

PhD THESIS IN ENVIRONMENTAL EPIDEMIOLOGY

Prenatal exposure to environmental chemicals and cardiometabolic health in adolescents.

Host team

The Research Institute of Environmental and Occupational Health ([Irset](#)) is a joint research unit (UMR_S 1085) of Inserm, the University of Rennes 1 and the School of public Health (EHESP). Its mission is to study the biological processes and environmental factors that influence human health and to support the work of authorities concerned with public health.

This PhD thesis will be carried out within the Elixir team (Lifecourse Epidemiology and exposure science in environmental health) and will be based at the EHESP campus in Rennes, in the Irset building.

Doctoral School

Doctoral School Biology-Health ([BS, Biologie-Santé](#)) from the Bretagne Loire University

Context

The scientific literature built up over several decades has documented the role of exposure to various chemical contaminants in our environments on child health and development, particularly when these exposures occur during key developmental periods including the fetal life (DOHaD hypothesis). Several epidemiological studies have investigated the effects of prenatal exposure to chemicals on childhood growth and obesity. The strongest evidence relates to (1) prenatal exposure to polychlorinated biphenyls (PCBs) and perfluorinated substances (PFASs) and decreased birth weight, and (2) prenatal exposure to dichlorodiphenyldichloroethylene (DDE) and accelerated weight gain in young children and the risk of obesity in childhood. Current epidemiological knowledge on cardiovascular health and other markers of metabolic disorders such as dyslipidemia or insulin resistance is limited, inconsistent and mainly based on cross-sectional studies.

To date, very few longitudinal studies, conducted from pregnancy through adolescence, exist to assess whether the observed associations between prenatal exposures and young children health persist, attenuate, or emerge in later life. Moreover, chemical exposure in the general population is complex and is defined by a mixture of compounds, which can potentially interact with each other. It is thus necessary to take into account this real context of multiple exposures in epidemiological studies.

Hypothesis and research questions

The general objective of the PhD thesis is to study the associations between prenatal exposure to multiple environmental chemicals (organochlorine pesticides, PCBs, PFAS, phthalates, phenols and glycol ethers) and cardiovascular and metabolic health in adolescents. This thesis project is based on data collected in mother-child cohorts, notably the PELAGIE cohort in Brittany (France), which the advantage of having collected exposure data measured by biomarkers during pregnancy and health data up to the age of 12.

The specific objectives of the thesis are:

- To study the associations between prenatal exposure to environmental chemicals and anthropometric measures and blood pressure at age 12.
- To study the associations between prenatal exposure to environmental chemical contaminants and blood markers of the metabolic function (e.g., lipids, adipokines).
- To assess and identify, using appropriate statistical methods, if specific chemical mixtures or exposure profiles exist and for which the health effect would be higher
- To study the role of sex hormone levels (at birth and at puberty) and pubertal status in these associations, in order to explore possible underlying biological mechanisms.

This thesis project will be carried out in the context of European H2020 projects such as ATHLETE and OBERON, and will require regular exchanges with our collaborators.

Keywords

Epidemiology; Environment; Pregnancy; Chemicals; Biostatistics; Cardiometabolic health

Supervision

Dr Cécile Chevrier, Inserm Research director, Team leader
Dr Charline Warembourg, Inserm Researcher

PhD candidate profile

Master degree in Public health, Epidemiology or Biostatistics
Good statistical knowledge
Skills on R or SAS software
English
Interest in health and environment

Application procedure

Please send your CV and a motivation letter to charline.warembourg@inserm.fr before **April, 22th 2022**.

Fundings

PhD grant from the French Ministry of Research, Higher Education, and Innovation ("*Contrat Doctoral d'Établissement*"): Irset internal selection in June 2022 (3 funded grants for 5 applying candidates)

Start of the PhD

Last trimester of 2022