

# DATA-DRIVEN APPROACHES FOR A HEALTHY LIFE COURSE





GRAND  
CHALLENGE

# CITIZEN HEALTH AND WELLBEING

MISSION

## DATA-DRIVEN APPROACHES FOR A HEALTHY LIFE COURSE

100% health intelligence-based  
precision health and care by 2030

AREAS OF  
INTEREST &  
CROSS-SECTOR

Medical & Public  
Health Sector    Social Sector  
Legal & Ethics    Pharmaceutical  
Sector    Service  
Sectors

Tech  
Sector    Consumer  
Goods    Food  
Sector    Behavioral    Regulatory

R&I  
PROJECTS

Novel  
interventions  
to prevent  
diseases

Innovative  
treatment options  
to enable precision  
health care

Innovative tools  
for precision  
diagnosis and  
disease prediction

New  
methodologies  
to combine and  
analyze data

Novel processes  
for rapid  
implementation of  
digital solutions

## 1 Bold, inspirational with wide societal relevance

The vast amounts of data generated in healthcare provide a wealth of information for systematic analysis to improve healthcare. Such health intelligence based on 'real world information' combined with data from clinical trials allows the development of data-driven, individually tailored, evidence-based strategies for prevention, diagnosis, and treatment of disease. These strategies, once developed, have the potential to realize a significantly healthier world population with lower costs and fewer side-effects than the standardized regimes currently available.

## 2 A clear direction: targeted, measurable and time-bound

The target is that by 2030, precision strategies for prevention, diagnosis and treatment are evidence-based through health intelligence. For this purpose, different healthcare data sources need to be disclosed and linked. Variations in treatment across the EU are significantly reduced, while individual tailoring of prevention, diagnosis, and treatment is increased.

## 3 Ambitious but realistic research & innovation actions

Innovative development areas such as artificial intelligence, machine learning, and Big Data analytics provide a platform for the Health arena to realize goals that were unimaginable only a few years ago. Harnessing these developments for healthcare means creating innovative methods applying such developments to the intricacies of human development, health, and disease.

Big data and machine learning are extremely useful for finding associations and thus for prediction of outcomes, but more research is required to exploit these data sources and techniques for understanding causal relations, which are necessary for precision preventive interventions and treatments. Solutions are needed to deal with huge amounts of data for health intelligence as well as to translate outcomes of data analytics into digital tools that can be applied in health and care settings. Deciphering mechanisms of disease through health intelligence opens avenues to designing innovative diagnosis and treatment methods, enabling precision medicine. Correlating disease incidence with data collected years earlier can, for instance, uncover early biomarkers of disease and even genetic linkages or predispositions.

Yet to enable such innovative research, infrastructure must be adapted and developed to allow combined analysis of data from various sources. Actions will need to be undertaken to address interoperability, common standards, data quality and accessibility.

**4 Cross-disciplinary, cross-sector and cross-actor innovation**

A highly-developed, linked knowledge base and digital solutions enabling analysis of immense datasets are fundamental to myriad types of healthcare research and will become increasingly important as the drive for precision medicine demands analysis of more and more individual subgroups, for which larger and linked datasets are needed to derive meaningful results. At the same time, the need to keep healthcare costs within bounds will demand innovative implementation of precision medicine solutions. Addressing this target requires harnessing and integrating the combined skills and expertise of medical researchers, IT professionals, software developers, healthcare providers, experts in legal and ethical practicalities, economists, (local) governments, patients, and the general public. Strong multi- and interdisciplinary approaches will be needed for implementation of digital solutions

to provide automated mapping of individual patient characteristics onto precision medicine analytics, enabling cost-effective medical strategies. Moreover, these data-driven approaches can be used to develop patient-centered healthcare which empowers individual patients to optimize their own health care according to their personal preferences.

**5 Promote multiple, bottom-up solutions**

Creating data-driven approaches to enable a healthy life course will demand that we piggy-back healthcare applications onto innovative developments in more fundamental areas, such as the development of artificial intelligence, extreme-performance data analytics, data management, and linking tools. “Privacy by design” and regulatory requirements are core to the analysis of medical data and implementation of digital solutions to medical problems and should occupy a central role from the very start of this mission. These elements will assemble to provide trustable, safe, user-friendly and cost-effective tools and technologies which allow a vast array of applications which enable evidence-based, precision medical solutions to prevention, diagnosis, and treatment of disease, resulting in a healthy life course for all.

**DATA-DRIVEN APPROACHES FOR A HEALTHY LIFE COURSE RESEARCH FUNDING LINES:**



A healthy life course through predictive data-driven approaches



A healthy life course through preventive data-driven approaches



A healthy life course through precision data-driven approaches



# THE IMPACT WE WANT TO MAKE: 'A HEALTHY LIFE COURSE FOR ALL!'

Erasmus Medical Centre wants to enable health and a healthy life course for all!

We are using transdisciplinary approaches to develop strategies for prediction, prevention, and precision medicine that can be employed to solve current as well as emerging health challenges. It is how we impact the lives of healthy citizens and patients through our networks and collaborations.

We are an academic hospital with the DNA of Rotterdam, an academic hospital that walks the talk.

