World Health Organization
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EUROPEAN ENVIRONMENT AND HEALTH PROCESS

Risks from mercury for human health and the environment

Report of an awareness-raising and training workshop
Yerevan, Armenia

28–29 September 2016

World Health Organization

REGIONAL OFFICE FOR Europe

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ABSTRACT

Exposure to mercury and mercury compounds is harmful for human health, especially for foetuses and children at early stages of development. In 2013, the Minamata Convention on Mercury was adopted by the international community with the aim of preventing negative impacts on human health and the environment from mercury. It places certain obligations on Parties that require action, as applicable, by the health sector in coordination and cooperation with other competent sectors, including the identification of exposed population groups and assessment of the risk from exposure to mercury. A workshop was organized in September 2017 by the Ministry of Nature Protection of the Republic of Armenia in the framework of the project Minamata Convention Initial Assessment of Armenia (carried out by the United Nations Industrial Development Organization and funded by the Global Environment Facility) to raise awareness of the effects on health of mercury and its compounds, provide training for public health and other allied professionals in assessing the risks from mercury and discuss the next steps for the early implementation of the Convention.

Keywords

MERCURY – adverse effects
ENVIRONMENTAL EXPOSURE – adverse effects
ENVIRONMENTAL EXPOSURE – prevention and control
ENVIRONMENTAL HEALTH
HEALTH PROMOTION

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Acknowledgement

The WHO Regional Office for Europe thanks the Ministry for Nature Protection of Armenia for organization of the workshop and United Nations Organization on Economic Development for its generous financial support for the Meeting in the framework of the project “Minamata Convention Initial Assessment of Armenia”.

Abbreviations

HBM	human biomonitoring
UNIDO	United Nations Industrial Development Organization

Introduction

Exposure to mercury and mercury compounds is harmful for human health, especially for foetuses and children at early stages of development. In 2013, the international community adopted the Minamata Convention on Mercury[1] with the aim of preventing negative impacts on human health and the environment from such exposure. This Convention places certain obligations on Parties to ensure that their health sectors take appropriate action, in coordination and cooperation with other competent sectors, including the identification of population groups exposed and assessment of the risk from exposure to mercury.

As part of this process, the Ministry of Nature Protection of the Republic of Armenia organized a workshop in Yerevan, Armenia on 28–29 September 2016 in cooperation with the WHO Regional Office for Europe and in the framework of the project Minamata Convention Initial Assessment of Armenia. This Initial Assessment is being carried out by the United Nations Industrial Development Organization (UNIDO), funded by the Global Environment Facility. The purpose of the workshop was to raise awareness of the effects on health of mercury and its compounds, provide training for public health and other allied professionals in assessing the risks from mercury and discuss the next steps for the early implementation of the Convention

A high-level representative of the Ministry of Nature Protection, experts from various government bodies, research centres and educational institutions and representatives of nongovernmental and intergovernmental organizations participated in the workshop. In total, representatives of 13 government agencies attended the workshop, including the Ministry of Foreign Affairs, Ministry of Health, Ministry of Agriculture, Ministry of Emergency Situations, Ministry of Territorial Administration, Ministry of Energy and Natural Resources, Ministry of Defence, Ministry of Finance, National Security Council, National Security Service and the Republic of Armenia Police. Representatives of the nongovernmental organization Armenian Women for Health and Healthy Environment and of the National Academy of Science contributed to the workshop discussion.

Ms Anahit Aleksandryan, National Project Coordinator and Focal Point of the Minamata Convention on Mercury in Armenia, Head of Hazardous Substances and Waste Policy Division of the Ministry of Nature Protection of the Republic of Armenia, chaired the meeting. Ms Alla Ivchenko was elected rapporteur. The programme is at Annex 1 and the list of participants is at Annex 2.

Opening of the workshop

In welcoming the participants, Ms Aleksandryan stressed the importance of the implementation of the Minamata Convention in Armenia in preventing the negative impacts on human health and the environment from mercury in the country. Armenia has begun to implement the Convention, starting with an evaluation of the national situation. No information is available about population groups at risk of exposure to mercury. The workshop would be a significant step in moving forward with the collection of such information at national level. On behalf of UNIDO, Ms Rodica Ella Ivan welcomed the participants and, together with Mrs Anahit Simonyan (UNIDO representative in Armenia), gave a briefing on the current status of UNIDO's activities

[1] Minamata Convention on Mercury. Geneva: United Nations Environment Programme; 2013 (http://www.mercuryconvention.org/Convention/tabid/3426/Default.aspx, accessed 11 January 2017).

at country level and the implementation of the Minamata Convention Initial Assessment of Armenia project, stressing the importance of cooperation between the different sectors involved at national and international levels. Ms Irina Zastenskaya welcomed the participants on behalf of WHO. The workshop would focus on new scientific knowledge about mercury and its effects on health as well as WHO's recommendations for facilitating the implementation of the Convention.

Aims and objectives

The aims of the workshop were to share knowledge on exposure to mercury and its impact on health, provide information about the tools and instruments developed by WHO and carry out an exercise in identification of exposed population groups, with the objectives of:

- raising awareness of the role and responsibilities of the health sector in implementation of the Convention;
- making an input into strengthening national capacities for addressing problems relating to mercury and health;
- facilitating implementation of the Convention in and by the health sector.

To achieve its objectives, the workshop was organized in a series of presentations delivered by international experts from the Regional Office (Ms Zastenskaya) and from UNIDO (Ms Ivan) and two practical exercises which actively involved all the participants.

UNIDO: activities and services related to the Minamata Convention

UNIDO has established an environment department to promote inclusive and sustainable development and support countries in complying with international conventions, in particular the Montreal Protocol and the Stockholm and Minamata Conventions. This department includes the development of cleaner and more resource-efficient production centres and the implementation of sound waste and chemicals management. Since 1994, UNIDO has been supporting countries in their efforts to reduce the risks from mercury for humans and the environment. Currently UNIDO, in cooperation with different stakeholders including nongovernmental and intergovernmental organizations, industry and academia, has been executing projects related to the Minamata Convention in 30 countries worldwide. Cooperation with WHO to promote action aimed at preventing negative impacts from mercury is one of UNIDO's priorities.

Assessment of exposure to and risks to human health from mercury

Mercury and health: introduction to the problem

All forms of mercury are toxic for humans and the environment but the pattern of toxicity and health effects varies with its chemical form (metallic, inorganic, organic), the route of exposure (inhalation, ingestion), the amount (low concentrations can have an impact), the duration (acute and chronic), timing/life stage of exposure (exposure in early life is the most dangerous) and the vulnerability of the person exposed. Mercury is persistent in the environment, highly bioaccumulative and can cause a variety of toxic effects including nephrotoxicity, teratogenicity and damage to the cardiovascular system. Endocrine-disrupting and immunotoxicological properties are under scientific discussion. Clinical symptoms of exposure to different forms of mercury vary from nausea, abdominal pain to tremor, paralysis, memory loss and kidney

damage. The Minamata disease, the so-called "mad hatter syndrome" and acrodynia are caused by chronic exposure to different organic and inorganic mercury compounds.

Early life is the window of sensitivity for exposure to mercury. During pregnancy, mercury compounds cross the placental barrier and can interfere with the development of the foetus, causing attention deficit and developmental delays during childhood. The problem is global in its nature. For example, within the European Union, more than 1.8 million children are born every year with exposure to methylmercury above the adjusted safety limit of 0.58 μg/g hair, and the total benefits of preventing exposure have been estimated to be a gain of about 600 000 intelligence quotient points per year.[2]

Minamata Convention and responsibilities of the health sector

In view of the impact from mercury on health and the environment, the international community adopted the Minamata Convention with the main objective of protecting human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. The role of the health sector in the implementation of the Convention was agreed by ministers of health at the Sixty-seventh World Health Assembly in resolution 67.11 on public health impacts of exposure to mercury and mercury compounds and the role of WHO and ministries of public health in the implementation of the Minamata Convention. It includes: phasing out the manufacture, import and export of mercury-added products from health care practice by 2020; phasing out mercury skin-lightening cosmetics, including soaps, and topical antiseptics; reducing the use of dental amalgams worldwide; developing public health strategies to address the impacts on health of the use of mercury in artisanal and small-scale gold mining; assessing the risk to human health in contaminated sites to inform action to reduce this risk; developing health programmes to identify and protect vulnerable populations at risk; ensuring the provision of diagnostics and of health care; and ensuring the exchange of health information, public awareness-raising, and research into and the monitoring of health. Relevant capacities should be built in the health sector for these purposes.

Sources of mercury and identification of populations at risk: an overview

There is a number of sources of exposure to mercury by humans including pollution of the air, water and food and mercury-containing products and wastes. Concentrations of mercury in occupational settings can be quite high and pose significant risks to human health. The main sources of air pollution come from releases of mercury in the course of industrial processes such as coal combustion, mercury-mining, manufacture of chlorine and caustic soda, artisanal and small-scale gold mining, metals processing, wastes management and incineration. Mercury concentrations in surface and drinking-waters are usually not high. The presence of mercury in the aquatic environment is, however, of great concern due to its biomagnification – the synthesis of methylmercury resulting from biotransformation and bioaccumulation of methylmercury in fish and other aquatic organisms. Contaminated fish and other sea-food are sources of organic mercury. Humans are exposed to inorganic mercury from dental amalgams and mercury-containing cosmetics. Specific attention should be paid to intentional and unintentional chemical spills and potential acute exposure to high concentrations of metallic mercury, especially if they happen in schools, hospitals or institutions for small children.

[2] Bellanger M, Pichery C, Aerts D, Berglund M, Castaño A, Čejchanová M et al. Economic benefits of methylmercury exposure control in Europe: monetary value of neurotoxicity prevention. Environ Health. 2013;12(1):3 (http://www.ehjournal.net/content/12/1/3, accessed 12 January 2017).

Identification of exposed population groups: biomonitoring of mercury in humans

There are two approaches to assessing the burden of mercury and its compounds for humans: to predict the levels of toxicants in a body by mathematical modelling or to measure them directly in the individual body fluids or tissues by human biomonitoring (HBM). Mathematical modelling, however, requires prior knowledge of the toxicokinetics of particular chemicals, the levels of chemicals in food and environmental media, and the nutrition, health and lifestyle habits of people. Both approaches have advantages and disadvantages. As already mentioned, exposure sources differ with each chemical form of mercury. For example, most exposure to methylmercury comes from the consumption of fish and seafood, so the pathway is ingestion.

There are several non-invasive matrices for sampling such as hair, urine, cord blood, blood, finger- and toenails or meconium to estimate exposure to mercury. Hair, urine, blood and cord blood are commonly used as biomarkers in mercury HBM programmes. Mercury concentrations in blood indicate recent or current exposure. Urine is the preferred non-invasive matrix for biomonitoring of exposure to inorganic of mercury. Hair samples are useful for assessing exposure to methylmercury. A number of studies and HBM programmes exist in various countries, including Czechia, Slovenia and the United States. HBM surveys can have a number of objectives, such as assessing the distribution of exposure, detecting emerging threats, monitoring the effects of policy interventions aimed at reducing or preventing harmful exposure, setting priorities for downstream risk assessment, monitoring spatial patterns and temporal trends, identifying and monitoring contaminated sites or supporting epidemiological research.

The discussion focused on other sources of exposure to mercury such as contaminated rice, the use of pesticides (such as the pesticide available in Armenia under the name Granosan) in the past and skin-lightening creams that are still on sale. The participants were concerned about the effectiveness of control and prevention measures such as methylmercury monitoring in food, the implementation of screening programmes for pregnant women and the elimination of stockpiles of obsolete pesticides. The combined exposure to chemicals with the same health end-points, for example the effects on the nervous system of mercury and lead, is a challenge for assessments of risk and impacts on health.

Practical exercise 1

The participants carried out a practical exercise in three working groups to develop an HBM programme for a population living around a lake polluted by discharges from a chloralkali plant located on the shore of the lake, and another for the general population in a country where power is produced by burning coal. All the steps in developing an HBM programme such as defining its objectives, selecting the target population groups and biological matrices, developing the survey protocol, analysing data and communicating risks to decision-makers and the population were discussed in detail. On the basis of the situation analysis, the participants proposed to establish an overall HBM and health monitoring programme to include workers at the chloralkali plant in addition to the general population and the population living around the lake. They stressed the need to develop and implement the environment and food monitoring programmes in addition to HBM, and that the interpretation of the results and communication of risks should be done by scientists and relevant professionals. Valid reference concentrations and reliable thresholds need to be established in view of the sensitivity of individuals and the most vulnerable groups and the windows of exposure. Reference concentrations should be established for mercury as well as for other heavy metals and pollutants. The participants expressed the wish that, in the interests of risk

analysis and communication with decision-makers, national and WHO reference concentrations should not differ significantly.

Assessment of human exposure to mercury: environmental monitoring

Risks in the environment and requirements of mercury initial assessments

The assessment of the risks from mercury and its impact on human health and the environment is one of the main priorities at national level.

There are a number of natural and industrial sources of mercury emissions. Mercury is released into the environment as a result of volcanic eruptions, forest fires, volatilization from the ocean and melting of icecaps. Intentional use of mercury in artisanal and small-scale gold mining, chloralkali processing and the production of mercury-containing products is one of the main anthropogenic sources of mercury. Mercury is also released as a by-product of processes such as coal combustion, metal smelting and waste incineration. The prevention and minimization of mercury releases are the main objectives of the Minamata Convention, which contains a number of articles (3, 4, 5, 7, 8, 9, 10, 11 and 12) requiring specific action regarding industrial processes that emit mercury and its compounds. As an initial step to address the risks from mercury at national level, countries are encouraged to make an inventory of sources of mercury, including sources of mercury emissions into the air and of releases of mercury into surface and groundwater. The initial assessment of mercury should focus on industrial processes, the trade in mercury, stockpiles and storage places and contaminated sites. This information is critical in order to assess the risks from mercury for the environment and human health. Together with this inventory of sources, information about the policies and regulatory and institutional arrangements gathered in the framework of the initial assessments of mercury will form the basis for prioritizing measures to implement the Convention.

Pollution of air and water with mercury

In general, mercury and its compounds can be found in all environmental and other media including ambient and indoor air, surface and drinking-waters, soil and sediments, biota, food and the occupational environment.

According to WHO assessments in residential areas that are not classified as contaminated, exposure to air pollution from mercury and its compounds is relatively small. Ambient air monitoring is, however, necessary to calculate air emissions and for modelling, assessments of emissions from local sources and transboundary movement, and monitoring of exposure in highly contaminated sites. Methods for passive sampling allowing the calculation of concentrations significantly simplify the monitoring of mercury in air.

Concentrations of mercury in waters do not usually create risks for human health. Direct spills into aquatic environments can, however, cause significant local contamination that potentially leads to elevated population exposures and are, therefore, likely to be of greater local concern. Given that methylmercury is formed from metallic mercury by aquatic organisms, monitoring of mercury contamination in aquatic environments will help to properly assess the risks to the environment and human health resulting from exposure to methylmercury.

Exposure to mercury in hot spots and emergency situations (mercury spills)

Mercury hot spots are defined as regions/locations where there are risks of higher contamination of the environment (air, soil, water or food sources) occurring as a result of human (anthropogenic) activities. Exposure in hot spots is characterized by some specifics such as combined and chronic exposure from different sources to other heavy metals in addition to mercury, and higher concentrations of mercury in environmental media and locally produced food than in other residential areas.

Mercury spills lead to high concentrations in air, especially indoors, which can result in acute health effects and manifestation of clinical symptoms such as damage to the kidneys. They often happen in places where children live and study as well as in hospitals. The management of mercury spills requires special attention to proper decontamination to prevent the creation of a source of chronic exposure to mercury.

Fish and shellfish as a source of methylmercury

Fish and shellfish are the main sources of methylmercury for humans. Fish monitoring programmes are required at national and regional levels to prevent the risk of mercury contamination in fish. Simple screening methods to obtain initial estimates of exposures based on calculations of average daily consumption levels and average mercury levels in fish, as well as more complex monitoring programmes with assessments of individual consumption, could be used for assessing exposure to methylmercury from consumption of fish and shellfish. Risk communication strategies should be developed based on assessments of the risks and benefits of fish consumption, taking into account that fish and shellfish are a source of dietary proteins and nutrients, including polyunsaturated fatty acids.

Risk communication

Risk communication is a tool for raising awareness, preventing exposure, educating and promoting safer behaviour, as well as for involving all stakeholders in the implementation of preventive measures. In the context of exposure to mercury, the main target groups include pregnant women, parents, children, workers, medical professionals, communities in hot spots and policy-makers. Certain principles should be followed if the aims of risk communication campaigns are to be achieved: training materials should be adapted to the needs and education level of the audience, the choice of potential sources of information (television, print media) is important and information should be delivered by professionals.

Practical exercise 2

Participants were invited to develop environmental, food and occupational monitoring programmes in response to high concentrations of mercury revealed in hair and blood in the simulated biomonitoring survey. As a first step, it was proposed to monitor contamination in fish. Prioritizing environmental monitoring, the participants considered that sediments should he monitored to predict the persistence of contamination of surface waters and aquatic organisms. They also proposed that monitoring of releases from relevant enterprises should be included in the monitoring programme.

National capacities for environment and food monitoring

A capacity for food monitoring that enables the monitoring of mercury in fish has been built recently in Armenia. The Sanitary-Chemical Laboratory of the Reference Laboratory Centre at the National Centre for Disease Control and Prevention, Ministry of Health has been equipped with a mercury analyser with cold vapour atomic absorption spectrophotometry. The possibilities for controlling air pollution are limited due to the low concentration of mercury in ambient air. Armenia does, however, have experience of monitoring mercury in ambient air. For example, during analyses of mercury concentrations performed in the Synik Marz area (a metallurgical production zone) no concentrations exceeding the threshold were observed. According to a previous national assessment, contamination of fish and other foods with mercury is not high in Armenia. No threshold levels were exceeded. Concentrations of mercury in food samples analysed in the Narek laboratory since 1994 have also fully corresponded to national safety standards.

Participants concluded that the monitoring system needs to be improved and its sustainability ensured given that, according to some assessments (such as those performed by the Centre for Ecological-Noosphere Studies), mercury is a risk factor for human health and the environment in Armenia.

Introduction to WHO methodology for the assessment of combined exposures to multiple chemicals

A description of the methodology for the assessment of combined exposures to multiple chemicals developed by WHO included:

- an explanation of the terminology related to the different types of exposure (aggregated, cumulative and combined);
- an introduction to the basic principles/concepts of toxicology;
- a description of the tiered approach to assessing combined exposure to multiple chemicals recommended by WHO and the International Programme on Chemical Safety, including a demonstration of its applicability, for example, in the case of risks caused by carbamates;
- information about the step-by-step assessment of hazards/exposure and the databases available for this purpose, as well as for calculating the risks for different population groups (children and adults) and evaluating the risks of combined exposures to multiple chemicals.

Issues addressed during the discussion included the criteria for choosing a risk evaluation approach, either the use of a reference value or the benchmark dose. Most legislation requires the use of a reference value, resulting in a hazard index or percentage reference value. An alternative approach can, however, be applied by risk assessors.

Another important aspect is the choice of safety factors, or margins of exposure, for carcinogens (groups 1A and 1B), mutagens and reproductive toxicants and other highly toxic chemicals. For example, in countries where scientific data have confirmed a link between higher levels of neurobehavioural disorders in children and exposure to lead, stricter safety factors could be applied.

The WHO framework has many advantages. For example, risk assessments can be carried out with limited data at national level in combination with those available in relevant international databases, and risk reduction measures can be decided at all stages of the assessment.

During discussion of the applicability of the WHO framework for assessment of the risks from combined exposure the participants stressed the urgent need for training in chemical risk assessment, including the risks of combined exposure.

Activities to support the implementation of the Minamata Convention

Phasing out mercury-added products and reducing the use of dental amalgams in health care practice

The Minamata Convention on Mercury set clear time-bound targets (Article 4) for phasing out the manufacture, export or import of a number of mercury-added products specified in the Convention. WHO has published a guidance document, *Developing national strategies on phasing out mercury-containing thermometers and sphygmomanometers in health care*,[3] to facilitate the development of approaches across health systems, building on successes and good experiences at the level of individual institutions and providing a suggested process (model) for developing such approaches. The document highlights several issues in the development of the national strategy: the involvement of all relevant stakeholders; establishment of a national policy or regulation related to the phasing out of the devices; development/updating of national standards/guidelines; ensuring of environmentally sound storage and disposal of mercury devices; awareness-raising, training and capacity-building needs; and the need to ensure the availability of affordable alternatives. Information is also included on the step-by-step procedure for strategy development and its implementation, including the calculation of socioeconomic considerations.

Article 4 of the Minamata Convention encourages countries to develop a national plan for reducing the use of dental amalgam. Dental amalgams are the primary source of exposure to inorganic mercury for most people who have mercury-containing dental fillings, the source of occupational hazard for workers in dental surgeries and laboratories and the source of mercury leaking into the environment. The results from human studies and experiments in laboratory animals are controversial regarding the contribution to the burden of mercury in people who have amalgam fillings. Countries differ regarding the use of amalgam from prohibition to wide use. A multipronged approach with short-, medium- and long-term strategies should be considered. The WHO guidance document *Promoting the phase down of dental amalgam in developing countries* can be helpful in planning national strategies.[4]

[3] Developing national strategies on phasing out mercury-containing thermometers and sphygmomanometers in health care. Geneva: World Health Organization; 2015 (http://www.who.int/ipcs/assessment/public_health/WHO GuidanceReportonMercury2015.pdf, accessed 11 January 2017).

[4] Promoting the phase down of dental amalgam in developing countries. Geneva: World Health Organization and United Nations Environment Programme; 2014 (http://www.unep.org/chemicalsandwaste/Portals/9/Mercury/Products/dental%20mercury%20phase%20down%20project%20brochure%20FINAL_lr.pdf, accessed 11 January 2017).

Conclusions and recommendations

The workshop resulted in the following conclusions and recommendations.

- Armenia has signed and is preparing for ratification of the Minamata Convention. Support is required from international organizations to help build the national capacities to ensure that the Convention is implemented.
- Although mercury is not widely used in industrial production in Armenia, a national assessment has shown that there are risks from mercury to human health and the environment.
- The knowledge shared and practical experience gained during the workshop in the areas of environmental and human biomonitoring of mercury, exposure and risk assessment, development of strategies for phasing out mercury-added devices and reducing the use of dental amalgams were important for facilitating the involvement of the health sector in the implementation of the Minamata Convention.
- The practical experience in risk assessment gained during the workshop could be used in relevant daily activities.
- Human biomonitoring data are important for the assessment of human exposure to mercury and other cumulative chemicals. Consideration should be given to broadening HBM programmes and capacity-building in the relevant areas.
- With support from the government, national capacities for HBM and monitoring of mercury in fish and sea products and in the environment have been created in Armenia. The organization of training in HBM and in chemicals risk assessment will be of significant benefit in the implementation of relevant monitoring and risk assessment programmes.
- The identification of population groups exposed to mercury, the establishment of a fish contamination monitoring system and the phasing out of mercury-added products from health care settings are priorities in the implementation of the Minamata Convention in Armenia.

Annex 1

PROGRAMME

Wednesday, 26 September 2016

Session 1 09:00 – 10:00	Introduction Welcome address *Ms Anahit Aleksandrian, Head, Division of Hazardous Substances and Wastes Policy, Ministry of Nature Protection, National Coordinator of the Project, focal point for the Minamata Convention in Armenia* *Ms Rodica Ella Ivan, UNIDO* *Ms Irina Zastenskaya, WHO European Centre for Environment and Health, WHO Regional Office for Europe* Introduction of the participants Scope and purpose of the workshop *(Ms Zastenskaya)* UNIDO activities in the framework of implementation of the Minamata Convention *(Ms Ivan)*
Session 2 10:30 – 17:30	Assessment of exposure to mercury and human health risks *(Ms Zastenskaya)* Mercury and health: introduction to the problem Minamata Convention and responsibilities of the health sector Sources of mercury and identification of population groups at risks: overview Monitoring of human exposure to mercury: human biomonitoring Practical exercise: identification of exposed population groups and assessment of risks of exposure to mercury – development of human biomonitoring programme.

Thursday, 28 September 2016

Session 3 09:00 – 12:00	Assessment of human exposure to mercury: environmental monitoring *(Ms Zastenskaya)* Environment risk and MIA requirements (*Ms Ivan)* Monitoring and risk assessment of: - air and water pollution - contamination of fish, sea products and other food products - emergency situations (mercury spills) Risk communication Introduction to WHO methodology of assessment of combined exposure to multiple chemicals Practical exercise – situational task: development of environment and food monitoring programme and assessment of risks of combined exposure International activities to support the implementation of the Minamata Convention

Session 4 13:00 – 15:30	Phasing out mercury-added products from health care practice *(Ms Zastenskaya)* Dental amalgams: human health risks and planning of risk reduction actions *(Ms Zastenskaya)*
Session 5 15:30 – 16:00	Closing session

Annex 2

LIST OF PARTICIPANTS

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The WHO Regional Office for Europe

The World Health Organization (WHO) is a specialized agency of the United Nations created in 1948 with the primary responsibility for international health matters and public health. The WHO Regional Office for Europe is one of six regional offices throughout the world, each with its own programme geared to the particular health conditions of the countries it serves.

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Exposure to mercury and mercury compounds is harmful for human health, especially for foetuses and children at early stages of development. In 2013, the Minamata Convention on Mercury was adopted by the international community with the aim of preventing negative impacts on human health and the environment from mercury. It places certain obligations on Parties that require action, as applicable, by the health sector in coordination and cooperation with other competent sectors, including the identification of exposed population groups and assessment of the risk from exposure to mercury. A workshop was organized in September 2017 by the Ministry of Nature Protection of the Republic of Armenia in the framework of the project Minamata Convention Initial Assessment of Armenia (carried out by the United Nations Industrial Development Organization and funded by the Global Environment Facility) to raise awareness of the effects on health of mercury and its compounds, provide training for public health and other allied professionals in assessing the risks from mercury and discuss the next steps for the early implementation of the Convention.

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