

Topic idea submitted to IHI - Reference Number: TI_001204

Are you submitting the idea:

- in your personal capacity?
 on behalf of an organisation?

1 Title of your idea

Please provide a short title that accurately reflects the objective(s) of your idea:

Reducing the footprint of haemodialysis

2 Scope

Explain the specific challenges/problems to be addressed by your idea and how these affect relevant stakeholders, taking into account what is already known and/or available in the field:

Kidney failure requires a disproportionate share of healthcare system resources for its treatment, with correspondingly large costs (80-100k€/patient/year)(1), resource use and environmental impact. Renal replacement therapy is 18 times more resource intensive than the general healthcare emissions burden of a typical patient (2). A typical haemodialysis session uses 360L of tap water per patient per haemodialysis procedure, with 3 procedures per week amounting to 1080L/patient/week, the equivalent of more than 1 year or ~500 days' worth of drinking water for an adult. Most of this water is used during a reverse osmosis process to generate 120L of ultrapure water for the dialysate, which is then used to treat the patient and subsequently flushed down the drain.

In addition, each procedure costs 25.9 KWH per procedure, results in 14.6 kg of waste (of which 1.2 kg is biohazard waste), and there is 20% of carbon footprint due to transportation. Thus, haemodialysis has a huge impact on the environment, and there is a need to shift from in centre dialysis to home dialysis combined with remote monitoring, laboratory measurement at home(3).

The European Kidney Health Alliance describes the mutual impact of climate change on kidney health and kidney care on ecology, and shares initiatives on green nephrology, including green(er) dialysis(4). Sustainable haemodialysis options should be developed to drastically reduce the amount of water, energy and (plastic) waste required to lower its environmental footprint. Simultaneously, the new haemodialysis system should be more user-friendly on the lives of patients.

(1)Mohnen et.al. 2019, DOI: 10.1371/journal.pone.0220800.

(2)Barraclough et.al. 2020, DOI: 10.1038/s41581-019-0245-1.

(3)Sehgal et. al. 2022, DOI: 10.1681/ASN.2022010086.

(4)Vanholder et. al. 2022, DOI: 10.1093/ndt/gfac160.

Please indicate which IHI specific objective(s) (SO), as described in the IHI Strategic Research and Innovation Agenda (SRIA), your idea addresses:

["SO3: demonstrate the feasibility of people-centered, integrate health care solutions"

"SO2: integrate fragmented health research and innovation efforts bringing together health industry sectors and other stakeholders, focusing on unmet public health needs, to enable the development of tools, data, platforms, technologies and processes for improved prediction, prevention, interception, diagnosis, treatment and management of diseases, meeting the needs of end-users"]

Please select the keywords that are most relevant to your idea:

["Non-communicable diseases"

"Treatment"

"Health technology"

"Disease management"]

In alignment with the IHI specific objective(s) selected above, specify the objectives of your idea:

S02: Create a network of partners that focus on green nephrology and stimulate innovation towards saving water during haemodialysis.

S03: Develop and integrate a haemodialysis equipment and procedure that lowers the costs and resources of haemodialysis, enabling more affordable and sustainable haemodialysis, while increasing the comfort for the patient.

3 Expected impacts to be achieved by your idea

Briefly describe the expected impacts to be achieved by your idea, ensuring that they contribute to IHI general and relevant specific objectives, as described in the IHI SRIA:

Impacts are wider long-term effects on society (including the environment), the economy and science, enabled by the outcomes of R&I investments. Impacts generally occur sometime after the end of the project, e.g. successful implementation of digital solutions supporting people-centred care.

IHI general objectives: 1. contribute towards the creation of an EU-wide health research and innovation ecosystem that facilitates translation of scientific knowledge into innovations, notably by launching at least 30 large-scale, cross-sectoral projects, focussing on health innovations; 2. foster the development of safe, effective, people-centred and cost-effective innovations that respond to strategic unmet public health needs, by exhibiting, in at least 5 examples, the feasibility of integrating health care products or services, with demonstrated suitability for uptake by health care systems. The related projects should address the prevention, diagnosis, treatment and/or management of diseases affecting the EU population, including contribution to 'Europe's Beating Cancer Plan'; 3. drive cross-sectoral health innovation for a globally competitive European health industry and contribute to reaching the objectives of the new Industrial Strategy for Europe and the Pharmaceutical Strategy for Europe.

The procedure and technology to be developed would drastically improve the sustainability of haemodialysis, by lowering the amount of water, energy usage, waste and overall carbon footprint. The procedure and technology will increase user-friendliness of haemodialysis systems for both patient and healthcare professional.

4 Why should your idea become an IHI call topic?

Explain why collaboration through a cross-sectoral and multidisciplinary public private partnership is needed in particular:

Why does it require collaboration among several industry sectors (e.g. pharma, vaccines, biotech, medical devices, in vitro diagnostics, radiotherapy, medical imaging health ICT)?

Why does it require collaboration between private (industry) and public partners (e.g. academia, healthcare practitioners, patients, regulators)?

The partnership combines the expertise of the pharma industry and the digital health and medical devices industries from an industry perspective. In terms of public private partnerships, this should bring in the expertise of the MedTech industries, but also from academia to perform research on new technologies for haemodialysis, healthcare practitioners with expertise on kidney health and hospital procedures, patients for their preferences and experiences throughout dialysis, and regulators for early advice and discussions for preparing the different technologies and procedures for approval.

Why is the contribution of industry needed to achieve the expected impacts?

Contribution of industry: Large companies that are members of the IHI industry partners (i.e. COCIR, EFPIA, EuropaBio, MedTech Europe, Vaccines Europe) contribute to the programme, primarily through 'in-kind' contributions (e.g. their researchers' time, laboratories, data, compounds). At least 45% of each project's total costs have to be in-kind contribution.

The different industry sectors have previously expressed their interest in developing novel technologies and procedures that contribute to a more sustainable health and care system. The industry expertise is specifically needed to translate research findings and develop new products for implementation in the healthcare sector.