

# Roadmap 2024 -2027 Institute 4 Preventive Health



#### **Executive Summary**

The i4PH programme aims to contribute to the central mission and overall long term goals of the Knowledge and Innovation agenda of Health Holland: For all Dutch people to live for at least 5 years longer in good health, and to decrease the health differences between the lowest and highest socioeconomic groups by 30% by focusing on system transitions in preventive health with four key research lines covering important events over the life course.

- Healthy Start: the goal is to contribute to reducing the health gap between the lowest and highest socioeconomic groups by 30% by 2040. It focuses on children and families from conception until they leave home, with a specific focus on vulnerable groups with low socioeconomic status (SES). It will address societal challenges such as socioeconomic health gaps, peer pressure, limited access to healthy lifestyle options, and mental health issues through research and technology that promote healthy behaviors and support a successful transition into adulthood. Engagement with public and private stakeholders will ensure dissemination of evidence-based practices and support for policies that promote health equity.
- **Preserving Health**: the goal is to minimize functional decline and reduce health disparities in Dutch society for individuals aged 18-65, with a focus on vulnerable populations in specific neighborhoods. The research line will focus on integrative approaches (social, organizational, digital, technological) and interventions to overcome limitations of point solutions. Preference is given to structural solutions in which the environment is made such that it stimulates and sustainably supports healthy, affordable, and attractive living in neighborhoods at risk. By 2030, the programme aims to implement integrated interventions in living labs, focusing on a healthy environment, through trans-disciplinary collaboration with stakeholders with the ultimate aim to contribute to proactively to prevent the emergence of health problems and enable individuals to achieve their full health potential.
- Living with disease: the goal is to contribute to decreasing the incidence and prevalence of disease by 2055, and to contribute to improving quality of life for those living with disease and/or undergoing treatment. It will address common diseases and disabilities with increasing incidence and prevalence in all ages, with an initial focus on cancer, expanding later to obesity, cardiometabolic diseases (including diabetes), neurodevelopmental decline, and mental health. The societal challenges addressed in this research line include lifestyle changes among patients and the need for more research on women's health.
- Health @ home: The goal is to contribute to promoting digital self-management and digital self-organization through concrete living lab implementations by 2030. It will focus on frail elderly individuals who wish to avoid institutionalization, who used to go to the hospital, those with risk factors like falling and loneliness. The societal challenges addressed include how to optimize functioning, participation in society, and a sense of purpose and meaning, as well as how to optimally help and monitor patients at home with technological innovations.

The i4PH programme aims to conduct **cutting-edge research** in the preventive health domain by bringing together the expertise and resources of our 4 institutes. Through interdisciplinary collaboration, we aim to address the complex and multifaceted nature of preventive health issues and support scientific breakthroughs that will lead to improved health outcomes for individuals and society as a whole. Our efforts include bringing researchers together to create joint research projects, supporting research with attracting external funding, creating visibility of their work, support setting up living labs, organizing seed calls, and providing support for researchers.

The i4PH programme also aims to build **a community** in the preventive health domain by expanding the internal and external network through building relationships, marketing communication activities such as online communication, conferences, webinars, etc.

Additionally, the programme includes **educational** activities. It is essential for i4PH to support the Education team in educational activities, such as student challenges and hackathons in the preventive health domain, as well as a lifelong learning course for professionals, and a Master's programme for professionals based on microcredentials. This will not only provide valuable learning opportunities for students and professionals in the field, but also foster a strong community of preventive health experts who can collaborate and share knowledge to drive progress in addressing the complex challenges of preventive health. Furthermore, this will also bring in more professionals with the knowledge and skills to effectively contribute to strengthen preventive health transitions within our society.

The i4PH brings together the unique expertise of four prominent institutions in the Netherlands: Technical University Eindhoven, Wageningen University and Research, University of Utrecht, and Utrecht Medical Centre. This collaboration is unique in its approach to preventive health, which includes the integration of technology, behavior, exposome, nutrition and biology. The EWUU alliance also includes the use of living labs to test and implement best practices, making the research scalable and applicable to real-world settings. The focus the interactions between lifestyle, treatments, mental health, physical fitness, and resilience, sets i4PH apart from other preventive health initiatives in the Netherlands. The interdisciplinary approach allows for a more holistic understanding of the complex challenges facing preventive health and the potential to drive scientific breakthroughs that will lead to improved health outcomes for individuals and society.

Over the course of the next four years, the team at i4PH will diligently and consistently undertake regular evaluations to assess the progress of each Research Line against in 2023 pre-established milestones. Based on these assessments, i4PH will make informed decisions to disinvest or reinvest resources as necessary. Our four Research Lines are expected to narrow down and prioritize specific areas of interest, through increased interdisciplinary collaboration and focus on societal challenges, to create a unique collaboration that addresses pressing challenges in a targeted and impactful manner for a more sustainable and resilient future.

#### A. Mission and objectives

**Our mission** is to contribute to the central mission and overall long term goals of the Knowledge and Innovation agenda of Health Holland: For all Dutch people to live for at least 5 years longer in good health, and to decrease the health differences between the lowest and highest socioeconomic groups by 30% by

- 1. Stimulating, developing and executing excellent integrated research from the different perspectives from the EWUU institutions (healthcare, behavior, technique and nutrition) in prevention focused on through 4 research lines:
  - i. Healthy Start,
  - ii. Preserving Health,
  - iii. Living with disease
  - iv. Health @ Home
- 2. Facilitating Implementation of interventions and products from this research portfolio in society through implementation research.
- 3. We will work closely with our Education team to support the development and implementation of education programmes within the field of i4PH. This collaborative approach will ensure that our initiatives are aligned with our vision and result in the successful achievement of our educational objectives.
- 4. i4PH will take a pragmatic and modest approach towards establishing a robust and recognizable network for preventive health researchers within our four institutes, while also forging meaningful connections with external stakeholders.

**Our goal** is to leverage the resources and expertise of our four institutes to drive scientific advancements and facilitate the implementation of solutions that improve population health and reduce disparities among societal groups. Our focus will be on sharing our knowledge and collaborating with internal and external stakeholders to achieve our goal of being recognized as a reputable institution in the field of preventive health.

## Collaboration with the other EWUU working groups

<u>Artificial Intelligence (AI)</u> and <u>Living Technologies</u> (LT) play a crucial role in the field of preventive health by enabling the development of innovative solutions that can help prevent and manage various health conditions. AI can analyze large amounts of health data, such as medical records and OMICS information, and information from sensors and wearables, to identify patterns and make predictions about a person's risk of developing certain conditions and suggest appropriate measures. This information can be used to develop personalized health plans and early warning systems that can help individuals take preventative measures.

Living Technology (LT) research in preventive health aims to develop living diagnostic devices and organoid technologies to improve our etiological understanding of health, early disease diagnosis and treatment.

Both AI and LT have the potential to revolutionize preventive health by providing more accurate and personalized health information. This will enable individuals to take control of their health and prevent the onset of serious health conditions.

The focus of the <u>Education</u> team on innovative teaching methods and student opportunities aligns with the mission of the Institute for Preventive Health to improve public health through cuttingedge research and education. By enabling students to engage in hands-on learning and collaborate with peers, the Education team helps to prepare the next generation of professionals to tackle the complex challenges in preventive health. Collaborating with the Institute for Preventive Health allows the Education team to access preventive health research and technologies, and provides students with exposure to the latest developments in the field of preventive health. This collaboration helps to ensure that future professionals have the skills and knowledge necessary to make a positive impact on public health, and work towards reducing the burden of preventable diseases.

The Institute for Preventive Health benefits from the <u>Centre for Unusual Collaborations</u>' unusual look on interdisciplinary collaboration. The mission of the Centre of Unusual Collaborations is to bring together experts from different fields and disciplines to address complex problems and find innovative solutions. Our i4PH mission is to improve public health through collaborative research and education. By working with the Centre of Unusual Collaborations, i4PH can tap into a wider pool of expertise ('the not so usual suspects') and bring new perspectives to our research in preventive health by for example organizing 'unusual' workshops with CUCo's way of working and help to design new innovative and impactful projects. The collaboration between i4PH and the Centre of Unusual Collaborations helps to drive innovation and find new solutions to complex problems in the field of preventive health, with the ultimate goal of improving public health outcomes.

i4PH and the institute for a <u>Circular Society (i4CS)</u> aim to seek opportunities for collaboration, such as exploring how preventive health measures and reduced use of raw materials can be addressed simultaneously. In this the adagio is that if it is not healthy it is not sustainable and if it is not sustainable it is not healthy. We will benefit from sharing resources, such as a marketing communication manager, to more effectively reach our target audiences and align tone of voice and messaging. Additionally, to avoid scheduling conflicts, we will coordinate activities such as seed calls, webinars and conferences. By collaborating, i4PH and i4CS can leverage their strengths and resources to achieve their shared goals more efficiently and effectively.

#### B. Description of thematic focus

The preventive health domain is facing substantial societal challenges related to aging of the population, the change of the living environment, the need for promoting health, preventing disease and the mission to ensure a sustainable health care system.

Some of the wicked problems include (for a more extensive description including references see appendix B, Health and Healthcare trends in The Netherlands):



- Behavioral risk factors and chronic disease management: Chronic diseases such as cancers (the leading cause of death in the Netherlands), diabetes, and cardiometabolic diseases, are major contributors to morbidity and mortality worldwide. In addition lifestyle-related increases in multimorbidities in the same individual are a major challenge. More than one third of all deaths in the Netherlands can be attributed to behavioral risk factors. These behaviors include smoking, unhealthy diet, alcohol consumption, unhealthy sleeping habits and low physical activity. Within i4PH, we aim to identify effective interventions and create enabling living environments to support citizens in prolonged healthy living, managing their chronic diseases and achieving higher quality of life.
- Aging of the population and its impact on the healthcare system: The aging population has a significant impact on the healthcare system. With an increasing number of older individuals, the demand for healthcare services and medical attention increases. The aging population also has higher rates of chronic diseases and disabilities, which require ongoing medical care and management. This places a strain on healthcare resources and staff, as they need to provide more specialized care to an aging population. Preventive health systems and interventions can help address the problem of the aging population and decrease the workload of healthcare workers. Within i4PH, we aim to develop knowledge around promoting healthy lifestyle habits such as regular exercise, healthy eating, and stress management, develop telemedicine solutions for remote monitoring and consultation, develop assistive technology devices and home modifications to improve safety and independence with the help of e.g. artificial intelligence and robotics.
- Health disparities and the perpetuation of poverty across generations: Disadvantaged populations experience higher rates of chronic diseases and poorer health outcomes. Lower education and lower income are factors for poorer health outcomes and shorter life expectancy. Preventive strategies have to find ways to reach these populations and meaningfully involve them in developing preventive health initiatives. Within i4PH, we will contribute to developing and efficient delivery of education and resources (such as promoting healthy eating, healthy sleeping habits, physical activity, and stress management, as well as providing information on the risks and benefits of different health behaviors) with the aim to reduce health disparities by identifying and

addressing social, personal and economic determinants of health and promoting equitable access to preventive services.

- **Preventive health challenges in young people: From pre-conception to adulthood:** Preventive health challenges in this group are complex and multifaceted. Several factors, such as low income and parental education, can significantly impact the well-being, health, and social inclusion of children. For instance, children growing up in low-income families are more likely to have poor health outcomes and mental health issues. Additionally, obesity and unhealthy eating habits are more prevalent among children with less-educated parents. Moreover, alcohol consumption and suicidal thoughts are some of the significant concerns in young people, especially during the post-COVID and economic recession period. Preventive health measures need to focus on lifestyle factors prior and during pregnancy (including gestational diabetes), healthy lifestyle factors during all stages of growing up such as nutrition, behavioral issues, physical health, mental health, healthy habits, and the transition to independent health management. Addressing these challenges requires a comprehensive and integrated approach that involves families, healthcare providers, policymakers, and other stakeholders.
- **Growing burden of mental health problems:** Mental health has become a major issue, with projections showing that it will be the leading cause of morbidity and mortality by 2030. A billion people globally have a mental disorder, with life expectancy being 10-20 years shorter for those with severe mental disorders. The rise in mental health issues, especially among young people and the added stress of COVID-19, is putting a strain on already overburdened mental health services. In the Netherlands, 18% of adolescents have a mental health disorder, which is higher than the European Union average. Within i4PH we will stimulate research which takes a holistic approach considering individuals' needs and integrates mental health as an important factor in achieving better health outcomes.
- Environmental health: Environmental factors such as air and noise pollution, lack of access to safe and healthy housing, and the lack of an environment which stimulates physical activity can have a major impact on health. Preventive health strategies aim to contribute to improving population health by informing policies and regulations that stimulate the co-design and development of healthy neighborhoods. Within i4PH, we will provide insights into what enables wellbeing and contribute to creating healthy surroundings that reduce environmental stressors and promote an active lifestyle and enhance social cohesion and well-being.
- **Sustainability of Healthcare:** The above described challenges threaten the sustainability of healthcare, which becomes a major concern in the Netherlands, with the national healthcare expenditure reaching 107 billion euros in 2021, a yearly increase of 5% per capita. This trend, if unchanged, is predicted to lead to a tripling of healthcare costs by 2060, with 25% of employees in the sector compared to the current 16%. This presents a challenge in healthcare capacity, as the projected shortage of healthcare professionals globally is estimated to be 10 million by 2030, with a shortage of 135,000 healthcare workers in the Netherlands by 2031. The current staff shortage is already substantial with 61,000 vacancies open in the Dutch healthcare sector. Within i4PH we aim to contribute to decreasing the pressure on our healthcare system by addressing the mentioned challenges and developing and testing human centered and technology-based solutions.

Globally, our society is faced with a wide range of wicked problems that affect the health and well-being of individuals and communities. These require a comprehensive and transdisciplinary preventive approach that focuses on improving health and wellbeing by improving the living environment, care and cure for people at risk. This requires partnerships between health care providers, public health officials, community organizations, policymakers, companies and researchers and integrates individual behavior change interventions with technology, including the AI, machine learning, living technologies, and built environment as an enabler for citizens to promote healthy lifestyles and wellbeing.

The i4PH programme aims to contribute to tackling these wicked problems by focusing on 4 Research Lines:

- Healthy Start
- Preserving Health
- Living with disease
- Health @ Home



Because of their interdependency the 4 Research Lines itself and our goals within the research lines are partly overlapping.

It is envisioned that the I4PH Programme team is led by a scientific and a programme director who will be responsible for executing the plans in the roadmap. This i4PH leadership team will be supported by liaison officers and principal investigators who, on a regular basis, will aid in moving the plans in the roadmap forward.

The i4PH Steering Committee will function as a strategic advisory committee to reflect and evaluate the progress of each Research Line against the pre-established milestones on a regular basis. These evaluations are shared to the Supervisory board to ensure that the i4PH resources are being utilized effectively and efficiently.

Based on these evaluations, the i4PH Programme team will make informed decisions regarding the allocation of resources. If a Research Line is not progressing as expected or is not aligned with its intended objectives, i4PH may choose to disinvest resources from that Research Line. This could involve reallocating resources to other Research Lines or discontinuing activities that are not contributing to the desired outcomes. On the other hand, if a Research Line is showing positive progress and aligned with its objectives, i4PH may choose to reinvest resources to further optimize its outcomes. This may include allocating additional resources, expanding activities, or exploring new opportunities to enhance the impact of the Research Line.

The regular evaluations and the subsequent decisions to disinvest or reinvest resources demonstrate i4PH's commitment to adaptability and flexibility in its approach. It reflects the organization's proactive approach to continuously monitor and assess the progress of its Research Lines and make data-driven decisions to optimize outcomes. This iterative process ensures that i4PH remains agile and responsive to changing circumstances, and is able to consistently align its efforts with its intended objectives in order to achieve optimal outcomes.

(see detailed descriptions of each Research Line next pages)

## **Healthy Start**

## **Target group**

Individuals **from conception until the age of adulthood** (until the age young people can decide independently what they eat and how much do they move e.g. when leaving their parents' home), with a specific focus on **vulnerable groups** e.g. with migration background, facing economic, educational disadvantages and societal challenges.

## **Societal challenge**

Society faces a number of significant challenges in the area of preventive health, one of which is the **persistent socioeconomic gap**. This is characterized by a 'vicious circle' in which low socioeconomic status (SES) parents tend to raise low SES children, perpetuating a cycle of disadvantage. Another societal challenge is the impact of **peer pressure** and influence on individuals' health behaviors. Additionally, **access to affordable and healthy food options** is limited in many communities, which can contribute to poor health outcomes. Furthermore, **mental health issues** are often linked to unhealthy behaviors, which can increase the risk of non-communicable diseases (NCDs) such as cancer, heart disease and diabetes.

What impact should we have achieved? Both societal and economic

The i4PH programme aims to make an impact in the field of preventive health by contributing and supplying building blocks to **decrease differences in health outcomes among youth**. Our aim is to play a role in closing the disparity in physical and mental health between children and their families in different socioeconomic groups, with the target of contributing to reducing the gap by 30% by 2040. The programme seeks to contribute to improvement through conducting research aimed at **developing effective and smart technology** which enable **healthy behaviors** and support successful transition into healthy adulthood (e.g. health games, digital twins of the food environment etc), keeping a system change in mind. Engagement of the public and private stakeholders will ensure dissemination of evidence-based practices, and the support of policies and programmes that promote health equity.

## What knowledge & which innovations do we want to have developed to be able to achieve this impact?

- Making healthy choices attractive for youth (and their families). This could be achieved through gaming and AI assisted technology
- Integrating different measures (individual behavior change, enabling environment, less invisible risks) with a holistic approach.
- Participatory approach (understanding thoughts, needs and wishes of youth and their families)
- Engaging communities in interventions.
- Pilots large rollouts of the initiatives proved to be effective.

## Preserving Health

## **Target group**

Individuals/families between the **ages of 18 – 65 years in particular in disadvantaged neighborhoods** with the goal to minimize functional decline in early and late middle age. Special attention is given to vulnerable populations (such as migrants, low SES and disabled people) to help combat the increasing health disparities in Dutch society.

## Societal challenge

We are facing a continuous **growing pressure on the healthcare system**. This raises questions on how to keep the healthcare system affordable, sustainable and inclusive. One avenue to combat pressure on the health care system is by investing in system changes in neighborhoods that make healthy living and healthy choices easier, simpler, more affordable and attractive.

## What impact should we have achieved? Both societal and economic

By 2030 we want to have developed and implemented a portfolio of **implementable integrated interventions** that make the healthy choice the logical choice, with an initial focus on a healthy living environment (e.g. food and built environment). This requires system changes in neighborhoods that are pioneered in living labs in the three regions of the EWUU. Such interventions require trans-disciplinary work in co-creation with stakeholders and citizens.

# What knowledge & which innovations do we want to have developed to be able to achieve this impact?

We want to have

- Developed methodologies for participatory research (including citizen science).
- Developed innovative urban designs, and technological enabling technologies that facilitate health and health behaviors
- Build a knowledge-base of integrated interventions and their effectiveness and make this information available to stakeholders.
- Built information systems to allow the evaluation of interventions in real-world circumstances (living labs).

## Living with disease

## **Target group**

Individuals coping with **common (multiple) chronic diseases** and conditions face a substantial impact on quality of life and health care: e.g. cancer, cardiometabolic diseases, and obesity. Improving lifestyle can contribute to the prevention of this impact, and prevent further functional decline. Our initial main focus will be on **cancer** which will be expanded to other diseases in a later phase.

## Societal challenge

How to **change lifestyle behavior** among those with a disease, taking challenges into account which exist on different levels:

1) individual (e.g. fatigue, changes in appetite, life-long unhealthy behaviors, lifestyletreatment interactions, poverty, limited access to healthcare, lack of health literacy, poor health behavior and high stress levels,

2) social (e.g. family traditions, marital status);

3) cultural e.g. family ethnicity, religion).

Women are underrepresented in health research, which results in incomplete data and lack of data about how diseases and treatments affect women (e.g. bias in study design, hormonal fluctuations, pregnancy and lactation).

## What impact should we have achieved? Both societal and economic

The impact we aim to achieve by 2033 is to **improve the quality of life** for those living with disease or after treatment, through a combination of lifestyle changes and system changes. By 2055, we aim to **significantly reduce short-and long-term complications and side effects of treatment**, improve the quality of life and prognosis for those living with disease, through changes to a healthier lifestyle, with a specific emphasis on women and low SES groups.

## What knowledge & which innovations do we want to have developed to be able to achieve this impact?

- Tools and sensors to monitor and stimulate healthy behavior and self-management.
- Knowledge on underlying biological and metabolic mechanisms (focus on women).
- Participatory research in co-creation.
- Knowledge on the role of environmental exposures in the etiology and recurrence of diseases and conditions.
- Lifestyle interventions aiming at sustainable changing healthy behaviors increasing quality of life and reducing the incidence of novel diseases.

#### Health @ Home

## **Target group**

Health at Home aims to aid vulnerable individuals at risk of illness already in the healthcare system and those with a high risk of becoming patients soon. The focus is on **frail elderly**, as frail elderly have more physical limitations, behavioral risks, incidents and diseases, leading to psychosocial burdens such as loneliness, depression and dementia. They are also more likely to be admitted to hospitals or nursing homes.

## Societal challenge

The key challenges in healthcare that society is facing are the **aging of the population**, with subsequent **increase in prevalence of disease**, the **increasing workforce required** and the **affordability of the healthcare system.** A key condition to keep the system future proof is to limit the institutional demand on hospitals, nursing homes and mental health facilities. This requires extension of the healthcare delivery at home, through digital, technical and self-management programmes. There is not enough healthcare available in institutions and by professionals. Therefore we aim to prevent the need for institutionalized healthcare (for elderly).

What impact should we have achieved by? Both societal and economic

Health @ Home aims to prevent, postpone or shorten institutional admissions by supporting fragile elderly with **programmatic, technical or self-management healthcare solutions** in their own environment.

We aim to develop a **portfolio of interventions that support Health @ Home**, by developing and evaluating **technical, digital and self-management interventions** in prevention and health care delivery that will contribute to a decrease in primary hospital admissions, shortening the hospital stay and increasing the healthcare delivery at community level or at home.

What knowledge & which innovations do we want to have developed to be able to achieve this impact?

- The setting-up of lifestyle interventions networks providing community initiated lifestyle interventions.
- Studies on the uptake of healthcare at home and its effectiveness, with focus on barriers and facilitators, human-technology interaction.
- Technical solutions for providing healthcare or health monitoring at home (e.g. vital signs monitoring patches, diagnostic support services, self-measurement and monitoring devices).
- Healthy urban living solutions, with trans- and interdisciplinary approaches and cocreation of community based interventions in living environments that will improve health outcomes.
- Home care technology with technical solutions for home supervision and monitoring, replacing institutional admission.
- Digital mental health intervention programmes focusing on social cohesion.
- Community based interventions to improve nutritional intake and physical activity.

#### C. Overview of contributing (research) groups

Collaboration between our 4 institutes in the preventive health domain could achieve a significant impact by leveraging the strengths and expertise of each institution. Some potential benefits of our collaboration include:

- Interdisciplinary research: Collaboration between universities with different areas of expertise, such as medicine, nutrition, public health, epidemiology, exposome, artificial intelligence, living technology, robotics, diagnostics, urban design and social sciences, can lead to more interdisciplinary research that addresses the complex and multidimensional nature of preventive health challenges. Collaboration between our institutes provides access to diverse expertise and perspectives, which leads to new insights and approaches that improve the effectiveness of preventive health strategies.
- Increased resources: Collaboration between our institutes increases resources, such as funding, equipment, and data, and by approaching funding agencies and private partners together in an aligned manner, it helps to increase efficiency and effectiveness, facilitating more ambitious and impactful research projects.
- **Broader impact on policy and practice:** Collaboration between our institutes can lead to a broader impact of the research, and provides access to diverse communities and populations, which helps to ensure that research is relevant and impactful (co-creation). Collaboration between our institutes also leads to greater impact on policy and practice, as research findings can be more effectively disseminated and translated into action by working with partners across different sectors, such as government, industry, and community organizations.

The bibliometric analysis with specific preventive health search terms showed distinctive but complementary focus areas of each of our institutes within the Preventive Health domain:



Overall, collaboration between our 4 institutes in the preventive health domain could achieve a significant impact by leveraging the strengths and expertise of each institution and addressing the complex and multidimensional nature of preventive health challenges by providing

interdisciplinary research, increased resources, broader reach, access to diverse expertise, and greater impact on policy and practice. The consideration to develop a community of preventive health experts and stakeholders, expanding internal and external networks through strategic partnerships, marketing, and communication efforts, and providing access to resources such as guidelines and networking events could also be considered unique.

Within i4PH, we therefore seek collaboration with groups and specific researchers within our 4 institutes as well as collaboration with our own groups of external and private partners.

An overview of the current and future collaborating research groups per institute can be found in Appendix C.

An initial bibliographic analysis of current collaborations between (known) researchers from our 4 institutes on the topic of Preventive Health provides the following picture (see attachment C for more detailed pictures). To make the picture readable, we limited ourselves to at least 15 publications per author (400 colleagues) and a max of 25 authors per publication, publication set 2017-2023.:



For an extensive list of colleagues involved, please see **attachment C.** (living document which will be updated regularly).

#### D. Collaboration strategy

Collaborations with societal and academic partners can lead to significant value creation and support for research activities within i4PH in several ways. By working with individuals and organizations that have expertise in different fields, researchers gain access to new data, technologies, and perspectives that can enhance their own research. In addition, collaborations with private and industrial partners can provide researchers with access to valuable resources such as funding and equipment, as well as opportunities to test and commercialize their findings in use cases. Furthermore, societal partners can provide researchers with insights into the practical applications of their work, which can help to ensure that research is relevant and impactful. Additionally, academic partners can provide researchers with access to a wider range of research expertise and resources, which can lead to more interdisciplinary and collaborative research projects. Overall, collaborations with societal and academic partners can provide researchers with the resources, expertise, and perspectives needed to conduct innovative and impactful transdisciplinary research that can benefit society.

An initial bibliographic network analysis of publications (search based on an initial selection of key words in the Preventive health domain) shows that our network of academic partners is extensive. Note: In SciVal the University of Utrecht and the UMC Utrecht are seen as one organization. Furthermore keywords related to TU/e need to be brought into this query in a better and more visible way. This analysis is limited to publications with a maximum of 25 authors per publication and to organizations with at least 10 publications in the set (2017-2023). This resulted in 321 organization with which we are connected (see appendix D for a larger picture) via scientific publications:



Of course we also work with other partners than academic partners. A (not exhaustive) list is shown n the table below:						
<ul> <li>Collaborating part</li> <li>Living labs (Brainport region / Metropolia region, Cartesius)</li> <li>Municipality Eindhoven, Utrecht, Wageningen</li> <li>Health insurance companies</li> <li>GGD</li> <li>GPs (huisartsen)</li> <li>Youth organizations</li> <li>Schools</li> </ul>	<ul> <li>tners (examples)</li> <li>Preserving Health <ul> <li>Municipalities of Utrecht, Eindhoven, Wageningen/Ede</li> <li>Community workers</li> <li>e-health, food producers, supermarkets, out of home (restaurants, meal boxes, delivery companies etc)</li> <li>Urban designers, planners, developers, (social) housing providers, construction companies, transport companies</li> </ul> </li> </ul>					
<ul> <li>Living with disease</li> <li>Alliance Nutrition in Care (incl Regional hospitals)</li> <li>Patient organizations – NKF</li> <li>Caregivers – FMS (physicians), NH&amp;HC (nurses), NVD (dieticians), Physiotherapists, General Practitioners</li> <li>Care foundations (SGF)</li> <li>Businesses in food, eg Danone, Verdify, The Right Meal</li> <li>Digital Tools/Al: eg Ancora Health,</li> <li>Body composition eg In Body</li> <li>Lifestyle Treatment interactions: Pharma Companies</li> </ul>	<ul> <li>Health @ Home</li> <li>Tech start-ups</li> <li>Insurance companies</li> <li>Patient organizations</li> <li>District nurses</li> <li>Homecare organizations</li> <li>Hospitals</li> <li>General Practices</li> <li>The National Elderly Foundation the Netherlands</li> <li>NUZO elderly representation</li> </ul>					

Additionally, our institutes have several existing initiatives that could potentially enhance the research areas of i4PH. A comprehensive analysis of these initiatives will be conducted in 2023. However, we have already identified a few of these initiatives that could be of interest, categorized per institute. Our initial focus will be on initiatives where two or more EWUU partners are already involved or where it is feasible for other initiatives to join. This (living) document will be completed in 2023 and is available on request.

Joining or having knowledge about scientific collaborations and consortia in the field of preventive health provides numerous advantages for the Institute for Preventive Health (i4PH). By participating in these collaborations, i4PH has access to a wider pool of expertise, resources and data, which enhances its research and development efforts. Additionally, collaborations will help i4PH to build relationships with other organizations and experts in the field, leading to new partnerships and opportunities for collaboration. Furthermore, consortia can provide i4PH with a platform for exchanging knowledge and best practices, fostering innovation, and promoting the development of new technologies and approaches. By being part of these collaborations and consortia, i4PH will stay up-to-date on the latest developments and advancements in preventive health, fill the existing gaps and contribute to the growth and advancement of the field as a whole. During 2024-2027 a 'living' document will be kept up to date of relevant groups and if needed relevant connections will be made.

An overview of scientific collaborations and consortia and focus area of each of these can be found in Appendix D: Overview Preventive Health Landscape in The Netherlands (living document which will be updated regularly). Below a (not complete) overview of collaborations and initiatives in which one or more of our institutes participate:

SA HEALTHY START			
I-JGZ	Schoolkantine	Health & Wellbeing (mICF)	
gezonde tevkomst		POPFIT health RI rradig day alway builty	Data- en Kennishub Gezond Stedelijk Leven
LIFESTYLE 4HEALTH	HEALTH HUB UTRECHT	OnePlanet Research Center 4TU.Federation	ProMuscle in de Praktijk
FOR ALL Oncode	e	Dutch Empthic Environment Livingidos	beter zorg voor beter 000

Summarizing conclusion of the uniqueness of I4PH vs other initiatives & collaborations: Most initiatives focus either on a specific age group (youth, elderly) or on a specific disease. Other initiatives focus on a specific technology which might be applicable in all our target groups, sometimes combined with a specific target group in mind. Within i4PH, we aim to cover the population during their entire life (life course perspective) with an integral approach along 3 complementary routes: technology, lifestyle and environment.

What we can learn from other initiatives is the active involvement of target groups (participatory research), active communication strategy of some initiatives, clear focus, and often either fundamental or application focused approach of some initiatives.

In the next four years, the four Research Lines of i4PH are expected to become more focused based on societal challenges and collaborative efforts among the institutes which will help to further sharpen the uniqueness of our collaboration. As research progresses, the Research Lines are likely to narrow down and prioritize specific areas of interest, with increased interdisciplinary collaboration to tackle the wicked problems of our society. The aim is to align research efforts with the evolving needs of society, addressing pressing challenges in a targeted and impactful manner to create a more sustainable and resilient future.

#### E. Agenda & (F) Milestones and deliverables

At i4PH we will focus on one main activity, supported by marketing communication activities: **Expanding our research activities per research line** and depending on the needs of the research lines to achieve their goals by for example setting up living labs, organizing pressure cooker sessions and/or seed calls in order to establish distinct portfolio of research and innovation projects. Projects which receive financial support from i4PH will be supported with acquisition efforts from the liaison officers, marketing communication support from our marcom colleague as well as general support by connecting with other colleagues within our institutions.

Furthermore our aim is to work towards expanding **the internal and external network to create a preventive health community** where people can easily find each other to collaborate, make use of the unique skills of colleagues (from the EWUU institutes) and create a higher impact in the field of preventive health. And **support education activities** with connections and learnings from our i4PH community in order to prepare our students and professionals for developing and working in the preventive health domain with the latest skills set.

#### Expanding our research activities:

At i4PH, we are dedicated to advancing the field of preventive health through collaborative research. Our programme activities include support setting up living labs, where we conduct research in real-world settings to better understand the complex challenges and opportunities in the preventive health domain. Depending on the needs of each research line we also aim to organize pressure cookers based on subsidy opportunities; intensive, collaborative sessions that bring together experts from different disciplines within our 4 organizations to generate new insights and ideas on pressing issues in preventive health and develop joint project proposals. Additionally, we initiate seed calls to support the development of new and innovative research projects in the preventive health domain. Through these activities, we aim to generate new knowledge and insights that will inform policies and practices, and ultimately lead to better health outcomes for society. Additionally, this process will assist in identifying topics within our institutes that have sufficient momentum and motivation to drive dedicated efforts.

	2024	2025	2026	2027				
- 8-8-8 8-8-8	Scientific team complete & first project initiations & roll out							
	Field labs support	Field labs support	Field labs support	Field labs support				
	3-4 Pressure Cookers	3-4 Pressure Cookers	3-4 Pressure Cookers	3-4 Pressure Cookers				
	3 projects submitted	4 projects submitted	5 projects submitted	6 projects submitted				
	2 seed calls	2 seed calls	2 seed calls	2 seed calls				

## Supporting educational activities:

At i4PH, we are committed to provide knowledge from the preventive health domain to the Education working group to help them develop a wide range of educational activities to support the development of knowledge and skills in the preventive health domain. The EduXChange platform offers a variety of courses on various topics related to preventive health. Additionally, we support the Education team in organizing student challenges and hackathons in the preventive health domain, providing students with an opportunity to apply their knowledge and skills to real-world problems and develop innovative solutions. We also support the team to offer a lifelong learning course for professionals, aimed at keeping them updated with the latest knowledge and developments in the field. Furthermore, together we aim to develop a master programme for professionals based on microcredentials, providing a flexible and efficient way for professionals to enhance their expertise in the preventive health field. By supporting these educational activities, we strive to empower individuals and organizations to take a proactive approach to health and to improve the overall health and well-being of society.



## Community building

At i4PH, we recognize the importance of building a strong and vibrant community in the preventive health domain. Within the given budget we aim to expand our internal and external network through building relationships with key stakeholders, such as researchers, businesses, policymakers, and practitioners.

Our marketing communication activities, such as online communication, conferences, and webinars to share research findings and updates on our research activities, will be designed to engage and inform our community about the latest developments in the field.

To activate our *internal* network we envision the following activities:

- Host regular internal meetings or webinars to share research findings and updates on programme activities.
- Encourage team members to participate in internal events and conferences to represent i4PH and build relationships with external stakeholders.

By building an internal community, we hope to foster a dynamic and collaborative environment that will support the advancement of knowledge in the preventive health domain and ultimately lead to better health outcomes for society.

To activate our *external* network we envision the following activities:

- Organize networking events and opportunities for stakeholders to connect and collaborate and host regular events such as conferences, webinars, and workshops to share research findings and engage with stakeholders.
- Visit networking events such as conferences.
- Develop and maintain an active social media presence to share updates, news, and events with external audiences.
- Reach out to relevant organizations and associations in the field to establish partnerships and collaborations.
- Organize or participate in scientific and research initiatives, working groups, and committees to engage with the external research community and contribute to the development of the field.

By actively engaging with the external network, i4PH will be able to build strong relationships, expand its reach and impact, and gather valuable feedback and input from stakeholders to inform its research, education and outreach activities.



Our **marketing communication strategy** for the preventive health domain will focus on increasing awareness of our research and academic programmes by leveraging the knowledge of our scientific efforts through press releases and media coverage across various channels such as written press, webinars, and podcasts. To engage with our target audience, we will create valuable, relevant content to build credibility and foster relationships with students, alumni, researchers and other stakeholders. Our goal is to host at least one conference annually on relevant topics in the preventive health domain to promote and showcase our expertise to students, colleagues, alumni, and other stakeholders.

#### G. Governance

The governance of the i4PH programme will look as follows:

- **Supervisory board:** plays a crucial role in providing expert advice and guidance to i4PH. The Supervisory Board members are responsible for identifying potential opportunities and challenges, facilitating networking and collaboration within the four institutes, reviewing performance and progress, and approving the financial budget of i4PH. They also assess the impact and outcomes of the initiative and provide oversight and representation to specific groups or communities within their own institutes. Additionally, the Advisory Board works closely with the Steering Committee and Programme Team, providing valuable advice to support the overall progress of i4PH. Members of the Advisory Board are typically individuals with direct access to the Executive Board of the four institutes, such as members from the Board of Directors or the deans, depending on the governance structure of each institute. Their expertise and input help shape the strategic direction and success of i4PH in achieving its goals and advancing public health research and innovation.
- External Consultation Board: provide the viewpoints of external parties within the field of Preventive Health, facilitate networking and collaboration in the regions and represent stakeholders in Eindhoven, Wageningen and Utrecht, e.g. municipality of Eindhoven, Alliance Nutrition in Care, KWF, a building company, a food company, citizens organization, patient organization and a tech company (t.b.d.).
- Steering committee: plays an important role in providing oversight and guidance to the preventive health team within the i4PH initiative. As representatives of their respective institutes, the committee members bring a "bird's eye view" to the strategic direction and decision-making processes of each of the Research Lines of i4PH. Composed of key stakeholders, including key opinion leaders from each participating university, the Steering Committee guides and shapes the overall direction of the initiative. Each of them has thorough knowledge of a specific scientific field and is at the same time able to represent their entire institute. Their responsibilities include providing strategic guidance, setting priorities, reviewing progress, and providing advice on resource allocation, budgeting, and other critical aspects of each of i4PH's research lines. The Steering Committee ensures that the Programme team stays aligned with the overarching goals and objectives of i4PH, and that the initiative progresses in a coordinated and effective manner, ultimately driving positive impact in the field of public health research and innovation.
- **Programme team,** with a leadership team consisting of a Programme Director and a Scientific Director whom are supported by their respective teams.
  - Programme director (0,8 fte): The programme director is end responsible for overseeing the team's activities and ensuring that the team is meeting its mission and goals. The Programme Director is end responsible for the distribution of the allocated financial budget of the initiative, ensuring that resources are allocated effectively and in accordance with the strategic priorities, reviews and approves the budget allocations in collaboration with the Scientific Director. The Programme Director is also responsible for lobbying & representing the team to the 4 institutes and relevant external partners (ministries, subsidy organizations, industrial network, patient organizations, municipalities etc.) as well as providing input to the Steering Committee on the overall progress during their meetings. In addition, the Programme Director is temporarily liaison for the WUR.

- **The Scientific director (0,3 fte)** has end responsibility of the scientific direction of i4PH and setting overall scientific goals and objectives. The Scientific Director represents the interests of i4PH to specific scientific groups or science communities, advocating for its mission and vision, and promoting its scientific activities and achievements. Furthermore providing scientific advice to the programme team of i4PH, assisting in decision-making processes, and contributing to the progress and success of i4PH.
- 4 PIs\_(each 0,2 fte) are responsible for leading and overseeing research projects or programmes within their Research Line, including, initiating research proposals, developing research plans, monitoring progress of research ideas and projects. Together with the liaison officers the PIs are responsible for securing funding for their research projects or programmes, which may involve supporting writing grant proposals, and submitting funding applications. PIs have the obligation to collaborate with researchers of the 4 institutes to foster interdisciplinary research collaborations, share resources and expertise, and advance their Research Line. The PI's need to represent their Research Line during conferences and to support marketing communication activities. The PI's will report to the Scientific Director. We are considering the possibility of establishing a dotted line between the PI from Institution A and the Steering Committee member from Institute B in order to ensure optimal cross-fertilization between the institutes, allowing for better collaboration and information sharing.
- Liaison officers: The preventive health team will consist of 2 liaison officers (TU/e 0,5 fte and UU/UMCU 1 fte) who have a particular interest and knowledge in preventing illness, promoting health and wellness, and managing health disparities in order to create a sound network base within each institute as well as with external stakeholders which potentially could be co-funders in subsidy trajectories and living labs. Furthermore they will be responsible for having a good overview of subsidy opportunities, organizing pressure cookers and linking the researchers of their institute to the researchers of the other institutes. The Liaison Officers will promote i4PH opportunities within their own institutes, participate in strategic direction meetings of i4PH and support the PI's in finding relevant external partners for subsidy schemes. They will support the groups which received seed call money in advancing the proposals towards larger subsidy schemes. Within their own institute they will build a community interested in the i4PH activities. Liaison officers will report to the Programme director.
- Support team: The support team reports to the Programme Director and will consist of a <u>marketing communication manager</u> (0,4 fte) who will develop and implement the i4PHs marketing and communication strategy, create and manage marketing materials, coordinate events such as a conference and support the communication around pressure cookers, manage the i4PHs website and social media accounts, measure and analyze the effectiveness of marketing and communication efforts, and ensuring compliance with relevant regulations and guidelines. The <u>administrative support</u> who will take care of the practicalities of organizing meetings, pressure cookers, agenda management of the programme director etc.

**Decision-making:** The governance structure will include a process for making decisions, such as through regular meetings, voting, or consensus-building.

• The Programme team will convene weekly to discuss the progress of ongoing projects and generate plans for upcoming activities.

- The Steering committee, the Programme Director, and the Scientific Director will meet on a quarterly basis to exchange updates on ongoing projects and provide guidance on next steps. The Steering Committee and Programme team could potentially be part of the seed call decision making team, together with some members of the External Advisory Board. Twice a year (June & November), a comprehensive analysis of the progress towards the set goals for each Research Line will be conducted.
- The Supervisory committee will meet twice a year with the Steering Committee, the Programme Director, and the Scientific Director to share updates on upcoming opportunities within their respective institutes and receive input from the i4PH team for dissemination within their institutes.

**The External Consultation Board** will meet once a year with the Steering Committee and the Programme team to receive updates on the programme, provide input on societal needs and expectations, and offer advice to the i4PH team on how to engage external stakeholders effectively. Some members of the External Advisory Board will be asked to be involved in the seed call process.

**Communication and reporting:** The governance structure will include a process for communication and reporting on the team's activities, progress, and outcomes. This includes regular meetings, reports, and presentations to university leadership, community partners, and other stakeholders.

- An annual report will be prepared by the Programme team, with the report being completed in January. The report exists of a description of the goals achieved as well as a financial report.
- An updated annual plan will be developed by the Programme team, and it will be presented to the Steering committee. The first version of the annual plan will be presented in November, with the final version being completed in December.
- Minutes from meetings of various consultation structures will be shared with the appropriate teams and committees.
- Presentations on behalf of i4PH will be shared with the relevant teams and committees.

**Evaluation:** The governance structure will include a process for evaluating the team's activities, progress, and outcomes. This will include regular reviews of the team's performance, assessments of the impact of the team's work, and feedback from team members and external partners. Overall, the governance of the i4PH team will include a combination of leadership, decision-making, communication and reporting, and evaluation processes, with input from key stakeholders such as university leaders, researchers, health professionals, and community partners. This governance structure is designed to ensure that the team is meeting its mission and goals, and is having a positive impact on the health and well-being of the community.

**Decision making:** The Scientific Director and Programme Director equally possess the ultimate decision-making authority with regards to the actions and direction of I4PH, while striving to maintain collaboration and an equitable distribution of activities, resources, and budget among the four institutes. Additionally, they must ensure that the organization's activities remain adaptable on a regular basis to reflect the changing realities of the world and steer the ship on the right course. The Steering Committee provides valuable advisory support, but lacks decision-making power. In case of a dispute between the Scientific Director, the Programme Director and/or the Steering Committee, the matter will be referred to the Supervisory Board for a final decision.

#### H. Management



#### I. Membership model



People can become part of the i4PH community for which we offer:

- **Research and development:** access to exclusive research and development opportunities in the preventive health domain such as pressure cookers and seed funds. For example, people within the network could be given the opportunity to participate in studies or clinical trials, or to be among the first to try out new preventive health technologies or treatments (especially valuable for our external partners).
- Educational opportunities: access to educational opportunities in the preventive health domain for both our internal as well as our external partners. For example, people within the network could be given the opportunity to attend seminars, workshops, or webinars on topics related to preventive health.
- Networking and collaboration: We will provide opportunities for people in our network to connect and collaborate with other experts, professionals, and researchers in the preventive health domain. This could include opportunities to participate in online forums, attend networking events etc..
- Advocacy: Opportunities to engage in advocacy efforts to promote preventive health and support policy changes that would benefit the public health.

Overall, the network of the i4PH programme provides access to research and development opportunities, educational opportunities, networking and collaboration opportunities, and opportunities to engage in advocacy efforts. This can provide additional benefits to the 4 institutes as well as to the network, as it allows everyone to have a wider reach and impact in the society and allows them to have a more active role in the preventive health field.

#### J. Support team

The in kind contributions from TU/e (Eindhoven University of Technology), WUR (Wageningen University & Research), UU (Utrecht University) and UMCU (University Medical Center Utrecht) for the Institute for Preventive Health would likely include the following:

- Access to research facilities and equipment, with use of laboratory space if needed
- Expertise and knowledge of researchers and faculty members
- Technical support and administrative assistance
- Collaboration on research projects and initiatives
- Access to databases and other information resources
- Sharing of research results and publications
- Overall EWUU marketing support
- Support from the financial controllers with an easy accessible real time dashboard
- Providing insights and overviews of potentially interesting subsidy schemes (RSO)
- Contract management support
- HR management support
- A Scientific Director (0,3 fte)
- The Steering Committee members
- The Advisory Board members

These contributions would help the Institute for Preventive Health in its mission to advance preventive health research and practices, and could help strengthen its partnerships with these universities and medical centers.

The dedicated support from the i4PH budget will consist of a marketing communication support person (0,4 fte), 2 liaison officers (1,5 fte), 4 PI's (0,8 fte in total) and 1 programme director (0,8 fte).