



World Health  
Organization  
REGIONAL OFFICE FOR Europe



United Nations  
Environment Programme

# Assessment of prenatal exposure to mercury: standard operating procedures



# Abstract

Mercury is toxic for humans, and the toxic effects of different forms of mercury have been extensively studied. Human biomonitoring is recognized as the most effective tool for evaluation of cumulative human exposure to mercury. In-utero development is the most vulnerable stage for the long-term adverse neurodevelopmental effects of mercury. Characterizing prenatal exposure is critical for evaluating public health impacts of mercury and assessing public health benefits of exposure reduction measures. Approaches to estimating exposure to mercury include measuring mercury levels in different biological matrices. The level of mercury in tissues can be an indicator of exposure to various types of mercury. The validity, usefulness and meaning of such measurements depend on the form of mercury exposure, type of tissue measurement and other factors. This document consists of standard operating procedures describing the assessment of mercury in hair, cord blood and urine. Quality control is essential to get reliable results. The document also provides information on alternative methods that can be used for analysis of mercury.

## Keywords

Biomarkers – analysis

Mercury – analysis

Prenatal Exposure Delayed Effects – analysis

Maternal Exposure – adverse effects

Environmental Exposure

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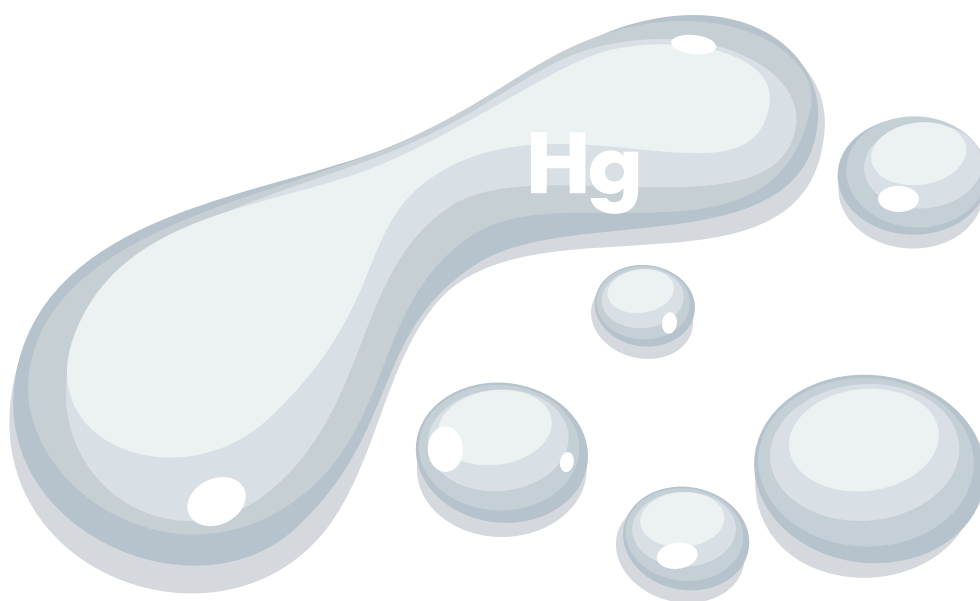
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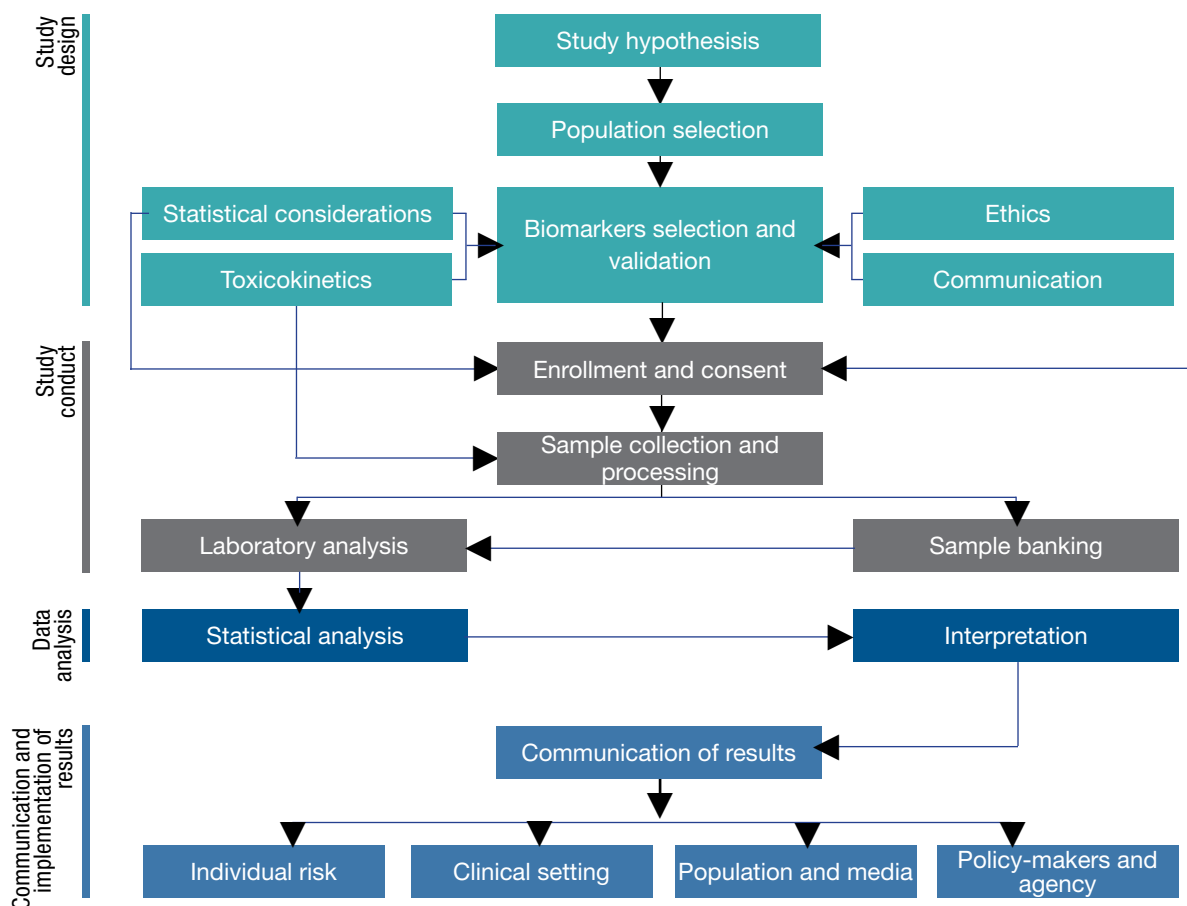
# Introduction

Although human biomonitoring (HBM) has been widely employed in the framework of occupational exposure, it has only recently been used to assess the exposure of the general population to environmental pollutants. The extension of HBM to this field of application over the past few years has been boosted by, among others, different initiatives focused on increasing our understanding of the relationship between the environment and health.

The potential of HBM in the field of public health is an accepted fact, although the lack of harmonization between the different HBM studies/programmes can considerably limit the comparison of results, their global interpretation and subsequent translation into policy. It is, therefore, fundamentally important to develop a harmonized framework that allows the most efficient use of data obtained in HBM studies, such as in the European Union-supported projects Development of a coherent approach to human biomonitoring in Europe (ESBIO), Consortium to Perform Human Biomonitoring on a European Scale (COPHES) and its twin feasibility study DEMOCOPHES.

The organization of an HBM survey is a complex process involving professionals with different technical skills (epidemiologists, analytical chemists, toxicologists, statisticians, physicians and communications specialists), all of whom contribute to specific stages of the study. They work together to deal with the interactions between the various disciplines concerned (Fig. 1).

Fig 1. Stages of a biomonitoring study



# Quality control programme for mercury human biomonitoring

## **Abstract**

The objective of the document is to define an effective system for performing quality-control activities to ensure the reliability of mercury human biomonitoring (HBM) results. These activities are focused on the pre-analytical and analytical stages of the mercury HBM. The measures described should be seen as a general recommendation for use when planning and implementing HBM surveys at national, regional and international level. The document should be considered for use together with relevant standard operating procedures for sampling and analysis of mercury in human scalp hair, cord blood and urine.

## **Keywords**

Mercury – analysis  
Methylmercury compounds – analysis  
Biomarkers - analysis  
Maternal exposure  
Maternal-fetal exchange  
Infant, newborn  
Environmental exposure  
Quality control  
Public health

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# Abbreviations

HBM human biomonitoring

ID identification

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