longITools
HEALTH & ENVIRONMENT DYNAMICS

The LongITools project is studying the interactions between environmental, lifestyle and biological factors to determine people's risks of developing cardiovascular and cardiometabolic non-communicable disease.

Project Context

Cardiovascular diseases are the leading cause of deaths in Europe, and metabolic diseases, such as type 2 diabetes and obesity, have reached epidemic proportions worldwide and continue to become more prevalent. Together, they affect the daily lives of millions of EU citizens and put significant strains on healthcare budgets and services. It is therefore essential that we gain a deeper understanding of what causes these diseases, in order to aid in developing policies and interventions to both prevent and reverse them.

The environment is estimated to account for almost **20%** of all deaths in the WHO European region[1]

1 in 3 school-aged children are living with pre-obesity or obesity in the European region[2]

400,000 premature deaths per year are due to air pollution[3]

61 million people in Europe have diabetes[4]

20% of Europe's population are exposed to long-term noise levels that are harmful to their health[5]

Cardiovascular disease accounts for **45%** of all deaths in Europe[6]

1-6 See website for references

The Human Exposome

Using a large resource of life-course data, LongITools is studying how lifestyle and biological factors as well as exposure to air pollution, noise, and the built environment collectively contribute to the risk of developing cardiovascular and metabolic disease. This holistic, or exposome, approach aims to define the disease pathways and the points at which to best intervene during the life-course to reduce the risks.

LongITools has access to data which includes prospective birth cohort studies and longitudinal studies in adults, register-based cohorts, randomised controlled trials, patient databases and maternity and hospital biobanks. These data sets include many data variables on over 11 million EU citizens. Variable examples include height, weight, blood composition, employment, lifestyle factors and cholesterol.

18	**12 million**	**24**	**11 million**
PARTNERS	EUROS FUNDING	STUDIES	EU CITIZENS

Expected Key Outputs

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The development of tools to collect and analyse the data

Improving our knowledge and understanding

Improving the health of EU citizens

New Knowledge and Publications

Scientific evidence which improves our understanding of the human exposome and identifies gaps in knowledge for future research.

Metadata Catalogue

An online, searchable tool enabling exposome researchers to access rich metadata about data sets for example, the type of data set (e.g., cohort), the population, number of participants, and harmonised data variables. Users are able to assess the suitability of the data sets to answer specific research questions.

Life-course Causal Models

Novel statistical software to explore, understand and describe the associations/pathways between environmental, lifestyle and biological factors and risk of cardiovascular and metabolic disease.

Exposome Data Analysis Toolbox

An online toolbox that enables researchers to search for and use multiple exposome data analysis tools and visualisation methodologies via a single platform.

Policy and Regulation Database

Details of the major policies, laws and regulations in the LongITools data set countries (Finland, France, Netherlands, Norway and the UK) which can affect the external exposome e.g., pension rules, state benefits, healthcare reforms.

Health Risk Assessment System

Personalised and precise monitoring system integrating exposome-based data from users, environmental sensors and wearables to estimate, using an artificial intelligence algorithm, an individual's risk of developing cardiovascular and metabolic diseases.

Economic Simulation Model

A model for assessing, projecting and visualising the economic burden related to non-communicable diseases. Understanding the economic burden may help determine the amount of resources that may be saved due to early prevention or intervention.

Policy Options

Translation of the LongITools research, including economic modelling, to inform current policies and future policy development.

Keep up to date with project developments

www.longitools.org   @LongITools   LongITools Project

MEMBER OF THE
European Human Exposome NETWORK