

THE FOOD-KNOWLEDGE GATEWAY TO HEALTH



GRAND CHALLENGE

CITIZEN HEALTH AND WELLBEING

MISSION

FOOD AND LIFESTYLE FOR A HEALTHY LIFE COURSE

Evidence based food and lifestyle interventions for all by 2030

AREAS OF INTEREST & CROSS-SECTOR

Medical & Public Health Sector
Tech Sector
Agri Sector
Living Environment
Pharma-ceutical
Food Sector
Service Sectors
Behavioral Economics

R&I PROJECTS

New standards and techniques to differentiate and assess food safety

Evidence based food and lifestyle interventions for a heterogeneous patient population

Personalized nutrition and lifestyle approaches /tools

Understanding of the long-term effects of food intake on health

1 Introduction - the food-knowledge gateway to health

"Unhealthy diets pose a greater risk to morbidity and mortality than does unsafe sex, and alcohol, drug, and tobacco use combined". The WHO states that a healthy diet helps protect against malnutrition in all its forms, and against Non-Communicable Diseases (NCDs) such as diabetes, heart disease, stroke and cancer¹. Changes from current to healthy diets are likely to substantially benefit human health, preventing approximately 11 million deaths per year¹. Against this background, there is an **urgent need for evidence based interventions** to prevent and cure disease.

Furthermore, food safety is an important issue: 23 million EU citizens fall ill each year due to food-borne diseases². **Current standards for food safety do not differentiate between healthy consumers and patients with underlying conditions.** While both groups are heterogeneous, patients are generally much more vulnerable. What is harmless for a healthy consumer could be very harmful for patients. With the increasing population and the elevated demand for food products, coming from diverse geographic locations with diverse foodborne pathogens, the maintenance in its quality becomes a greater challenge. By the year 2030, the global food demand is expected to rise by 35%. A One Health approach is essential to mitigate food and environmental health risks.

Important complicating factors are that persistent social disparities exist when it comes to obesity, alcoholism and tobacco use⁴ and that individuals differ in their genetic risk for NCDs, and in their response to food patterns and pathogens (nutri-genetics). Major questions and challenges for the next decade include⁴: 1) the role of nutrition in the prevention, care and cure of NCDs; 2) the use of foods with high nutritional value

in care and cure; 3) assessment, prevention and cure of malnutrition in all its forms; 4) the promotion of healthy and sustainable diets across Europe; and 5) food safety in times of globalization, climate change and antimicrobial resistance.

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

The mission is to **unlock the potential of food in preventing and curing disease**. The target is that by 2030, *evidence based food and lifestyle interventions during the life course to support optimal health* for both healthy citizens and patients, are developed, available, and ready to be implemented. In addition, by 2030 food safety standards should differentiate between healthy and vulnerable (patient) populations.

3 Ambitious but realistic research & innovation actions

To develop interventions and tools that improve health for a changing patient population as well as for healthy consumers, Research and Innovation (R&I) projects are needed to gain a thorough understanding of the relation between food and health across the full life course and **from molecule to population**. These R&I projects will ultimately deliver:

- 1 Evidence based food and lifestyle interventions for a heterogeneous patient population
- 2 New standards and techniques to assess food safety for patients and healthy consumers
- 3 An understanding of the long-term effects of food intake on health
- 4 Personalized nutrition and lifestyle approaches and support tools to monitor nutritional status

¹ [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(18\)31788-4/fulltext?utm_campaign=tleatig&utm_source=hub_pag](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(18)31788-4/fulltext?utm_campaign=tleatig&utm_source=hub_pag)

² <https://www.who.int/news-room/fact-sheets/detail/healthy-diet>

³ Adapted from: http://ec.europa.eu/research/bioeconomy/pdf/food2030_report_conference_2017.pdf#view=fit&pagemode=none

⁴ <http://www.oecd.org/health/health-at-a-glance-europe-23056088.htm>

To deliver on these questions and challenges, Research & Innovation projects are needed with a variety of approaches.

- a **Food for better health through nutrition approaches** - personalised nutrition to prevent malnutrition in relation to health and disease, and to support care and cure; randomized clinical trials on dietary regimes for patient groups.
- b **Food for better health through data driven approaches** - use of real world data through wearables and smart home devices and utensils; unlocking the human genome, microbiome and virome, and its' interaction with food; new insights from well-established longitudinal cohort studies; identification of (novel) biomarkers to assess malnutrition.
- c **One health approaches to implement health and well-being** - Combating antimicrobial resistance and (re-)emerging food-borne diseases across the globe. New techniques to prevent and predict food- or wildlife-borne disease outbreaks.
- d **How food acts on human biology and how human biology acts on food** - understanding the long-term health effects of diets, the interaction between food-microbiome-health and how biological processes such as stress affect and influence these relationships.

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

Food is a big part of social life and social tradition. It can be a conscious or an unconscious activity, with temptations everywhere in parts of the world and shortages in other parts, both leading to low-quality diets. And, last but not least, it is very much a biological process. Too little is known about the effect of food

intake and food safety on our health and well-being in different stages of our life course, and on the effect of food intake on prevention, recovery and cure of diseases in different states of health and disease / patient population/vulnerable populations. Issues and problems connected with food safety, food security, and sustainable production systems qualify as a wicked dilemma. Ensuring safe, accessible, affordable, and nutritious food is increasingly difficult, especially in a global context. Central to this challenge is the development of a One Health strategy, and a new level of thinking and acting⁵.

To address all these questions in order to combat disparities and reach our target, interdisciplinary approaches are key. Research teams combining medical, biological, sociological, psychological, public management, programmers and ICT specialists, amongst others, are needed. Successful research strategies on a number of the challenges should include a citizen science approach.

5 promote multiple, bottom-up solutions

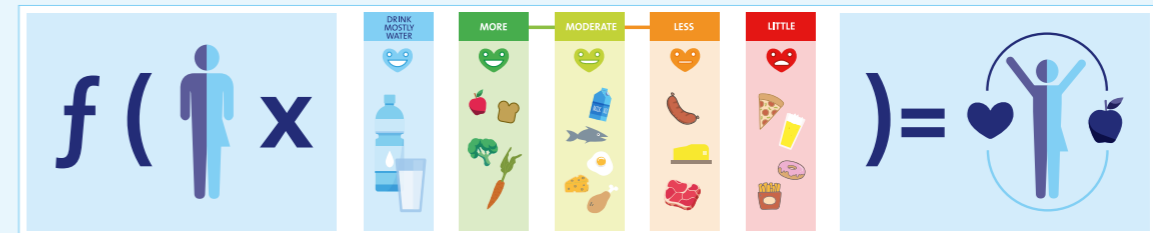
The fact that both food and health are right at the center of society, makes that this mission can only be achieved by addressing all these multiple elements simultaneously in a connected and coordinated effort. This requires multiple solutions for the European heterogeneous context and (patient) population from grassroots and bottom-up initiatives, to large scale interventions to establish new and widespread standards and interventions.

Erasmus University Medical Center is committed to **let actions speak louder than words** and work towards **unlocking the potential of food and food safety in preventing and curing disease.**

THE FOOD-KNOWLEDGE GATEWAY TO HEALTH RESEARCH FUNDING LINES:



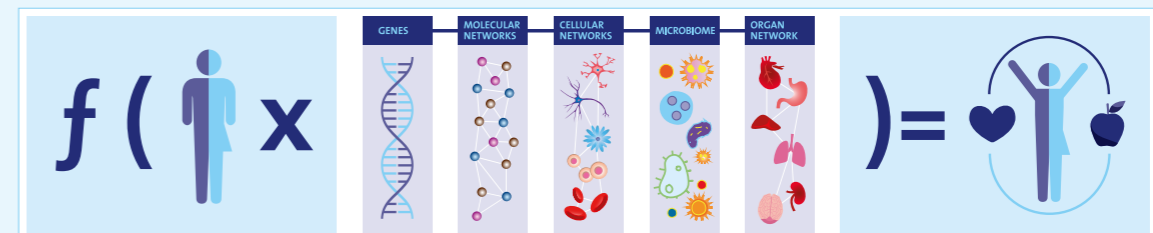
Food for better health through data-driven approaches



Food for better health through nutrition approaches



One health approaches to improve health and well-being



How food acts on human biology and how human biology acts on food

⁵ https://www.ncbi.nlm.nih.gov/books/NBK114498/#_appa_s72_

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.

