

FP9 proposed mission for Healthcare

“Start Healthy, Live Actively, Feel Better”

1. Ambitions:

Providing a healthy start for all, and adding 3 healthy life years for every European citizen by 2030 while containing healthcare costs.

European citizens consider their health to be the most important factor determining quality of life. Advances in healthcare and health technology can improve care and cure and increase quality of life, for a longer period. Still, Europe faces challenges in improving its citizens' health, from conception to grave.

Environmental factors such as lifestyle, urban living, climate change, and vector-borne diseases pose a continuous threat to the health and well-being of European citizens. This is strengthened by socio-economic differences between and within countries, causing disparities in health literacy and access to healthcare at national, regional, and even local levels. Health during the entire life course is determined already before conception and in the first weeks of pregnancy.

During a person's lifetime much progress can be achieved in developing means of healthier living, prevention and early diagnosis of potential diseases, and improved treatment and monitoring if that person becomes ill. Improvement of the quality and sustainability of healthcare through digitization will drive efficiency in health, social, and informal care delivery, enable value-based healthcare systems and improve patient and citizen involvement in their personal health and care.

The health domain can accomplish sustainable health in Europe by 2030. Europe taking the lead in addressing global challenges and Sustainable Development Goals (SDGs) in particular helps to meet the European health challenges. This refers specifically to the health SDG3 (Ensure healthy lives and promote wellbeing for all at all ages).

Benefits for the society/citizens

- Providing the next generation of European citizens with a healthy start, in this way preventing diseases throughout the entire lifecycle
- Improved insight into the relationship between genome and disease risks, allowing personalized medicine
- Reducing the negative impact of environmental factors on European citizens' health at every age
- Staying active and healthy for an extended period of time, preventing citizens from getting a disease
- Early and definite diagnosis -prior to symptoms occurring- enabling treatment before disease progresses

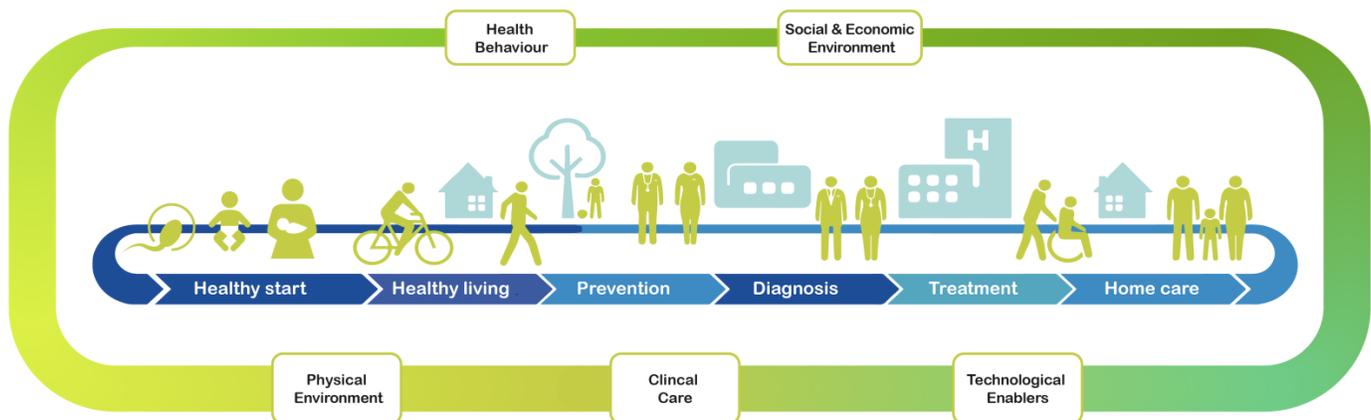
- Digitized and visualized health to promote prevention models, shorten time-to-diagnosis, and optimize personalized care, i.e., adapted to specific patient conditions and (environmental, behavioral, and social) context
- Personalized, first-time-right treatment and acute care for better therapy outcomes, informed prognosis, and more patient comfort
- Reduction of overall hospital stays by 30% through e.g., minimally invasive therapies and reduction in re-admissions
- Lower workload for health professionals and increased job satisfaction
- Keeping the budget of healthcare in Europe at sustainable levels below 10% of GDP, while providing high value-based healthcare, leading to 3 additional healthy life years for every European citizen by 2030.

Transformative potential for society, science, technology, and industry

The start of life determines health throughout a person’s lifecycle. Therefore, there is an urgent need for Europe to invest in a healthy start for all. Technological advances are needed for a better understanding of the impact of the exposome, i.e. all external and internal environmental factors, on early human development. These factors are becoming more and more a leading cause of death and are largely avoidable.

The digital transformation of health and social care will drive innovation. Technologies (like imaging, medical informatics, biomolecular techniques, artificial intelligence, and therapies), medical know-how (such as novel decision-making methods for diagnosis and therapy), and patient engagement (through smart applications, ranging from social platforms through devices at the point of care and dynamic coaches) will converge. Participants are connected across the continuum of care and integrated by new organizational, business, and financial models. This benefits European citizens, societies, and economies.

These digital innovations will touch upon all parts of the care continuum of individuals, but will also enable connecting them across multi-disciplinary professionals and care providers. This allows for true patient-centered and -connected health and social care.



Patient- centered and -connected health and social care.

2. Scope:

The major developments described below are crucial to the ambition of adding 3 healthy life years, while containing costs and improving quality, efficiency, and satisfaction. Major advancements in several parts of the care continuum are to be foreseen in the next decade.

Digitization of healthcare

The delivery of healthcare is in the process of “industrialization”, i.e. going through changes in organization of work, more or less comparable to those taking place in industry a century ago. Digitization is an important driver in this process. It will enable increasing the efficiency and effectiveness of care, as well as personalizing healthcare towards 2030:

- **“Industrializing” care:** standardizing and optimizing (currently silo-ed) building blocks of healthcare, enabling health systems to deliver value-based healthcare with better outcomes at lower cost.
- **“Personalizing” care:** convergence of professional healthcare and consumer health, enabled by data and digitization, leading to increased self-management and individualized treatment paths.

A healthy start

Better understanding of the impact of the exposome on child development:

- Technological advancements to unravel exposome-induced changes in epigenetics, DNA, and RNA profiles that are related to the development of diseases at a later age, leading to the development and implementation of preventive measures.
- Innovative approaches in improving maternal and child health from pregnancy until eighteen years of age, with a focus on the first 1000 days.

Better understanding of the impact of the negative environmental factors on the vulnerability and resilience of human health:

- Technological advancements for environmental health research, leading to the development and implementation of preventive measures.
- Development of the next generation vaccines for global disease prevention.

Connected and integrated care

Connected Care aims to industrialize care through standards and evidence-based practices, while enabling precision medicine and personalized treatment, amongst others based on the following advancements:

- Analytics- and imaging-enabled clinical and operational programs for acute care and chronic care patient management. This will help providers to efficiently allocate resources across a highly varied patient and clinical needs landscape.
- Building IT solutions and tools that enable migration of on-premises solution to hybrid or cloud-based deployments, with advanced data science capabilities.
- Enabling Electronic Health Record (EHR) data capturing, aggregation, and sharing into clinical relevant and user-friendly contexts. This reduces false alarms, improves early detection of disease progression, and supports timely intervention.
- Deploying well-integrated tools for team collaboration, both technical and visual, across the health and social care settings, based on social media and collaborative principles.

- Deploying IT systems that support dynamic, distributed, citizen-specific, and integrated (clinical, social, and informal) care workflows.
- Ubiquitous monitoring technology, combined with cloud-based interconnected analytics, enabling continuous healthcare delivery across care teams and settings, with adaptable cost-structures.
- Connected care solutions will engage multi-disciplinary clinicians, consumers/patients, and their families to support worried-well and healthy-aging consumers, as well as acute and post-acute patients with ongoing (poly-)chronic disease management needs.

Definitive diagnosis, biomedical modeling, and treatment optimization (theranostics)

Early and definitive diagnosis will combine information from biomedical imaging, digital and advanced microscopic pathology, genomics, and other clinical and patient data to deliver first-time-right diagnoses within and outside of the hospital. This will amongst others be based on the following advancements:

- Advanced imaging protocols (microscopic imaging, non-invasive imaging) to visualize and diagnose diseases, underlying processes, and repair mechanisms in early onset of disease.
- Population and patient-specific findings, disease and clinical pathway models, and predictive analytics will enable personalized treatment selection.
- Mitigate strategies and technologies for the rise of Anti-Microbial Resistance (AMR) and its negative impact on human health.
- Intelligent and standardized clinical solutions, combined with value added services, will improve departmental efficiency and cost-effective care delivery.
- Image-guided therapy will industrialize care-delivery processes for better quality assurance, clinical outcomes, and cost control.
- Integrated solutions that combine real-time imaging with smart devices and intra-procedural navigation will further accelerate the transformation from open surgical to minimally and non-invasive procedures.
- Disruptive new treatment modalities (like mRNA, siRNA, immune cells therapy, stem cells regeneration) are enabled by appropriate dosage forms that accomplish delivery at the target site, release of the therapeutic activity at the right time while limiting exposure of non-target tissues.
- New biocompatible materials, low-cost miniaturized sensors, virtual/augmented reality guidance, and data-driven algorithms will enable real-time adaptive therapy delivering more predictable outcomes in cardiology, oncology, and many other medical treatments.

Which actors, sectors and disciplines are engaged.

An eco-system that drives the digital transformation of healthcare, in interaction with citizens, patients and patient associations, academia, care providers, governmental bodies, health insurers, industry, and policy makers is needed to enable a healthy start and life for all European citizens.

Challenge is in linking various data sources amongst the healthcare actors in the value chain. The role of industry is in providing digital technologies to connect and integrate data sources to turn data into patient-centric information. All actors across the value chain are citizens, patients and patient associations, clinicians, hospitals and care centers, family care providers, social care providers, RTOs and academia/scientific societies, industry (large and small), health insurers and local, regional and national public authorities including municipalities and policy makers.

3. Expected impacts:

Impact on society and on citizens

- Healthier citizens, actively involved in co-creating health-targeted prevention policies, guidelines, measures, tools, and campaigns to “avoid the avoidable”.
- Novel leads through new scientific knowledge and technological innovations on epigenetics and nutrigenomics. These result, amongst others, in novel preventive, diagnostic, prognostic, and therapeutic solutions, such as biomarkers for future diagnostic medicine, gamifying behavior change, and a next wave of wearable health technologies, focusing on gathering personal data with direct use for doctors.
- Active use of prediction tools, (pre-)event health-related early warning systems, management tools, and models to timely assess and mitigate the negative impact and environmental factors on health.
- Availability of next generation vaccines for global disease prevention, providing a foundation for vaccine development against new and emerging diseases.
- Effective action against the rise of AMR, mitigating its negative impact on human health, society and the economy. Implementation of the One Health approach, addressing AMR in humans and animals.
- Personalized health, better outcomes, and higher efficiency healthcare, reducing waste and optimizing use of healthcare professionals, allowing:
 - each European citizen to have access to his digital health record at any place and any time
 - personalized treatment, based on a patient’s individual data
 - keeping healthcare costs at 10% or below of GDP while adding 3 healthy life years
- A continuum of care providing integrated solutions, supported by a high level of connectivity of equipment and devices, allowing:
 - provision of tailor-made and responsive care for each citizen
 - combination of deep data from both personal measurements and professional healthcare solutions, to create a rich and comprehensive overview of people’s health and give more (contextual) insights to care teams

EU-added value

- Competitiveness:
 - A healthy Europe with healthier and well-educated workforce
 - Medical and digital technology industries at the forefront of digitizing healthcare creating a competitive advantage.

- Societal:
 - A healthy start will benefit health during life of the new generation, and the next generations
 - Europe as an ageing but healthy society. Keeping healthcare manageable and affordable, and avoiding the avoidable;
- Scientific/technological:
 - Breaking down silos between various health actors and enabling data integration. A better scientific insight in the effect of the exposome on early human development in relation to the development of diseases later in life.
 - A better scientific understanding of the impact of climate change and environmental factors
 - Apply key enabling technologies (KETs) to solve the above-mentioned healthcare challenges, i.e. ageing society at manageable healthcare cost through digitization.

- *In 2030, Europe will be able to provide its next generation of citizens a healthier start and in this way a healthier lifecycle. Knowledge of the impact of the exposome on early human development and the development of diseases later in life will be translated into preventive and risk mitigation measures as well as into novel leads for diagnostic and therapeutic solutions.*
- *In 2030, healthcare will be fast, precise, personalized and cost-effective. Advanced diagnostics, imaging, pervasive monitoring, and innovative e-health applications will be able to detect body signals, symptoms, and diseases early on. Further diagnosis and treatment will be highly targeted, minimally invasive, and increasingly effective, reducing disability and mortality from cancer, strokes, and other major diseases.*
- *Diagnosis and treatment will be delivered instantly at the point of care, thanks to the new science of “theranostics.” With the help of these and other innovations, including data available to provide means to optimize personalized medicine, Europe will keep an ageing population healthy and fit.*