. Technovative Solutions Ltd (United Kingdom)
14. Tech Hive Labs (THL) (Greece)
15. Fundación Universidad Francisco de Vitoria (Spain)
16. Samenwerkende Topklinische Opleidingsziekenhuizen (Netherlands)
17. World Resources Forum Association (Switzerland)
18. OSAI Automation System SPA (Italy)
19. Agenzia Regionale per la Salute Ed Il Sociale (Italy)
20. European Regional and Local Health Authorities (EUREGHA) (Belgium)
21. Naucnoistrazivacki Institut Verlab (Bosnia and Herzegovina)
22. Greek Patients' Association (Greece)

23. Sterimed Holding (France)
24. Servicio Madrileño de Salud (Spain)
25. Multimed Engineers SRL (Italy)
26. Idryma Technologias Kai Ereynas (Greece)
27. Happy Mondays Communication S.L. (Spain)
28. Pfizer (US, UK, Ireland, Germany, Italy)
29. Novo Nordisk A/S (Denmark)
30. Eli Lilly and Company (US)
31. Johnson & Johnson (Germany, UK, US)
32. Takeda Pharmaceuticals International AG (Switzerland)
33. Fresenius Medical Care Deutschland GmbH (Germany)
34. DuPont (Luxembourg)
35. Boehringer Ingelheim (Germany, US)
36. International Solid Waste Association (Netherlands)
37. Forum des Patients Européens (Belgium)
38. Baxter R&D Europe (Belgium)
39. Active Ageing Association (Spain)

About ENKORE

ENKORE (Propelling the shift toward the future of circular, safe and sustainable packaging and single-use device ecoDesigned solutions through healthcare environments) is a public-private partnership funded by the Innovative Health Initiative. It was launched on 1 January 2025 and will run for 48 months, concluding in December 2028.

Supported by the Innovative Health Initiative (IHI)

This project is supported by the Innovative Health Initiative (IHI JU) under grant agreement No 101166707. The IHI JU receives funding from the European Union's Horizon Europe research and innovation programme and the industry associations COCIR, EFPIA, Europa Bio, MedTech Europe, and Vaccines Europe.

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