

The European Human Exposome Network

The Human Exposome is the study of how elements we are exposed to via our diet, lifestyle and the environment we live and work in, affect our health over our lifetime. **Nine** new **Horizon 2020**¹ Exposome projects started on 1 January 2020. Together, they represent **106 M€ funding** from the EU over 5 years. The projects will form a cluster to coordinate efforts to decipher the life-long impact of external and internal exposures on human health. The outcome will be better knowledge of health risks related to multiple environmental factors on which to build solid, cost-effective preventive actions and policies in the future to protect the human health from adverse environmental exposures.

The European Human Exposome Network's website: <https://www.humanexposome.eu/>

ATHLETE

Advancing tools for human early lifecourse exposome research and translation

Coordination: Barcelona Institute for Global Health, ES



ATHLETE

Children are particularly vulnerable to environmental hazards. ATHLETE will measure many environmental exposures (urban, chemical, lifestyle and social risk factors) during pregnancy, childhood, and adolescence. This “early-life exposome” will then be linked to children’s biological responses and cardiometabolic, respiratory, and mental health. The results will help us to better understand and prevent health damage from environmental agents and their mixtures, from the earliest parts of the life course onward.

EPHOR

Exposome project for health and occupational research

Coordination: Netherlands Organisation for Applied Scientific Research (TNO), NL



EPHOR

The total burden of disease caused by occupational exposure is estimated at 5-7%, similar to the burden resulting from urban air pollution or obesity. Within EPHOR we will develop methods and tools to characterize the working-life exposome, defined as all occupational and related non-occupational exposures (e.g., lifestyle, behaviour) throughout the course of life. By applying these, we will obtain better and more complete knowledge of the working-life exposome. The toolbox containing developed tools, methods and knowledge will be made available to scientists, policy-makers and occupational health practitioners. By providing a knowledge base for evidence-based prevention, EPHOR will contribute to reducing the burden of non-communicable diseases on EU healthcare systems, improving the health and wellbeing of EU citizens, improving the productivity of the EU workforce and increasing the competitiveness of EU industry.

EQUAL-LIFE

Early environmental quality and life-course mental health effects

Coordination: National Institute for Public Health and the Environment (RIVM), NL



EQUAL-LIFE will develop and test combined exposure data using a novel approach to multi-modal exposures and their impact on children’s mental health and development. A combination of birth-cohort data with new sources of data will provide insight into aspects of physical and social exposures hitherto untapped. It will do this at different scale levels and timeframes while accounting for the distribution of exposures in social groups based on gender, ethnicity and social vulnerability.

¹ EU Framework Programme for Research and Innovation



EXIMIOUS

Mapping exposure-induced immune effects: connecting the exposome and the immunome
Coordination: Catholic University of Leuven, BE

Immune-mediated non-communicable diseases, such as autoimmune diseases, allergic diseases and asthma, are chronic disorders in which the interaction between the exposome and immune system plays a pivotal role. In several cohorts—covering the entire lifespan, including prenatal life— the EXIMIOUS consortium will extensively map the exposome and the immune system (immunome), together with other omics, clinical and socio-economic data. The integrated data analysis will allow the construction of ‘immune fingerprints’ that reflect a person’s lifetime exposome and health status of his/her immune system (individual predictors of disease).



EXPANSE

Exposome powered tools for healthy living in urban settings
Coordination: Institute for Risk Assessment Sciences, Utrecht University, NL

EXPANSE will address one of the most pertinent questions for urban planners, policymakers, and European citizens: “How to maximize one’s health in a modern urban environment?” We will do this by bringing together the exposome and health data of more than 55 million Europeans and by applying a novel approach to agnostically screen for chemicals in 10,000 blood samples collected from these individuals. We will study the impact of (changes in the) urban exposome on the burden of cardio-metabolic and pulmonary disease. EXPANSE will translate its insights and innovations into research and dissemination tools that will be openly accessible via the EXPANSE toolbox.



HEAP

Human exposome assessment platform
Coordination: Karolinska Institute, SE

The Human Exposome Assessment Platform (HEAP) is providing an efficient platform for handling and analysing large amounts of data on environmental exposures and their health effects. The platform will be populated in particular with i) data from large-population-based cohorts analysed with high-throughput technologies such as analysis of microbes with metagenomics and analysis of the effects of the environment on the genome (epigenomics); ii) data from large and population-based cohorts on the health effects of purchased products (consumer receipts cohorts), and iii) data from volunteer cohorts that carry sensors for comprehensive and continuous monitoring of environmental exposures



HEDIMED

Human exposomic determinants of immune mediated diseases
Coordination: University of Tampere, FI

In HEDIMED 22 partners from 12 different countries will identify exposomic determinants, which are driving the rapid increase of immune-mediated diseases (IMDs) such as type 1 diabetes, celiac disease, allergies and asthma. The project is based on data and samples from large clinical cohorts and trials from countries with either high or low IMD incidence. Exposomic disease determinants and the underlying biological pathways will be identified using advanced omics, multiplex and data-mining technologies.



LONGITOOLS

Dynamic longitudinal exposome trajectories in cardiovascular and metabolic non-communicable diseases

Coordination: University of Oulu, FI

Lifestyle and living environments have changed. Exposures to the environment such as air and noise pollution and the built environment, and an individual's lifestyle, psychological and social situation, react with genetic factors leading to increased risk of developing diseases such as obesity, type 2 diabetes, heart disease and atherosclerosis. The LONGITOOLS project will study and measure how exposure to these environmental factors contribute to the risk of developing such diseases through a person's life. The project will take an 'exposome' or holistic-based approach to determine the best points in life to intervene to reduce these risks.



REMEDIA

Impact of exposome on the course of lung diseases

Coordination: French National Institute of Health and Medical Research (INSERM), FR

The objective of REMEDIA project is to better understand the contribution of the exposome to 2 untreatable respiratory diseases: chronic obstructive pulmonary disease (COPD) and cystic fibrosis (CF). Starting from the study of patient cohorts throughout life, REMEDIA will develop a toolbox, which will allow delivering new guidelines to predict disease risk better and should lead to the identification of modifiable risk factors on which preventive action could be implemented.