

POTENTIAL TOPICS FOR ERA4HEALTH TRANSNATIONAL CALL 2025

– DOCUMENT FOR CONSULTATION –

#	TOPIC TITLE	AREA
1	<i>Understanding the interaction between cardiovascular diseases (CVD) and other disorders and/or therapeutics</i>	Cardiovascular Diseases
2	<i>Non-Invasive Diagnostic and theranostic tools through Nanotechnology in non-communicable diseases</i>	Nanomedicine
3	<i>Nanotechnology Approaches in therapeutics and interventions</i>	Nanomedicine
4	<i>Health consequences of modern Life-styles and Diets</i>	Nutrition- and lifestyle-related diseases
5	<i>Understanding Overweight and Obesity: early detection risk indicators, prevention and public policies</i>	Prevention and Public Health
6	<i>Environmental determinants of health behaviours: prevention strategies and public policies</i>	Prevention and Public Health

NOTE: All Potential topics for the ERA4Health partnership should:

- Promote Europe's leadership in responsible and impactful health research.
- Embed Responsible Research and Innovation (RRI) principles in projects i.e. ensuring ethical and inclusive research that is attuned to societal needs and expectations.

1. UNDERSTANDING THE INTERACTION BETWEEN CARDIOVASCULAR (CV) DISORDERS AND OTHER DISORDERS AND/OR THERAPEUTICS

CV disorders are the most common cause of death worldwide. Continuous research is needed to advance our knowledge of CV disorders and their consequences. The CV system interacts with all the other systems in the human body, hence a deeper knowledge of these multifactorial interactions is needed.

AIM OF THE CALL

- To expand knowledge on how CVD affect the performance of other organs and systems and their capacity to respond to therapies.
- To understand how non-CVD affect cardiovascular system performance including response to therapies.
- To understand how non-CVD drugs or other therapeutic approaches affect the performance of the cardiovascular system (e.g. the effect of chemotherapeutic on cardiotoxicity).
- Generation of digital models of disease(s) to study disease-disease and disease-drug interactions.

EXPECTED IMPACT

- Develop holistic approaches to prevent and manage cardiovascular diseases.
- Improve personalized treatment in cardiovascular diseases.
- Understand the interconnection of cardiovascular diseases and their impact in the onset of other diseases.

2. NON-INVASIVE DIAGNOSTIC AND THERANOSTIC TOOLS THROUGH NANOTECHNOLOGY IN NON-COMMUNICABLE DISEASES (NCD)

This call aims to combine nanotechnology and/or Key Enabling Technologies in the service of public health and individual patients, particularly through the development of non-invasive diagnostic and theranostic tools for NCDs.

AIM OF THE CALL

- To significantly improve prevention and early detection for a range of NCDs.
- To explore novel clinical applications of nanotechnology grounded in fundamental concepts such as surface chemistry, fluid dynamics, and biophysics etc.
- To pioneer advances in nano-enabled *in vivo* imaging and high-throughput diagnostics
- To set new standards for sensitivity and specificity for improved patient stratification & safety.
- To promote the development of non-invasive companion diagnostics that align therapeutic regimens with individual patient responses.
- To combine precise and preventive diagnostics with targeted nanomedicine-based therapies.
- To support the development of decentralised diagnostic solutions and enabling key diagnostic assays to be conducted outside of traditional laboratory settings.
- To develop nano-based theranostic solutions coupled with real-time monitoring capacity to tailor therapeutic options to ensure personalised treatment plans.
- To reduce resistance of healthcare frameworks to nanomedicine-based solutions, by tackling scalability and accessibility across the health systems.

EXPECTED IMPACT

- Enhancing diagnostic precision and offering personalised therapeutic strategies.
- Achieving breakthroughs in patient management systems, leading to quantifiable variations in prognoses, life expectancy, and overall quality of life for individuals with chronic conditions.
- Bring diagnostics closer to the patient, accelerating health assessments and personalized interventions.
- Foster sustainability and ethical considerations in Nanomedicine.

- Upheld patient welfare and societal trust.
- Set new benchmarks for non-invasive diagnostics.
- Empower clinicians to deliver and improve precision medicine, enhancing the quality and outcomes of patient care.

3. NANOTECHNOLOGY APPROACHES IN THERAPEUTICS AND INTERVENTIONS

Advances in nanomedicine hold profound potential for transformative therapeutic interventions, particularly in areas where conventional treatments have limitations.

AIM OF THE CALL

Proposals should target one or more of the following areas and goals:

- Harness the precision and versatility of nanomaterials to revolutionise gene and cell therapy, notably through improved RNA and DNA material engineering, synthesis, and delivery, offering novel treatments for uncured diseases.
- Exploit the unique ability of targeted nanomedicines to cross biological barriers (such as Blood Brain Barrier), bringing forth tailored treatments for disorders where traditional approaches fall short.
- Leverage nanotechnology reshape immune system modulation.
- Enhance the clinical translation and efficacy in nano-enabled regenerative medicine.
- Apply nanotechnology to improve drug development processes, ensuring safety, efficacy, easy storage and/or affordability and alignment with ethical standards.

EXPECTED IMPACT

- Leveraging nanomedicine's unique capabilities to enhance treatment modalities for diverse diseases.
- Foster clinical translation of nanotechnological research.
- Catalyse the shift of research innovations into tangible healthcare applications.
- Integrate nanomedicine with digital health innovations to cultivate a patient-centric healthcare model.
- Advance the translation of nanomedicine research into industrial and clinical settings.
- Support sustainable nanomaterials' research and green processing methods.

4. HEALTH CONSEQUENCES OF MODERN LIFE-STYLES AND DIETS

Scientific evidence highlights the role of lifestyle and diet in health, namely in the prevention and progression of both physical and mental health conditions. While these connections are well-established, there is a significant gap in understanding how to effectively translate this knowledge in practical settings. As an example, it is unclear how zoning (regulations, urban planning...) could be used to facilitate healthier lifestyle behaviours.

AIM OF THE CALL

- Investigate how health inequalities are related to socio-economic and geographic areas.
- Investigate Health consequences of plant-based diets and of other changes in eating behaviours
- Investigate how modern lifestyle contribute to the positive/negative progression of chronic diseases - from hospitals to communities.
- Analyse the barriers to policy implementation and what is currently missing to tackle food deserts and food swamps.
- Develop integrated multidisciplinary and multistakeholders approaches/strategies to efficiently improve dietary and lifestyle habits/behaviours.
- Boost endeavors in knowledge transfer and implementation science, focusing particularly on prevention and/or treatment (both physical and mental conditions) that result from poor lifestyle and diet factors.

EXPECTED IMPACT

- Improve access to healthier food and lifestyle environments in both urban and rural areas.
- Improve the cooperation between public, private and social sectors to implement healthier policies.
- Improve the understanding of the policy process leading the expansion, or contraction, of food deserts and food swamps.
- Leveraging the knowledge linking healthy diet and healthy lifestyle to improved physical and mental health conditions towards the development of large-scale implementation strategies.

- Empower communities by bring scientific evidence in the field of Nutrition, Biomarkers, Nutraceuticals and related areas closer to practitioners, policy makers, and individuals.

5. UNDERSTANDING OVERWEIGHT AND OBESITY: EARLY DETECTION, RISK INDICATORS, PREVENTION AND PUBLIC POLICIES

Overweight and obesity are two major societal challenges and often a risk factor associated with poor prognosis and the development of multiple disorders such as diabetes, cancer, respiratory or cardiovascular diseases.

AIM OF THE CALL

- To develop preventive and predictive approaches beyond the “state-of-the art” capable to tackle overweight and obesity.
- Co-create with health care providers, patients, researchers and other relevant stakeholders, tools to predict the influence of overweight and obesity in the onset and progression of other disorders.
- To investigate how overweight and obesity affect the mechanism of action of therapeutics against cancer, cardiovascular and other disorders.
- Improve risk stratification of overweight and obesity patients.
- To understand how societal and environmental and biological factors, including geographic, ethnical, genetic, hormonal disbalance etc, affect onset and progression of overweight and obesity.
- To assess the economic impact of the proposed tools or strategies to healthcare system.
- To issue orientations that help policymakers to define new regulations and guidelines to prevent overweight and obesity.
- To get insights into regional variations, prevalence and incidence, of overweight and obesity.
- Systems’ approaches and interventions to prevent overweight and obesity in children, teenagers and vulnerable groups.
- Innovative prevention and treatment approaches for over-under- and malnutrition as a consequence of physiological, pathophysiological and behavioural influences as well as socioeconomic status.
- To understand chronobiological mechanisms underlying obesity, overweight and related metabolic diseases.

EXPECTED IMPACT

- To shift the paradigm of overweight and obesity management from “reactive” to “proactive”.

- To improve accuracy of social interventions, early detection and treatment of overweight and obesity.
- Development of effective public policies and public health initiatives supporting targeted interventions.
- To reduce the burden of overweight and obesity in Europe by improving data collection and identify inequalities, to support evidence-based decision-making processes.
- Improve knowledge on the economic burden of the disease and of its prevention and treatment.
- Empower and engage citizens and patients in the management of overweight and obesity related NCDs.

6. ENVIRONMENTAL DETERMINANTS OF HEALTH BEHAVIOURS: PREVENTION STRATEGIES AND PUBLIC POLICIES

A healthy environment is vital to ensure healthy lives and to promote well-being for all at all ages. Urbanization and industrialization confront citizens with co-exposure to several environmental stressors like air pollution, chemicals, noise or waste, as well as to facilitators of risk-taking behaviours such as long commuting times, unhealthy built and food environment.

AIM OF THE CALL

- Understanding and assessing the effects of environmental determinants of health, including health behaviours.
- Pilot or scale-up effective strategies/initiatives promoting healthier behaviours and communities.
- Investigate the impact of health policies and other legal instruments to the development of healthier societies.
- To promote the design of health strategies impacting disease prevention enabling building up communities where people live healthier.
- To understand the effect of public policies addressed to reduce contaminations and pollutants, in the health of citizens.
- To issue orientations that help policymakers to define new regulations and guidelines.

EXPECTED IMPACT

- To support improvement of public policies and its implementation.
- To develop healthy environments, benefiting health and wellbeing of citizens.
- To promote the development of [holistic] research-based policies.
- To reduce the impact of climate changes and registered augmented heat and humidity in human health.
- To embed healthy behaviours and strengthen resilience in European culture/societies to mitigate the negative effects of external factors (climate change, war, economic crisis...).