



# Causative mechanisms & integrative models linking early-life-stress to psycho-cardio-metabolic multi-morbidity

## Project Information

### EarlyCause

Grant agreement ID:  
848158

**Start date**  
1 Ene 2020

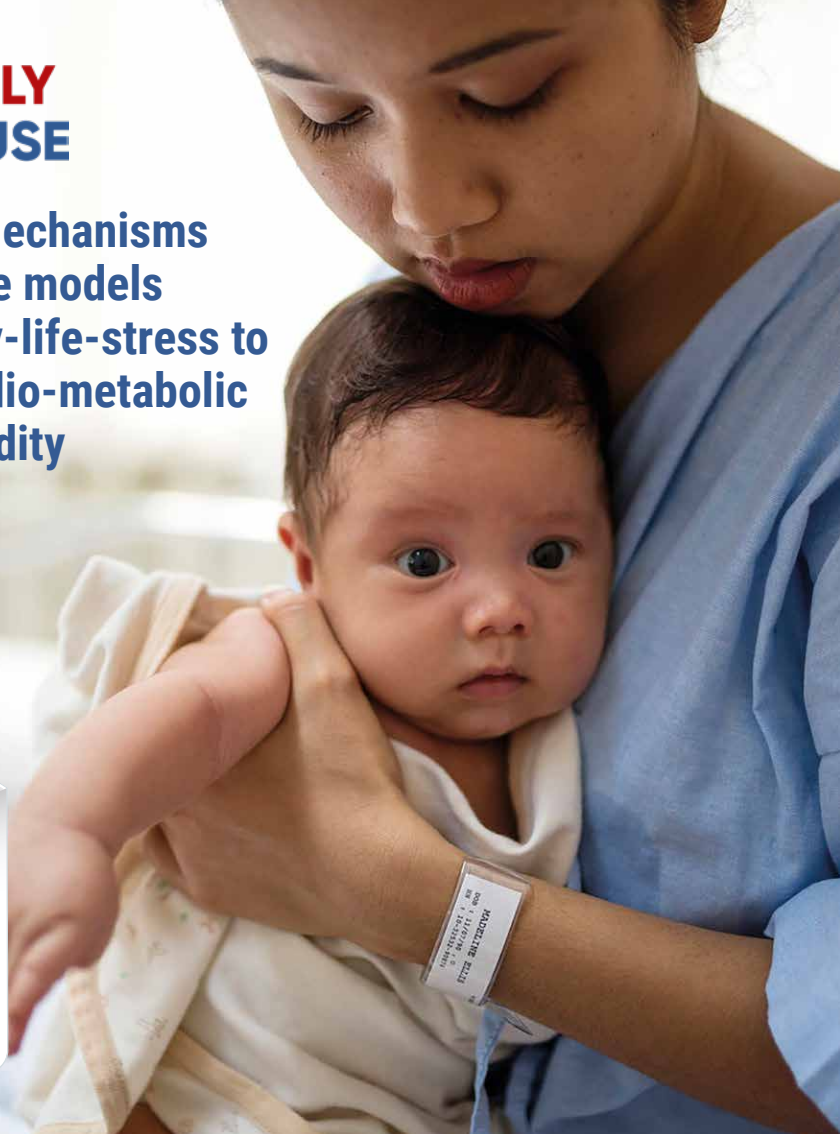
**End date**  
31 Dic 2023

**Funded under**  
H2020-EU.3.1.1.

**Overall budget**  
€5 997 381.25

**EU contribution**  
€5 997 381.25

**Coordinated by**  
Universitat de Barcelona



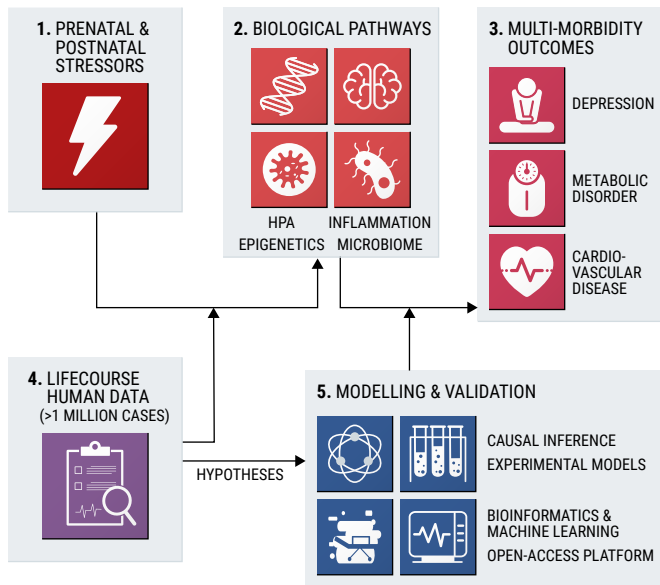
# Investigating the lifelong effects of early life stress on health

Exposure to early-life stress (ELS) has been established to increase the risk of mental illnesses, such as depression, for a long time. Stress experienced in early stages of life – from prenatal life to adolescence – is common and widespread, and affects up to 75% of pregnant women and their unborn babies, and nearly 50% of children after birth, with long-term consequences for development and health.

The EarlyCause project takes an original and novel approach to this public health issue, and explores the hypothesis that ELS is a risk factor not only for mental diseases, but also for cardiovascular and metabolic disorders, and that these pathologies can manifest simultaneously later in life.

By identifying and preventing ELS impact on mental and physical health, EarlyCause will help to better understand stress-induced diseases and improve the well-being and life span of vulnerable individuals for a better world.


## SCHEMATIC OVERVIEW OF THE RESEARCH FRAMEWORK PROPOSED IN EARLYCAUSE



# Objectives


Given the high prevalence of ELS in developed (about 45% of children) and emerging countries (over 50% of children), as well as the lack of research on the simultaneous appearance of psycho-cardio-metabolic disorders, the main goal of EarlyCause is to generate state-of-the-art knowledge by focusing on five objectives:

## OBJECTIVE 1




Identify the mechanisms and molecular pathways linking ELS to the simultaneous development of multiple psycho-cardio-metabolic disorders (multi-morbidity) by leveraging large-scale, deeply characterised human cohorts, and novel animal and cellular models.

## OBJECTIVE 2



Identify mediators and moderators of the impact of ELS on the multiple and simultaneous development of the diseases, investigating specifically (1) epigenetics, (2) inflammation, (3) neuroendocrine system, (4) microbiome, and (5) environmental factors.

## OBJECTIVE 3




Perform multi-level data integration to derive new integrative signatures and life-course models of multiple chronic conditions.

## OBJECTIVE 4



Establish a research platform and best practices to accelerate future research on the impact of ELS on the development of multiple chronic conditions.

## OBJECTIVE 5

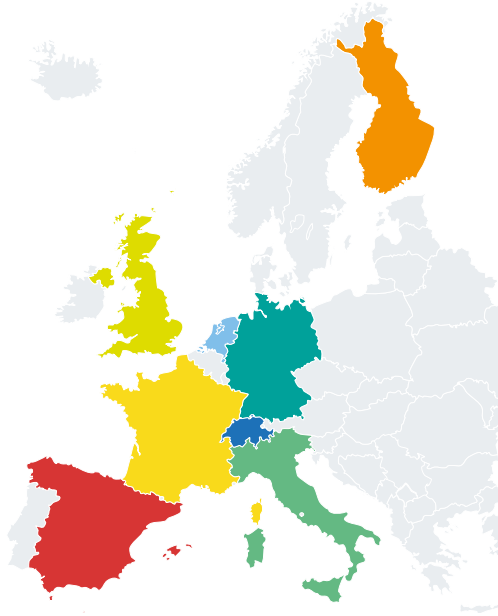


Evaluate and promote research findings to integrate ELS in personalised prevention, diagnosis and management of patients with multiple conditions.



# EarlyCause Consortium

The highly interdisciplinary consortium of the EarlyCause project consists of 14 partner members, including 12 universities and research centres and 2 SMEs, spread across 8 European countries.



Consortium members are specialised in a wide variety of research areas – including data science, psychiatry, psychology, neuroscience, biology, epidemiology, epigenetics, social sciences, nutrition, pharmacy, neuroendocrinology, behavioural studies, paediatric health and medicine, medical imaging, and computational biology.

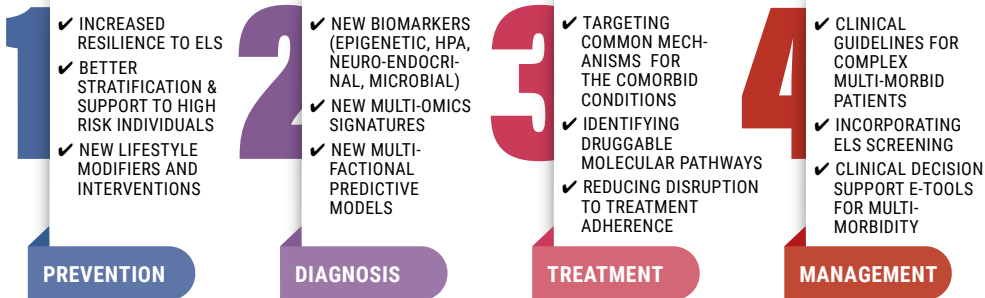
- CENTRE EUROPÉEN DE RECHERCHE EN BIOLOGIE ET MÉDECINE
- EUROPEAN MOLECULAR BIOLOGY LAB.; EUROPEAN BIOINFORMATICS INSTITUTE; EMPIRICIA GMBH
- ISTITUTO DE RICOVERO E CURA A CARATTERE SCIENTIFICO - FATEBENEFRATELLI
- KING'S COLLEGE LONDON; UNIVERSITY OF BRISTOL
- UNIVERSITY OF BARCELONA; CONSEJO SUPERIOR DE INVESTIGADORES CIENTÍFICAS; UNIVERSITAT POMPEU FABRA
- UNIVERSITY OF OULU; COMBINOSTIC OY
- UNIVERSITY OF ZÜRICH; ETH ZÜRICH
- VU AMSTERDAM MEDICAL CENTRE



THIS PROJECT HAS RECEIVED FUNDING FROM THE EUROPEAN UNION'S **HORIZON 2020 RESEARCH AND INNOVATION PROGRAMME** UNDER GRANT AGREEMENT N° 848158.

# Impact

## EarlyCause – New research directions for:



## Reducing burden of ELS-induced multi-morbidity ←

WP NUMBER	WORK PACKAGE TITLE	LEAD BENEFICIARY
WP1	Scientific Coordination dissemination & communication	1-UB
WP2	Data Coordination Platform to enable research in ELS and PCM	2-EMBL
WP3	Hypothesis-generating analyses of biological markers & environmental moderators	3-EMC
WP4	Causal inference and molecular mediation analyses	8-OLOU
WP5	Modelling ELS in animals for causality assessment	4-UZH
WP6	Cellular models to identify causal molecular mechanisms of ELS-induced multi-morbidity	5-KCL
WP7	Integrative models and computational tools for ELS-induced multi-morbidity prediction	1-UB
WP8	Impact assessment and exploitation planning	12-EMP
WP9	Ethics requirements	1-UB



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# Data Platform

The EarlyCause Data Platform integrates harmonised data, data services and standards, experimental protocols, and best practices to support next-generation research in ELS.

The EarlyCause data portal will grant access to data tools and provide a rich search and browse environment for the discovery and selection of appropriate data sets with relevant project protocols.

[earlycause.eu](http://earlycause.eu)

The screenshot shows the EarlyCause Data Platform website. At the top, there is a navigation bar with the EarlyCause logo and links for Home, About, News, Partners, FAQ, Useful information, and Submit data. Below the navigation bar, there is a secondary navigation bar with links for Cell Lines, Mouse, Rat, Human, Literature, and Tools. The main content area features a large header for 'Early Cause' with a sub-header 'Investigating the lifelong effects of early life stress on health'. Below this, there is a paragraph describing the portal's mission and a 'Read more' link. The main content is organized into a grid of six featured items, each with a title, a 'Work in progress' status, and a brief description of the data or tool. The items are: Cell lines (503 records), Mouse (503 records), Rat (112 records), Human (44,296 records), Literature (44,296 records), and Tools (a growing collection).

**Early Cause**  
Investigating the lifelong effects of early life stress on health

The Early Cause portal aims to bring together various datasets to promote research on early life stress and its short- and long-term effects on psychology, cardiology, and metabolism. The portal enables the upload, searching, sharing, and analysis of relevant mouse, rat, human, and cell-line datasets.

[Read more](#)

<b>Cell lines</b> Work in progress Defined population of cells that can be maintained in culture for an extended period of time, retaining stability of certain phenotypes and functions.	<b>Mouse</b> 503 records Mouse samples, literature, studies, and image analysis of pre and post natal stress in mice organisms.	<b>Rat</b> 112 records Records relating to pre and post natal stress in rats and possible implications in psycho-cardio-metabolic (PCM) multi- and co-morbidity.
<b>Human</b> Work in progress Records relating to cohort data which investigate the effects of early life stress (ELS) and modifiable lifestyle factors on psycho-cardio-metabolic (PCM) multi-morbidity and biological mechanisms spanning from pregnancy to adulthood.	<b>Literature</b> 44,296 records Publications related to early life stress and their effects on psycho-cardio-metabolic (PCM) multi-morbidity.	<b>Tools</b> A growing collection of tools for search, download and analysis of data filtering through multiple parameters.

**Interested in learning more and/or collaborating with EarlyCause? Contact:**

Project Coordinator  
**Karim Lekadir**  
[karim.lekadir@ub.edu](mailto:karim.lekadir@ub.edu)

Project Manager  
**Catherine Gallin**  
[catherine.gallin@ub.edu](mailto:catherine.gallin@ub.edu)

Project Assistant  
**Aitana Bellido**  
[aitana.bellido@ub.edu](mailto:aitana.bellido@ub.edu)