

# **Annotated outline of the guidance on monitoring to maintain comparable information on mercury levels in the environment and humans**

## **1. Acknowledgements**

*To be drafted by the Secretariat. Briefly describe how the guidance was developed.*

## **2. List of abbreviations and glossary of terms**

*To be developed by the Secretariat after the completion of the text.*

## **3. Introduction and objectives**

*To be drafted by the Secretariat. Explain the provision of the Convention (Articles 1 and 22) and guidance from COP on monitoring in the effectiveness evaluation. Explain the objectives of the document, which is to provide scientific and technical guidance to support the arrangements for COP to obtain comparable monitoring data for the effectiveness evaluation. Explain the structure of the document.*

## **4. Use of comparable monitoring data for the effectiveness evaluation**

*To be drafted by the Secretariat, based on the input from the consultants. Discuss the use of monitoring data in informing indicators on the level of mercury in the environment, biotic media and vulnerable populations for and in addressing the policy questions of the effectiveness evaluation. Explain the selected media for monitoring – air, biota and humans. Explain the limitations in water and sediment monitoring data and their possible use in relation to the biota monitoring. Discuss the requirement for quality control/assurance and metadata from the viewpoint of comparability, and approaches for aggregating the data and using them in statistical analysis and transport/exposure models to understand the levels of mercury and associated environmental and health risk geographically and temporally.*

## **5. Air monitoring**

*To be drafted by a consultant under the guidance of the Secretariat. Following is a tentative structure of the chapter, to be adjusted as appropriate.*

- (1) Mercury monitoring in air – rationale (Describe the recommendation for total gaseous mercury and gaseous elemental mercury in air and wet deposition of mercury. Also mention the use of other available data including speciated monitoring data)*
- (2) Consideration of monitoring sites (representativeness, influence of local emissions, description of sites etc. Existing monitoring networks or programmes may have their own site selection policies.)*
- (3) Sampling and measurement: methods (continuous measurement, active sampling, passive sampling for air; wet-only or bulk sampling for wet deposition), timing (frequency and duration), sampling equipment, sampling procedure, sample preparation, in-situ or laboratory measurements, etc)*
- (4) Quality control and assurance (requirement for sampling and analytical operations, control samples, inter-laboratory comparison, intercomparison of measurements, etc)*
- (5) Data collection (metadata elements that are needed/preferred, ancillary data can be collected to make the data more useful for interpretation, data quality, data extraction, etc)*

- (6) *Data management, analysis and evaluation (how the monitoring data can be stored, shared and aggregated to understand the levels of mercury and associated environmental and health risk geographically and temporally. Include statistical consideration such as sample numbers and uncertainty)*

## **6. Biota monitoring**

*To be drafted by a consultant under the guidance of the Secretariat. Following is a tentative structure of the chapter, to be adjusted as appropriate.*

- (1) *Identification of target ecosystems (A brief overview of the impact of mercury on ecosystems, including its biomagnification and bioaccumulation, effects on vulnerable fish and wildlife species and human exposure through diet.)*
- (2) *Mercury monitoring in biotic media – rationale (What organisms and tissue types are selected for monitoring for different objectives, ecosystems, and assessment frameworks: (A) Ocean Framework: e.g., total mercury in muscle tissue of fish and marine mammals at trophic level 4. (B) Continental Framework: e.g., total mercury in muscle tissue of fish and relevant tissues of birds. Also mention the use of other available monitoring data including other species and water and sediment monitoring)*
- (3) *Consideration of monitoring sites (representativeness, description and mapping of ecosystem sensitivity spots, etc)*
- (4) *Sampling and measurement (sampling methods, timing, sample size, transport, laboratory analysis, etc. Also describe sampling and analysis methods for water and sediment)*
- (5) *Quality control and assurance (requirement for sampling and analytical operations, control samples, inter-laboratory comparison, intercomparison of measurements, etc)*
- (6) *Data collection (metadata elements that are needed/preferred, data quality, data extraction, etc)*
- (7) *Data management, analysis and evaluation (how the monitoring data can be stored, shared and aggregated to understand the levels of mercury and associated environmental and health risk geographically and temporally. Include statistical consideration such as sample numbers and uncertainty.)*

## **7. Human biomonitoring**

*To be drafted by a consultant under the guidance of the Secretariat. Following is a tentative structure of the chapter, proposed by WHO. To be adjusted as appropriate.*

- (1) *Ethical considerations in, and requirements for, human biomonitoring studies that span identification and recruitment of individuals to data privacy and communication of findings (short overview. WHO is preparing guidance on this issue that can be referred to.)*
- (2) *Identification of target population (A brief overview of the key human population groups with respect to mercury exposure/risk and as mentioned in the Minamata Convention. These include general background populations and also vulnerable populations with high exposures to point sources of inorganic or elemental Hg (e.g., ASGM, dental workers), to methylmercury through diet (e.g., fish consumers that may include Indigenous Peoples and coastal and island communities), and fetal exposures.)*
- (3) *Human biomonitoring for mercury exposure – rationale. Short summary of the different approaches for biomonitoring of Hg (can include some references e.g. the WHO document on identifying populations at risk from mercury exposure and 2018 UN Global Mercury Assessment Human's Chapter 9 "Observed Levels and Trends of Mercury in Humans" ), Describe the recommendations for total mercury measurements in scalp hair (for*

*methylmercury exposure), in whole blood (mainly for methylmercury exposure but also inorganic Hg exposure), and in urine (for inorganic Hg exposure), and how these can be applied to both general population exposure groups as well as the most vulnerable population groups (e.g., foetal exposure, ASGM, indigenous peoples and other high fish consuming groups). For each, analytical approaches will be detailed including instrumentation and quality control (including reference materials).*

- (4) Development of a survey protocol that spans sampling design and strategy (e.g., sampling frame, spatial considerations, periodicity) to sociodemographic and dietary questionnaires (general considerations in developing a protocol and refer to WHO protocol which contains a statement about adapting to national needs; other protocols such as AMAP, HBM4U could also be referenced as examples of protocols for larger scale programmes).*
- (5) Data management, analysis and evaluation with particular emphasis on health/risk guidelines (the WHO survey protocol includes guidance on the topic, therefore the Minamata guidance should set out considerations that will support sharing and compilation of data for effectiveness evaluation).*

## **8. Cross-media data management, modeling and analysis**

*To be drafted by the Secretariat, based on the input from the consultants. This chapter will discuss how the monitoring data of different media can be compiled, analyzed and synthesized, how those data can be used in models, and how conclusions on the changes in mercury levels in environmental media and humans can be drawn.*

## **9. References**

*To be developed during the drafting of the text*

### **Annex 1: Review of existing monitoring, modeling and data management activities**

*Information to be collected from existing networks, including standard operating procedures, protocols and reference materials. Part I of UNEP/MC/COP.3/INF/15 will serve as a starting point.*

### **Annex 2: Gap analysis**

*Current gaps in monitoring data will be identified and analyzed to contribute to strategies for filling those gaps.*