LDE Thesis Lab 2026-2027

Sustainable Healthcare

Towards Planetary Health through Behavioural Change, Climate Adaptation and Mitigation Strategies



Thesis Labs Leiden-Delft-Erasmus Universities

Universiteit Leiden

TU Delft

Erasmus University Rotterdam

medical delta we add

ASSIGNMENTS

WE MIGHT ADD SOME ASSIGNMENTS IN THE PERIOD OF 23-30 SEPTEMBER.

ASSIGNMENTS ON EFFECTIVE MITIGATION / CIRCULAR STRATEGIES 5

#1 From barriers to solutions: towards environmentally sustainable infection prevention in the endoscopy department **(ZEE consortium x Erasmus MC)** 6

CLOSED #2 From recycling cardiac devices to a sustainable atrial fibrillation (AF) patient pathway **(Johnson & Johnson MedTech)** 8

#3 Making hospital care circular: design circular procurement strategies **(ESCH-R consortium)** 10

CLOSED #4 Inzet UV-C lamp voor desinfectie van niet-steriele hulpmiddelen **(LUMC)** 11

#5 GLOVE-LAB: efficient and sustainable use of gloves in clinical laboratories **(LUMC)** 12

#6 Schoon slim en duurzaam (verzorgend) wassen in de ouderenzorg **(Pieter van Foreest)** 13

CLOSED #7 Life cycle assessment of titanium versus carbon pedicle screws for spinal surgery **(Amsterdam UMC)** 15

#8 Transitioning healthcare: healthcare of the future **(Industrial Design Engineering, TU Delft x healthcare sector)** 16

#9 Circular strategies for critical raw materials in medical devices **(Industrial Design Engineering, TU Delft x Provincie Zuid-Holland)** 17

CLOSED #10 A sustainable and safe sanitary care chain: improving urinary care practices **(Reinier de Graaf Ziekenhuis)** 19

#11 Design of a multi-criteria decision-making (MCDM) tool for greener hospitals **(Medical Delta)** 21

ASSIGNMENTS ON EFFECTIVE ADAPTATION STRATEGIES 22

#12 Nursing for planetary health: building sustainable and resilient healthcare **(Alrijne Zorggroep)** 23

ASSIGNMENTS ON EFFECTS OF ENVIRONMENTAL CHANGE ON PUBLIC HEALTH 25

#13 Affordable, usable and environmentally friendly solutions for cooling homes and preventing heat stress **(Duurzaam Leiden)** 26

#14 Streamlining referrals to reduce both health harms and climate change **(Duurzaam Leiden)** 27

Erasmus MC

Johnson & Johnson MedTech

ZEE ZERO EMISSIONS ENDOSCOPY

esch-r creating circular hospitals together

LUMC

Pieter van Foreest

Amsterdam UMC

Alrijne zorggroep

TU Delft

Reinier de Graaf

Duurzaam Leiden

provincie Zuid-Holland

ASSIGNMENTS ON EFFECTIVE MITIGATION / CIRCULAR STRATEGIES

#1 From barriers to solutions: towards environmentally sustainable infection prevention in the endoscopy department **(ZEE consortium x Erasmus MC)**

Organisation

The ZEE Consortium stands for Zero Emission Endoscopy, a four-year interdisciplinary research program led by Erasmus MC, TU Delft, and Erasmus University Rotterdam within the Convergence Health & Technology initiative. Its goal is to significantly reduce the environmental impact of endoscopy care while maintaining high standards of patient care. Erasmus MC is the point of contact for this assignment. Website: https://convergence.nl/health-technology/programs/zee/

Thesis assignment

Gastrointestinal endoscopy is one of the most resource-intensive hospital departments, generating substantial waste and carbon emissions. Across the Netherlands, endoscopy Green Teams are working to implement interventions to reduce the environmental impact of endoscopic care. However, many promising sustainability initiatives are delayed or abandoned because of concerns related to infection prevention and hospital hygiene.

Throughout this proposal, "sustainability" refers specifically to environmental sustainability. Previous research performed by our research group identified infection prevention as one of the most important barriers to implementing sustainable practices in the endoscopy department. Yet, these barriers are often poorly understood. They may arise from regulations, local protocols, perceived risks, or uncertainty regarding the available scientific evidence. To achieve more sustainable endoscopic care, sustainability and infection prevention should not be viewed as opposing goals, but as shared responsibilities that require close collaboration.

This project therefore aims to answer the following research question: *How can endoscopy Green Teams and infection prevention professionals collaboratively overcome barriers to the implementation of sustainable interventions in gastrointestinal endoscopy?*

Using three to five sustainability interventions as case studies, the student will explore implementation barriers and identify successful strategies through interviews with endoscopy professionals and infection prevention specialists from hospitals across the Netherlands. The project will result in a co-creation workshop that brings together all relevant stakeholders to develop practical recommendations. Ultimately, an implementation roadmap will be developed, to enable the safe adoption of sustainable practices within endoscopy departments in the Netherlands.

Expected type of work or methodologies

The student will conduct semi-structured interviews with endoscopy green teams and infection prevention/hospital hygiene professionals. The findings will be used to develop case vignettes that will guide a co-creation workshop aimed at identifying practical solutions and implementation strategies for sustainable endoscopy.

Available data/reports or other relevant information sources for the project

A previous master thesis on sustainability interventions in endoscopy departments is available and can provide relevant background information and insights for this project. The thesis is available upon request.

CLOSED

#2 From recycling cardiac devices to a sustainable atrial fibrillation (AF) patient pathway **(Johnson & Johnson MedTech)**

Organisation

Johnson & Johnson MedTech is the medical technology division of Johnson & Johnson, one of the world's largest healthcare companies. The division develops medical devices, surgical technologies, robotics, and digital health solutions used by hospitals and healthcare professionals worldwide.
Website: Home | J&J MedTech

Thesis assignment

Context: Recycling Electrophysiology (EP) catheters has emerged as a promising first step toward reducing waste and avoiding incineration through the recovery of valuable materials. However, it remains unclear how such end-of-life initiatives can be integrated into a broader, sustainable AF care pathway. Hospitals face challenges related to logistics, stakeholder engagement, environmental impact measurement, cost allocation, and the coordination required to embed sustainability into routine clinical practice. As a result, many sustainability initiatives remain pilots rather than becoming scalable, system-wide solutions.

Problem statement: This challenge is highly relevant as healthcare systems seek to reduce their environmental footprint and contribute to planetary health. For Johnson & Johnson MedTech, it directly relates to product lifecycle strategies, circular healthcare innovation and collaboration with hospitals to develop sustainable models of care. The goal is to define the roadmap from recycling individual devices today toward a sustainable AF patient pathway for the near future that can be implemented at one Dutch hospital and potentially scaled to other Dutch healthcare institutions.

Main question: How can a Dutch hospital transition from catheter recycling as a standalone sustainability initiative to a sustainable atrial fibrillation (AF) patient pathway that delivers measurable environmental benefits while maintaining clinical quality and economic feasibility?

Sub-questions

1. Diagnose current state by verifying, adjusting and validating the current AF patient pathway. What are the main environmental impacts across the current AF patient pathway at the hospital?
2. Research future state and define which changes J&J can make together with the hospital to offer the greatest opportunity for reducing waste, CO_2 emissions, and resource

consumption to support a sustainable AF patient pathway without compromising quality of care, patient outcomes and operational efficiency?

3. What are the recommendations for J&J to implementation the future state, make it commercially relevant and what business model(s) need to be used to offer this to the hospital

Expected type of work or methodologies

To be discussed prior to start.

Available data/reports or other relevant information sources for the project

Yes, this research is a continuation of previous thesis lab projects.

#3 Making hospital care circular: design circular procurement strategies **(ESCH-R consortium)**

Organisation

ESCH-R stands for Evidence-based Strategies to create Circular Hospitals: applying the 10-Rs framework to healthcare. It is a large interdisciplinary research consortium that aims to help hospitals transition from a linear "use and dispose" model towards a circular healthcare system. The project is funded by the Dutch Research Council (NWO) as part of the Dutch Research Agenda (NWA). Erasmus University is the point of contact for this assignment, that is part of work package 4. Website: https://esch-r.org

Thesis assignment

Healthcare, and especially hospital care, is very resource intensive (energy, materials) and produces a lot of waste. Principles of the circular economy could help reduce the environmental impact of healthcare activities. Currently, many devices are single use disposables and a lot of value is destroyed when such devices are incinerated.

We plan to work on three concrete cases with hospitals and supply chain partners (upstream, such as manufacturers, as well as downstream, such as waste handlers) to create circular networks. Many of these partners are already committed to the ESCH-R project.

Research question: our main research objective is to design circular procurement strategies for these three circular networks. For instance, what procurement strategies can create and enable the network for recovery of critical raw materials from used medical devices? Three different projects will look at procurement strategies for three different cases for circularity in hospital care.

Expected type of work or methodologies

Students can define their own approach. Fruitful approaches could include design science (see the work of Van Aken and Berends) and transdisciplinary research.

Available data/reports or other relevant information sources for the project

The ESCH-R project started in 2024. Researchers in work package 4 (WP4) of the ESCH-R project have collected relevant data since the start of the project.

#4 Inzet UV-C lamp voor desinfectie van niet-steriele hulpmiddelen **(LUMC)**



This assignment is for Dutch speaking students.

Organisation

De Intensive Care (IC) van het Leids Universitair Medisch Centrum onderzoekt hoe UV-C-desinfectie kan bijdragen aan een veiligere en duurzamere omgang met medische hulpmiddelen. Door alternatieven voor wegwerppraktijken te verkennen, draagt deze opdracht bij aan de ontwikkeling van circulaire zorgprocessen en de vermindering van de ecologische voetafdruk van de gezondheidszorg.
Website: https://www.lumc.nl

Thesis assignment

Hoofdvraag: Hoe kan de UV-lamp VEILIG ingezet worden om herbruikbare scharen en kochers (en eventueel ook andere kleine materialen) in een niet steriele setting te kunnen hergebruiken.

Deelvragen:

a. Doodt de UV-lamp micro-organismen in achtergebleven lichaamsmateriaal?
b. Wordt het desinfecterend vermogen van de UV-lamp beter als voorafgaand aan de UV-lamp reiniging (wecoline) wordt toegepast (NB reinigen is verplicht voordat er, ook in andere settingen, gedesinfecteerd wordt)
c. Wordt het desinfecterend vermogen van de UV-lamp beter als voorafgaand aan de UV-lamp naast reiniging (wecoline) ook desinfectie dmv 70% alcohol wordt toegepast
d. Vergelijk desinfectiegraad via UV-C met sterilisatie via CSD en met desinfectie dmv alcohol?
e. Is de hoeveelheid materialen in de UV-C kast van invloed op desinfectiegraad? Wat is optimale hoeveelheid?
f. Is de houding van het materiaal in de UV-C kast van invloed op de desinfectiegraad?
g. Als blijkt dat 1 cyclus niet genoeg is voor volledige desinfectie, is een tweede cyclus zinvol?
h. Maak een vergelijk met workflow van andere ziekenhuizen die de UV-C-lamp gebruiken. NB wat zijn daar de obstakels. Welke aanbevelingen volgen daaruit voor LUMC?

Om deze vragen te kunnen beantwoorden moet er ook overlegd worden met Dienst Infectiepreventie en de Deskundige Steriele Hulpmiddelen.

Expected type of work or methodologies

Zie deelvragen.

Available data/reports or other relevant information sources for the project

Ja, is beschikbaar.

#5 GLOVE-LAB: efficient and sustainable use of gloves in clinical laboratories **(LUMC)**

Organisation

This assignment is from the Clinical Microbiology Laboratory (KML) at the Leids Universitair Medisch Centrum. Website: https://www.lumc.nl

Thesis assignment

Many disposable gloves are used in the medical laboratories of the LUMC. This contributes significantly to the hospital's carbon footprint and increases the expenses. Although clear guidelines indicate that gloves are not always necessary from an infection-prevention perspective, laboratory staff often continues to wear them even when they are not required. In addition, used gloves are frequently disposed of in designated hospital waste bins rather than in the regular waste stream, further increasing both environmental impact and costs.

Research question:
With this assignment we aim to understand why laboratory staff continues to use disposable gloves when they are not necessary. This project could investigate the behavioural factors, perceived risks, and practical barriers associated with glove use. Based on these findings, interventions could be developed to reduce unnecessary glove use in laboratory settings while maintaining safety and infection-control standards.

Expected type of work or methodologies

Literature search, interviews, stakeholder analyses; possibly life cycle analysis; but depending on final project aims.

Available data/reports or other relevant information sources for the project

Guideline on glove use in laboratories, 'no risk no glove' campaign on the use of gloves in clinical care. Reducing the environmental impact of gloves used in the Intensive Care Unit | TU Delft Repository

#6 Schoon slim en duurzaam (verzorgend) wassen in de ouderenzorg **(Pieter van Foreest)**

This assignment is for hbo and Dutch speaking students.

Organisation

Pieter van Foreest is een van de grootste ouderenzorgorganisaties in Zuid-Holland en biedt wonen, zorg, behandeling en welzijn voor ouderen in de regio Delft, Midden-Delfland, Pijnacker-Nootdorp en Westland. De organisatie beschikt over circa 25 locaties en biedt daarnaast thuiszorg, huishoudelijke ondersteuning en gespecialiseerde behandelzorg. Website: https://pietervanforeest.nl

Thesis assignment

Afgelopen jaar hebben er binnen Pieter van Foreest, een ouderenzorgorganisatie in de regio Delft en omstreken, twee initiatieven plaatsgevonden die betrekking hadden op het wassen en verzorgen van cliënten. Er is een pilot afgerond met de Syren Shower, een innovatief douchesysteem voor bedlegerige cliënten die je met behulp van dit systeem toch een douche-ervaring kan geven met weinig gebruik van water. Het tweede initiatief is een praktijkonderzoek naar verzorgend wassen. Bij verzorgend wassen worden cliënten gewassen met voorverpakte geïmpregneerde wasdoekjes. De aanpak biedt gebruik en comfort, maar is tegelijkertijd weinig duurzaam vanwege het wegwerpmateriaal. Van beide vormen van wassen willen we meer inzicht in de milieu-impact krijgen.

Hoofdvraag: Wat is de milieu-impact van de Syren Shower en verzorgend wassen bij bedlegerige cliënten?

Deelvragen:

1. Wat is het verschil tussen het gebruik van de Syren Shower en (verzorgend) wassen bij bedlegerige cliënten op de afvalstroom?
2. Wat is het verschil tussen het gebruik van de Syren Shower en (verzorgend) wassen bij bedlegerige cliënten voor het waterverbruik?
3. Wat is qua kosten-effectiviteit het meest efficiënt om in te zetten, de Syren Shower of het verzorgend wassen bij bedlegerige cliënten?
4. Bij welke combinatie van gebruiksfrequentie, waterverbruik, en afvalreductie is er een daling in de totale kosten ten opzichte van de baseline?

Expected type of work or methodologies

De studenten zijn vrij om zelf te verkennen wat zij nodig hebben om een antwoord te kunnen geven op de vraag. Aanbevolen wordt een stakeholderanalyse, deskresearch, observaties, interviews.

Available data/reports or other relevant information sources for the project

Ja, er is een businesscase beschikbaar over de pilot met de Syren Shower en advies over verzorgend wassen. Verder kunnen we inzicht geven in kosten en verbruik.

#7 Life cycle assessment of titanium versus carbon pedicle screws for spinal surgery **(Amsterdam UMC)**

CLOSED

Organisation

This assignment is from the Cancer Center Amsterdam and Neurosurgery department from Amsterdam UMC.

Amsterdam UMC

Thesis assignment

In patients with cancer that has metastasized to the spine (spinal epidural metastases), spinal instability may occur. In such cases, the spine is stabilized using screws and rods. Traditionally, these devices are made of titanium. While titanium is strong and durable, a significant drawback is that it can cause artifacts on MRI scans performed after surgery, making it difficult to monitor the metastasis accurately. For this reason, carbon-based screws have also been introduced. These contain little or no metal and therefore do not produce the same MRI imaging artifacts.

The costs of the two products are approximately the same. However, no research has yet been conducted on the environmental impact of these two different spinal fixation systems.

Research question: to conduct a Life Cycle Assessment (LCA) comparing the environmental impacts of titanium and carbon pedicle screws used in spinal surgery, in order to determine whether one of the two systems has a lower environmental footprint and to identify the key factors contributing to any differences observed.

Expected type of work or methodologies

Life Cycle Assessment (LCA).

Available data/reports or other relevant information sources for the project

It is possible to observe the surgical procedures and the materials in practice to gain a better understanding of the subject matter. In this context, direct supervision and guidance will also be provided by a spinal neurosurgeon.

#8 Transitioning healthcare: healthcare of the future **(Industrial Design Engineering, TU Delft x healthcare sector)**

For this assignment we are looking for a Strategic Product Developer.

Organisation

This assignment is from faculty of Industrial Design Engineering from the TU Delft.
In this assignment we aim to collaborate with partners in the healthcare sector.
Website: https://www.tudelft.nl/en/ide

Thesis assignment

The current healthcare system is unsustainable, both in environmental and social sense. Healthcare has a large environmental footprint, and depends too much on scarce materials, which are extracted overseas. At the same time, the growing population and ageing population are increasing the demand for care, while the healthcare workforce and resources are limited.

To provide good care in the future, healthcare needs to become more sustainable and resilient. This means reducing its environmental footprint, using resources more efficiently, becoming less dependent on vulnerable supply chains, and finding new ways to meet the growing demand for care as well as different ways of looking at care. In other words, a transition in healthcare is needed.

For this transition we should ask ourselves, what is the value healthcare brings, and should bring to people, what aspects do we want to discontinue and what values to keep or emphasize. These are not changes one can make on the short term, but will take 20-50 years.

Research question: We would like to challenge a student to engage in conversations with experts in the healthcare system, to understand the ideas people have about the future. And, what needs to happen between now and then to make these envisioned futures possible?

What interventions, new structures, products and services are needed now to make that transition happen? In short, this project focuses on understanding the multiple possible futures for healthcare and identifying the steps needed to drive change towards a more sustainable and resilient system.

Expected type of work or methodologies

Strategic Design Approaches: SWOT, Interviewing, trend analysis etc.

Available data/reports or other relevant information sources for the project

https://drift.eur.nl/nl

#9 Circular strategies for critical raw materials in medical devices **(Industrial Design Engineering, TU Delft x Provincie Zuid-Holland)**

For this assignment we are looking for an Industrial Ecology student and an Strategic Product Developer.

Organisation

This assignment is from faculty of Industrial Design Engineering from the TU Delft, in collaboration with the Province of South-Holland.
Websites: https://www.tudelft.nl/en/ide and https://www.zuid-holland.nl

Thesis assignment

The medical device industry relies heavily on Critical Raw Materials (CRMs) such as cobalt, rare-earth elements and lithium. These materials are essential for the performance and reliability of advanced medical technologies, like diagnostic imaging equipment and surgical instruments. However, growing geopolitical dependencies, supply risks, and environmental impacts make current CRM supply chains unsustainable in the long run.

Research question: Would it be possible to make the management of CRM in medical devices more sustainable by applying circular economy strategies?

To know that the following is needed first:

Assignment 1 (Industrial Ecology): A material flow analysis (MFA) of CRM in the medical device supply chain is needed to reveal opportunities for increased material efficiency, recycling, resource security, and circular economy strategy. One student (Industrial Ecology) will thus be asked to make a MFA of CRMs used in the hospital: which CRMs enter the hospital, via which medical devices, and how do they leave the hospital?

Assignment 2 (Industrial Design, SPD): An overview of how we can collect the CRMs from the medical devices and who is needed to further collect, process and return them into the value chain? Therefore, the second student should map all relevant stakeholders needed to start the process. Who are these stakeholders? What is required from them? How can we bring them onboard?

Expected type of work or methodologies

Student assignment 1: material flow analysis
Student assignment 2: visual mapping, ethnographic techniques, SWOT

Available data/reports or other relevant information sources for the project

Yes, there is literature on hospital mining, critical raw materials and rare earth elements.

#10 A sustainable and safe sanitary care chain: improving urinary care practices **(Reinier de Graaf Ziekenhuis)**



Organisation

Reinier de Graaf Hospital is a clinical hospital located in Delft, the Netherlands. Reinier de Graaf Hospital aims to make healthcare more sustainable by reducing the use of materials and disposable products, minimizing waste, and making the most efficient use of existing facilities and resources. Website: https://reinierdegraaf.nl

Thesis assignment

Urine collection is a routine procedure in hospitals and takes place on a large scale. Precisely because of this high volume, even a relatively small improvement in practice can lead to a significant reduction in material use, waste generation, water consumption, and costs.

Reinier de Graaf Hospital also operates a unique on-site wastewater treatment system, the Pharmafilter. This provides an interesting opportunity to investigate and optimize not only the use of materials, but the entire chain from urine collection to processing.

Recently, Reinier de Graaf Hospital implemented a more sustainable protocol for the clean insertion of catheters, which has already reduced material consumption. However, the subsequent stages of the urinary care pathway, from urine collection and emptying to cleaning and disposal, have received limited attention from a sustainability perspective.

In 2025, approximately 20,000 polypropylene (PP) urine jugs were used. In addition, practices vary between departments. This raises the question of whether the current processes can be organized in a smarter, more efficient, and more sustainable way.

Central research question: How can Reinier de Graaf Hospital minimize material use in urine collection and disposal processes and optimize disposal through the Pharmafilter system, while maintaining the quality of care and ensuring patient and staff safety?

The following sub-questions will be central to the project:

- Which current practices can be safely modified to reduce material consumption?
- What protocol or process changes are required to achieve this?
- What role do staff behaviour and established routines play?
- Which facilities, equipment, or supporting tools are needed?
- What are the potential environmental benefits and cost savings?
- How can improvements be successfully implemented and sustained over time?
- Can the existing Pharmafilter system technically and operationally accommodate the proposed changes?

The project is therefore both practically and socially relevant. It is expected to result in concrete recommendations that contribute to more sustainable healthcare practices and can be directly implemented within the hospital.

Expected type of work or methodologies

The student is free to choose an appropriate research approach. However, the project should include the following elements:

- Application of the Plan-Do-Check-Act (PDCA) cycle to guide both the research and implementation phases;
- Use of behavioural insights to better understand staff behaviour, routines, and willingness to adopt change;
- A Life Cycle Assessment (LCA), where sufficient data are available, to quantify the environmental benefits of alternative approaches;
- Stakeholder management throughout the project;
- A process analysis of the current urine management pathway, including variations in practice between departments;
- Preference will be given to an approach that not only analyses the current situation but also results in concrete, evidence-based, and implementable improvements.

Available data/reports or other relevant information sources for the project

Yes. The following information, among other resources, is available:

- Procurement and consumption data;
- Current protocols and work instructions;
- Relevant guidelines and regulations;
- Information on practices and workflows across different departments;
- Data on the use and disposal of urine collection containers;
- Available information on the Pharmafilter system.

#11 Design of a multi-criteria decision-making (MCDM) tool for greener hospitals **(Medical Delta)**

Organisation

Medical Delta is a transdisciplinary partnership of more than 1,000 participants from Erasmus University, Erasmus MC, TU Delft, LUMC, Leiden University and four universities of applied sciences in South Holland. Together with companies, healthcare institutions and governments, Medical Delta works on innovative solutions for sustainable healthcare. This assignment is part of the Medical Delta Program 'Sustainable Hospitals - From science to practice'.
Website: https://www.medicaldelta.nl

Thesis assignment

Hospitals increasingly consider, develop, pilot and implement a variety of sustainability interventions to reduce their environmental impact. For instance, a hospital (department) might consider switching from a single-use disposable medical device to a reusable one, reducing the number of absorbent pads used, or replacing intravenous medication with oral medication.

However, before deciding on piloting or implementing such a change, it is essential to zoom out and consider a variety of important criteria in addition to the criterium of environmental sustainability, such as clinical impact, supply chain risk, and costs. Whereas the proposed alternative might lead to synergies between criteria, it might also lead to (temporary or perceived) trade-offs. The identification of synergies and trade-offs is challenging, as information and knowledge are usually not readily available.

Research question: To support hospitals with such processes, our main aim is to develop a 'multi-criteria decision-making (MCDM) tool'. This MCDM tool is supposed to 1) guide hospital actors with collecting the necessary information, and 2) enable structured and actionable dialogue based on that information.

The student is asked to explore what such a tool can look like in practice and to design and build the actual (prototype of the) tool. Questions include: what are important characteristics or requirements of the MCDM tool (e.g., format, type, level of detail, etc.)? In what kind of settings or situations would such an MCDM tool be used (user case)?

Expected type of work or methodologies

An iterative design approach is recommended. As part of that, interviews with Green Teams and/or sustainability coordinators are recommended.

Available data/reports or other relevant information sources for the project

MSc reports and other resources are available.

ASSIGNMENTS ON EFFECTIVE ADAPTATION STRATEGIES

#12 Nursing for planetary health: building sustainable and resilient healthcare **(Alrijne Zorggroep)**

Organisation

Alrijne Zorggroep is a regional healthcare organization in the Netherlands that provides hospital care, nursing home care, and elderly care services across the Leiden, Leiderdorp, and Alphen aan den Rijn region. The organization includes Alrijne Hospital and the nursing homes Leythenrode and Oudshoorn. Website: www.alrijne.nl

Thesis assignment

Climate change is increasingly affecting public health and healthcare delivery. Rising temperatures and more frequent heatwaves place additional pressure on hospitals, while simultaneously creating challenging working conditions for healthcare professionals, particularly nurses. Recent research highlights the need for organizational interventions, such as Heat Health Action Plans, targeted training, and stronger climate adaptation strategies, to support nurses and improve hospital resilience.

Research question: How can nurses contribute to the development and implementation of climate adaptation measures that enhance hospital resilience to heat-related health challenges?

Sub-questions:

1. How do nurses currently experience and manage heat-related challenges in hospital settings?
2. What knowledge, competencies, and leadership roles are needed for nurses to act as climate-responsive change agents?
3. Which organisational interventions can effectively support nurses in preparing healthcare services for increasing heat-related pressures?
4. How can these interventions contribute to more sustainable and climate-adaptive healthcare systems?

This topic aligns closely with Alrijne's ambition to provide future-proof, high-quality healthcare while contributing to a more sustainable and healthier society. Sustainability is an integral part of Alrijne's strategy, reflected in initiatives such as multidisciplinary Green Teams, climate-conscious innovation, regional collaboration, and the implementation of measures that reduce the environmental impact of healthcare while maintaining high standards of patient care.

Climate change presents increasing challenges for healthcare organizations, including rising demand for care, workforce pressures, and the growing impact of extreme heat on patients and healthcare professionals. As the largest professional group within healthcare, nurses are uniquely positioned to contribute to climate adaptation, sustainable care practices, and organizational resilience. By strengthening their role as leaders and change agents, nurses can help translate sustainability ambitions into everyday clinical practice.

This study supports both Alrijne's sustainability goals and the ambitions of the Medical Delta Living Lab Changemakers for Sustainable Healthcare, which aims to empower healthcare professionals to take an active role in developing climate-adaptive and sustainable healthcare solutions for the future.

Expected type of work or methodologies

Students are free to find their own approach.

Available data/reports or other relevant information sources for the project

Data from the research group Nursing Leadership:
https://www.sciencedirect.com/science/article/pii/S2666142X26001256

https://nvz-ziekenhuizen.nl/actualiteit-en-opinie/duurzaamheid-de-beste-investering-continuiteit

https://www.alrijne.nl/media/6497/20220808_def_alrijne_a3_losse_paginas_strategie_en-toekomst_2022_2027.pdf

https://www.pwc.nl/nl/actueel-en-publicaties/themas/duurzaamheid/zorggroep-alrijne-wil-duurzaamheidsrapportage-uitbreiden.html

https://pmc.ncbi.nlm.nih.gov/articles/PMC13091379/ https://www.medicaldelta.nl/programmas-en-living-labs/society-duurzaamheid-vergroening/medical-delta-living-lab-veranderaars-voor-duurzame-gezondheidszorg

ASSIGNMENTS ON EFFECTS OF ENVIRONMENTAL CHANGE ON PUBLIC HEALTH

#13 Affordable, usable and environmentally friendly solutions for cooling homes and preventing heat stress **(Duurzaam Leiden)**

Organisation

Duurzaam Leiden is an independent sustainability cooperative that works to accelerate the transition towards a more sustainable city. It brings together residents, businesses, schools, community organizations, and the local government to develop and implement practical sustainability initiatives in Leiden. Website: https://duurzaamleiden.com

Thesis assignment

Some homes are poorly insulated, particularly social housing and homes in disadvantaged neighbourhoods. Residents of these homes often cannot afford air conditioning or other cooling solutions that are expensive to purchase or operate. As a result of climate change, these residents are increasingly experiencing health problems caused by high temperatures, a condition known as heat stress. Heat stress can, in turn, increase the demand for healthcare.

Fortunately, there are more affordable and environmentally friendly ways to cool homes and reduce the number of residents experiencing heat stress. Possible measures include blocking sunlight entering the house, or using simple cooling methods such as damp cloths placed near windows or doors.

Research question: For this project, you will investigate an affordable, usable and environmentally friendly solution for cooling homes and preventing heat stress. The project should address the following questions:

- In which types of homes are these solutions most needed?
- What affordable and environmentally friendly cooling measures are available or can be developed?
- Which solution(s) would be most suitable and effective to use in these homes?
- What is needed to make these cooling measures work?
- How can residents be supported in using and maintaining these measures?

Expected type of work or methodologies

Preferably students with technical understanding or a product development background.

Available data/reports or other relevant information sources for the project

Passive cooling examples from other (tropical) countries or from the past and bio-inspired design.

#14 Streamlining referrals to reduce both health harms and climate change **(Duurzaam Leiden)**

Organisation

Duurzaam Leiden is an independent sustainability cooperative that works to accelerate the transition towards a more sustainable city. It brings together residents, businesses, schools, community organizations, and the local government to develop and implement practical sustainability initiatives in Leiden. Website: https://duurzaamleiden.com

Thesis assignment

Vulnerable groups sometimes live in poorly insulated, energy-inefficient homes. This can create an unhealthy indoor environment, reduce living comfort, and lead to high housing costs, particularly in the context of climate change. Poor housing conditions may also contribute to health problems such as rheumatism and asthma.Energy fixers, professionals who implement small energy-saving measures, are often available free of charge and can help improve the homes of vulnerable residents. For example, they may install insulation materials or draught-proofing strips. There is growing evidence that these relatively minor interventions can also have a positive impact on residents' health and may even reduce their need for healthcare and medication. Enabling energy fixers to carry out these measures in the homes of vulnerable residents could therefore make a significant contribution to improving their health and well-being.

Research question: However, it is still unclear which interventions are most effective for specific health conditions and which patients are most likely to benefit from them. In addition, healthcare professionals and patients are often unaware that these services exist and could potentially help. Together with Duurzaam Leiden, we are currently working on two projects that aim to support vulnerable groups through their healthcare professionals. How can this process be improved and scaled up?

For this project, we seek to gain a better understanding of the relationship between these interventions and health. Some possible research questions include:

- How can awareness of energy fixers and their potential benefits be increased among healthcare professionals and their patients without adding to their existing workload?
- Which interventions are most effective for specific health conditions, and which patients will thus benefit most?
- How can the referral and support process be improved and scaled up?

Expected type of work or methodologies

The student is free to choose their own methodologies.