



## **Health Sector in the Implementation of the Minamata Convention**

**Jamaica, Kingston, 18-19 October 2016**

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## Executive Summary

On October 18 and 19, 2016, the workshop entitled: *“Health Sector in the Implementation of the Minamata Convention on Mercury”* was held in Kingston, Jamaica. The event was organized by the Pan American Health Organization/World Health Organization and the University of the West Indies, Mona, and was financed by the PAHO Special Program for Sustainable Development and Health Equity (SDE).

This workshop is part of a global initiative with the objective to promote the understanding of the roles of the health sector in the Minamata Convention and to facilitate the implementation of the World Health Assembly Resolution WHA 67.11, on the role of WHO/PAHO and the Ministries of Health in the Convention. The workshop was also an opportunity to promote awareness of the health sector on its responsibilities in health issues included in the agreement.

The welcome remarks were conducted by Dr. Noreen Jack, PAHO/WHO Representative to Jamaica, Bermuda and Cayman Islands; Bruno Pouezet, United Nations (UN) Resident Coordinator and UN Development Program Resident Representative; and Prof. Mitko Voutchkov, on behalf of the University of the West Indies (Mona), during the cocktail reception.

The workshop was attended by 20 participants, including representatives from eight English-speaking countries: Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, The Bahamas, and Trinidad and Tobago. The participants were professionals with experience in issues related to environmental health, chemical safety and mercury who belonged to ministries of health, environment, economic growth and job creation, national agencies, academic institutions, non-governmental organizations, and experts from Health Care without Harm and Artisanal Gold Council.

The working method used was the presentation of thematic panels, followed by question and answer sessions, working groups and plenary discussions, to enable participants to share their national experiences.

The panel presentations included concepts and the experience of countries and non-governmental organizations in each of the following issues: 1) Mercury and health; 2) Products with added mercury in health services: thermometers and sphygmomanometers; 3) Products with added mercury used in health services: dental amalgam; 4) GEF projects and health sector experiences in the Minamata Convention; 5) Analytical aspects; 6) Health aspects: fish consumption; and 7) Artisanal and small-scale gold mining.

Working groups were divided by specific topics and enabled participants to have an open discussion focused on the challenges, progress and recommendations in implementing the various aspects of the Minamata Convention on the health sector in their countries. Working group sessions were followed by presentations and plenary sessions, where cross-cutting issues in Caribbean countries were discussed, such as the need for improvement of waste management practices, training of health professionals and creation of a fish advisory database among Caribbean countries.

The expected outputs are the publication of participants and facilitators' presentations on the [PAHO/Toxicology](#) website and this workshop report. Workshop contents will be further expanded as a self-learning course to be available at the PAHO Virtual Campus, following from similar initiatives in progress in Spanish.

### **Acknowledgments**

Our thanks to the Representation of the Pan American Health Organization/World Health Organization in Jamaica, for collaborating with the administration and workshop secretariat, with support from PAHO/Jamaica officers. Special gratitude to the office of SDE PAHO/WHO in Washington, D.C.; and to the University of the West Indies, Mona. Workshop funds were provided by the PAHO Special Program for Sustainable Development and Health Equity (SDE).

Our appreciation to Health Care without Harm, Artisanal Gold Council, and all the individuals, experts and institutions who contributed to the success of this workshop - especially to each participant who endured workshop postponement and changes of logistical arrangements due to the Hurricane Matthew.

### **Introduction**

Mercury is recognized as a chemical of global concern due to its long-range transport in the atmosphere; its persistence in the environment; its ability to bio accumulate within food chains; and its significant negative effects on human health and the environment, even at relatively low exposures.

The [Minamata Convention on Mercury](#), currently under ratification, is a global binding agreement led by the United Nations Environment Program, (UNEP), with the World Health Organization and other organizations and stakeholders. The objective of the convention is "... to protect the human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds" (Article 1).

The WHO has actively participated in the development of the text of the Convention during the six meetings of the Intergovernmental Negotiating Committee (INC). The Latin American and the Caribbean Group (GRULAC), representation of the multi-lateral environmental agreements, has proposed and insisted on the inclusion of Article 16 (on health aspects) in the Convention. WHO has participated in INC meetings with analysis and contributions that were considered on the final text of the Convention. See meeting documents [here](#).

Furthermore, in support of the Convention, the World Health Assembly (WHA) adopted in 2014, the [Resolution 67.11](#): "Public health impacts of exposure to mercury and mercury compounds: the role of WHO and ministries of public health in the implementation of the Minamata Convention", on the role of WHO/PAHO and the Ministries of Health in the Convention implementation. These roles are well defined:

1. Development and implementation of strategies and programs to identify and protect population at risk, particularly vulnerable populations, from exposure to mercury and mercury compounds; setting targets for mercury exposure reduction where appropriate, and public education with the participation of health and other sectors involved;
2. Phase-out of mercury added products in medical devices (e.g. thermometers and sphygmomanometers) and products (e.g. antiseptics and skin-lightening cosmetics); phase-down of dental amalgam use;
3. Development of health strategies for the national action plan to eliminate or reduce the use of mercury in the artisanal small scale gold mining;
4. Dissemination of WHO guidelines on capacity building, mercury exposure levels and other related topics;
5. Information exchanges among intergovernmental organizations, governments and other institutions.

The Resolution WHA 67.11 is recommended to be implemented in the context of other existing WHO strategies, such as Health in All Policies, and Universal Health Coverage – both priorities for the multi-sectoral work needed today to mitigate and solve complex problems of health in chemical safety.

## **Objectives**

As part of a global initiative, the workshop aimed to promote the understanding of the roles of the health sector in the Minamata Convention to ministries of health of English speaking countries in the WHO Region of the Americas; and thus facilitating the implementation of the Resolution WHA 67.11.

The workshop was also an opportunity to promote awareness of the health sector on its responsibilities in fulfilling the roles and responsibilities included in the Convention. These health sector roles were addressed following similar workshops held in October 2015 in Montevideo, Uruguay, and in June 2015 in Bonn, Germany.

## **Workshop implementation**

The workshop was attended by 20 participants (Annex I), including representatives from eight English-speaking countries: Guyana, Jamaica, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, The Bahamas, and Trinidad and Tobago. Participants were professionals with experience in issues related to chemicals and mercury, representing ministries of health, environment, economic growth and job creation, national agencies, academic institutions and non-governmental organizations. Health Care without Harm (HCWH) and Artisanal Gold Council, Canada (AGC) professionals were invited to share their experiences on the workshop thematic related topics.

The event was initiated with opening remarks by Ana Boischio, Regional Advisor in Toxicology in the Special Program of Sustainable Development and Health Equity,

PAHO/HQ. She welcomed participants and acknowledged workshop postponement from October 5-6 to October 18-19, and consequent logistical changes due to the Hurricane Matthew - which hit the Caribbean on the first week of October. She clarified the objectives of the workshop: to promote the understanding of the roles of the health sector in the Minamata Convention; to facilitate the implementation of the Resolution WHA 67.11; and to exchange information on health, public awareness, monitoring and surveillance in health in different sectors. She emphasized the importance of this meeting in mobilizing the health sector to promote activities related to mercury, as addressed in the Minamata Convention, with the support of invited professionals (HCWH and AGC).

The welcome remarks at the cocktail reception were conducted by Dr. Noreen Jack, PAHO/WHO Representative to Jamaica, Bermuda and Cayman Islands; Bruno Pouezat, United Nations Resident Coordinator and UN Development Program Resident Representative; and Prof. Mitko Voutchkov, on behalf of the University of the West Indies, Mona.

## **Thematic panels**

The workshop agenda (Annex II) was presented through six thematic panels (as per the structure of the Minamata Convention and the Resolution WHA 67.11.), followed by question and answer sessions, working groups and plenary discussions, to enable participants to share their national experiences.

### **1. Mercury and Health**

#### *1.1. Mercury as a pollutant of public health concern*

Ana Boischio, Regional Advisor in Toxicology, Sustainable Development and Health Equity, PAHO/WHO presented the following items:

- Chemical safety;
- Mercury toxicology;
- Roles of the health sector in the implementation of the Minamata Convention.

She commented that according to the Regulation, Evaluation, Authorization and Restriction of Chemicals (REACH) in Europe, there are more than 100,000 chemicals in use globally. Competing interests of multiple sectors and stakeholders, in the context of the unbalance of short term development benefits and long term health adverse effects are among the main challenges in regulating chemicals. Conventions, frameworks and resolutions supporting health in chemical safety and other items were presented, such as multi-lateral environmental agreements and frameworks (i.e. the Strategic Approaches to International Chemical Management (SAICM), the Global Alliance to Eliminate Lead in Paint (GAELP); the Montreal, Basel, Rotterdam, Stockholm, and Minamata on mercury conventions; health in all (chemical) policies; universal health care; global plan worker's health).

The toxicology of mercury, including its diversity of forms, compounds, transformations and environmental fate of metallic, inorganic, organic and salt of inorganic mercury were

explained. Highlights were made on mercury speciation according to different sources, routes, health effects, and biomarkers. At the global and regional level, the sources of emissions of mercury to the atmosphere and its environmental fate, and the negative effects of mercury exposure on human health, especially in vulnerable groups, were also discussed. Emphasis was given to methyl mercury in food chain, beneficial and adverse health effects of fish consumption, especially during prenatal life and childhood development, and points to be considered by fish advisories at the local level (considering the high fish consumption in the Caribbean region).

The roles of the health sector in implementing the Minamata Convention were clarified. It was highlighted that the WHA Resolution 67.11 encourages Member States (MS) to ratify and implement the Minamata Convention and to address health aspects of exposure to mercury, while promoting appropriate health care services for prevention, treatment and care. The WHO role in this resolution is to facilitate and support MS and work in cooperation with Minamata Convention bodies. Ana Boischio presented health related Articles 4, 7, 12, 16, 17, 18 and 19 of the Minamata Convention, and recalled the role of the Latin American Group (GRULAC) in including Article 16 on human health aspects in the Convention.

The presentation was concluded with an overview of WHO documents on mercury and chemical pollutants, and the training resources available on the PAHO/WHO virtual campus, such as the mercury virtual course, which will become available in English and Spanish.

Plenary session:

- Mitko Voutchkov gave a brief overview of the capabilities of his lab, located in the University of the West Indies (Mona), in providing non-destructive testing for metal analysis in different samples, including fish, blood, and consumer goods. The mobile equipment was presented *in situ*, with some notes regarding its high cost of approximately 70,000 EUR, and the certification requirements to operate the device. He noted the use of pharmaceuticals for hair treatment as a problem of hair mercury analysis.
- Launa Williams raised concern regarding use of mercury-containing skin lightening soaps by women in the Bahamas. Cheryl Eugene mentioned this is a practice in many Caribbean countries. Terry Mohammed commented this is also an issue in Trinidad and Tobago, and that research confirms this is cause for concern in all Caribbean countries. Notes were made that these products are not strictly enforced, as they are considered a cosmetic rather than pharmaceutical. Jules de Kom noted also the dermal application of hydroquinone to lighten the skin. Carlos Wilson recounted that a number of women in Saint Vincent and the Grenadines have been diagnosed with mercury exposure due to the use of mercury-containing skin lightening products. He noted that small countries lack regulation and enforcement for these products, which are often imported from countries where they are not sold due to safety concerns, and thus it is a regional issue. Ana Boischio agreed that creation and enforcement of legislation of mercury-

containing skin lightening products can be useful to deter their importation, ensure adequate labeling and raise awareness of the health effects and risks associated with the use of these cosmetics. As such, consumers will be better enabled to make conscious choices based on improved awareness of health effects.

- Munair Dicks raised concern regarding the creation of effective fish advisories and public awareness of mercury exposure through fish consumption. Multiple dimensions of this dietary restriction would impact health and disrupt the local economy. Ana Boischio recommended working on fish advisories aimed at setting recommendations through tailored advice based on the fish ecology and local economic situation, rather than eliminating fish consumption and losing its health benefits entirely. This topic is further addressed in the “Health Aspects: Fish Consumption” panel.
- Terry Mohammed mentioned that it is possible to reduce mercury intake by eating fish with certain foods, such as sushi rice. While this may act as a potential mercury neutralizer, it was also recalled that water planted rice may be a potential route of methyl mercury exposure.

### *1.2. Minamata Convention in Mercury: general overview and process*

Jordi Pon, Regional Coordinator, UNEP/LAC, overviewed the Minamata Convention:

- Mercury as a global pollutant;
- Minamata Convention;
- Next steps.

Jordi Pon pointed out that in 2003, governments agreed on the need for global action on mercury, based on its adverse health and environmental effects and its long range transport in the environment. The need for a legally binding instrument to address the mercury issue was considered. In 2009, governments agreed to negotiate a legally binding instrument on mercury and establish the Intergovernmental Negotiating Committee (INC). In 2013, the Minamata Convention was adopted and opened for signature; at the time of the workshop there were 128 signatories and 32 Parties. The following components of the Minamata Convention were highlighted:

- Preamble – sets background for Convention, established previous relevant decision, cooperative actions.
- Objective – protect human health and environment from anthropogenic emissions and releases of mercury.
- Definitions – sets out definitions used in more than one Article of the Convention, whereas some articles include definitions specific to that article.

The obligations of different articles of the Convention were reviewed (Articles 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 and 16). The obligations in Article 3 include controls on primary mercury mining; identification of stocks; control of exports; consent and control of imports from Parties, and

reporting. Articles 4, 5 and 6 regard the phase-out and phase-down dates for mercury use in products and processes. Article 7 refers to international controls on artisanal small-scale gold mining. Articles 8 and 9 refer to control measures on air emissions and releases to land and water. Articles 10, 11, 12 and 16 refer to storage, waste; contaminated sites; and health aspects, respectively. It was mentioned that convention articles are organized into four main categories: 1. Substantive, which describes the obligations on Parties which will reduce anthropogenic emissions and releases of mercury and its compounds to the environment; 2. Support to Parties, which refers to financial mechanisms provided by the Global Environmental Facility (GEF), development of programs on capacity building, technical assistance and technology transfer, and the support of an implementation and compliance committee once the Convention enters into force; 3. Information and awareness raising, such as facilitation of information, awareness and education, monitoring and evaluation; and 4. Operational matters.

Regarding next steps, it was indicated that the Convention will enter into force when there are 50 country ratifications, which is likely to happen in 2017. The INC has assisted in preparing the Convention for entry into force by adopting guidance on provisional basis and forms to be used under the Convention. Support to countries for early implementation and ratification is underway and the ongoing technical support is available.

The panel was concluded with the announcement that the INC7 have requested the interim secretariat of the Minamata Convention to seek information from Governments and others, in relation to certain articles of the Convention. The deadline for submission of this information has been extended to 30 October, 2016. A power point slide containing this information with website [link](#) were stored in USBs, and distributed among participants.

Plenary session:

- Cheryl Eugene and Phylcia Ricketts asked the differences between signature and ratification in the Minamata Convention; and further information on the exemption of mercury-added products. Jordi Pon explained that after Convention text is adopted, MS sign the Convention, and proceed with national processes towards their ratification; after this moment the treaty is legally binding for the country. Currently, MS who have not signed the Convention only have the option to ratify, which has the same legal effect as signature. There are currently 32 ratifications in the Convention; nine of them from the Latin American and the Caribbean region (LAC). Once the Convention enters into force, MS that ratified the Convention become Parties, and as such, they agree to comply with its terms. Support to implement the Convention is also a practical implication of signing and ratifying. Exemption for a certain period of time (five years or more) for specific products was mentioned as an option for countries to register mercury-added products presenting challenges to phase-down/out.
- Andrea Bennett shared the findings of a mercury inventory process conducted in Jamaica, where it was found that cement plants are a major source of mercury

emissions and chemical waste. It was recommended that cement plants should be included for consideration when countries conduct their mercury inventory, and should also note the type of fuel used.

- Carlos Wilson commented on ways to express the importance and positive impacts of ratifying the Minamata Convention to Ministries of Health. He highlighted that the Convention is not only aimed at large countries or countries with artisanal mining issues. Other participants noted that Antigua and Barbuda recently ratified the Minamata Convention and may have experience on relaying the benefits of ratification to ministries. Their experience and lessons learned could be shared among Caribbean countries. Ana Boischio recommended providing information on the benefits of Convention ratification to ministries of health. She noted fish consumption could be a starting point in the discussion for Convention ratification in the Caribbean, due to the region's high fish consumption. It was suggested that evidence on harmful effects of mercury exposure through fish consumption should be shared to the Ministries of Health and policymakers. It was discussed that small countries might not have the tools to enforce the Convention, which may be a deterrent for ratification. It was noted that the Convention provides an opportunity for countries to protect themselves, especially when adjusting legal frameworks regarding chemicals.
- Jules de Kom pointed out that the Caribbean Community countries should raise awareness on CARICOM level of the health effects relating to dental amalgam use and phase-down strategies in a cohesive manner. Ana Boischio commented that a joint PAHO/UNEP effort with the CARICOM regarding lead in paint has been initiated, and that similar actions should be done with the phasing-down/out of mercury containing products. It was suggested that there should be strategies in place to identify drivers among the CARICOM countries to work jointly towards the reduction of mercury-added products and dental amalgam use.

## **2. Products with added mercury used in health services: Thermometers and sphygmomanometers**

### *2.1. WHO guidelines and documents*

Elida Vaught, Consultant, Sustainable Development and Health Equity, PAHO/WHO, presented the following topics:

- Products with added mercury used in health services;
- WHO guides and documents;
- Dental amalgam;
- Thiomersal in vaccines;
- Online resources available.

It was provided a general overview of Article 4 and Annex A of the Minamata Convention. These are referent to the phase-out of mercury-added products in health services, such as thermometers, blood pressure monitors, cosmetics, including skin-lightening soaps and creams; phase-down of the use of dental amalgam in health services; and exemption of thiomersal use in vaccines. Summaries of the following guides, documents and initiatives, available with workshop shared documents, were provided:

- Replacement of mercury thermometers and sphygmomanometers in health care (WHO, 2011);
- Developing national strategies for phasing out mercury-containing thermometers and sphygmomanometers in health care, including in the context of the Minamata Convention on mercury (WHO, 2015);
- Healthy hospitals, healthy planet, healthy people: addressing climate change in health care settings (WHO and HCWH, 2016);
- A comprehensive environmental health agenda for hospitals and health systems around the world (HCWH, 2011);
- Mercury-free health care initiative (WHO and HCWH);
- Promoting the phase down of dental amalgam in developing countries (WHO and UNEP, 2014);
- Paving the way for immunization: Meeting of the technical advisory group on Vaccine-preventable diseases (TAG) final report (PAHO and TAG, 2012).

It was mentioned that thiomersal containing vaccines are used in over 120 countries to ensure immunization of at least 64% of global birth cohort each year, against pandemic and epidemic threats (WHO). Thiomersal was exempt from the Minamata Convention during the INC3 meeting (2011), following up from the WHO Global Advisory Committee on Vaccine Safety documents, which indicate that pharmacokinetic and epidemiological studies do not support concerns over the safety of thiomersal in vaccines. Elida Vaught provided the PAHO projection of costs for single dose preservative-free vaccines. She noted that shifting to single dose vaccines would cause a potential multi-fold increase in overall costs, storage and waste. Several epidemiological studies proving the safety of vaccines and the WHO response and recommendations on the use of thiomersal in human vaccines were discussed, and reiterated that:

- The amount of mercury involved with thiomersal in vaccines is very small compared to other sources of mercury. Evidence available does not suggest possible health hazard with thiomersal containing vaccines;
- WHO recommends multi-dose vaccine vials for routine immunization programmes because they are safe, effective, and they limit the required storage capacity while reducing vaccine costs;
- Alternative presentations would limit the ability to offer affordable vaccines worldwide.

The presentation was concluded with a review of online resources on mercury available on the International Programme on Chemical Safety on the [WHO website](#); which include short information documents, tools for action, norms and guidance, educational and training resources, burden of diseases estimates and fact sheets.

## *2.2. Health care mercury elimination: regional experiences on replacement*

Maria Della Rodolfa, Health Care without Harm, Argentina, presented the following key topics:

- Chemical forms of mercury;
- Environmental fate of mercury;
- Mercury in health care settings;
- Mercury routes of exposure;
- Mercury in medical devices and dental amalgam;
- Making medicine mercury-free;
- Mercury clean up and disposal;
- WHO-HCWH;
- Mercury phase-out in Latin America.

She mentioned the chemical forms of elemental and organic mercury, inorganic salts, and the different routes of atmospheric emissions and anthropogenic sources, especially in health care settings. There are several constraints in shifting to mercury-free instruments, such as minimal understanding about mercury sources and its health impacts; lack of regulation and awareness of alternatives and economics; disposal costs of old mercury; reluctance to change; and wide use of mercury in health care settings.

The average amount of mercury in each mercury-containing medical device was shown. It was noted that the biggest offenders in mercury content are esophageal dilators, Miller Abbott tubes and blood pressure measurement devices. Although thermometers contain 1g of mercury, the average break estimated for a medium sized hospital was approximately 70 units per month (equal to 70g of mercury released each month by a hospital), which is a cause for concern.

Sphygmomanometers contain approximately 100 g of mercury and usually receive calibration and refilling in house, often by a worker without protection or training, who is exposed by dangerously high levels of mercury. It was shown that dental amalgam alloy contains approximately 50% of mercury, and that mercury is released when fillings are removed or when excess scrap is improperly handled. Health Care without Harm online resources and publications were provided to participants during the workshop. They include HCWH recommendations for medicine mercury free, such as: staff training; mercury audit; cost assessment; development and implementation of mercury free purchasing policy; and development and implementation of waste segregation for mercury containing wastes.

The benefits of digital sphygmomanometers and thermometers and other mercury free alternatives (including comparable costs to mercury-containing instruments and high level of accuracy) were discussed. Maria Della Rodolfa provided an overview of mercury clean up and disposal/storage, and showed low tech, low cost options for spill kits, which are recommended to be available in each facility (2-3 units).

The partnership between WHO and HCWH in demonstrating the feasibility of phasing-out mercury-based thermometers and sphygmomanometers in health care (and their substitution with accurate and economically viable alternatives) was discussed. Thermometers and blood pressure devices are included in the Minamata Convention (with phase-out by 2020, pending Convention entry into force dates). The countries in Latin America which have made strides towards the phase-out of these instruments are: Argentina, Brazil, Chile, Costa Rica, Ecuador, Nicaragua, Mexico, and Paraguay.

The presentation was concluded with video demonstrating the dispersion of mercury vapor using fluorescent image; discussion on the potential hazards of mishandling a mercury spill; and overview of HCWH online resources on elimination of mercury in health care settings. These resources were made available to the participants through USBs distributed during the workshop.

Plenary session:

- Launa Williams asked for more information on the usual clean up procedure health workers should follow. Maria Della Rodolfa explained that health workers usually wash away mercury from thermometers breakage in sinks; and noted that thermometers often break in health workers pockets. She mentioned a study in which significant metallic mercury leaks from thermometers were found in neonatal beds, exposing premature babies to inhalation of mercury vapors.

### *2.3. Thermometers and sphygmomanometers replacement: experiences in Jamaica*

Marsha Ann Palmer, Ministry of Health, Jamaica, noted she had overlapping material with Maria Della Rodolfa's presentation. She started her presentation with an overview of local perspective of mercury in health care. The following items were presented:

- Mercury containing equipment is predominantly used in public health care facilities (thermometer and sphygmomanometers);
- Absence of policy/procedure for the management of mercury containing equipment;
- Regular and ongoing breakage of thermometers and lack of mercury waste management protocols;
- Small Island State with the absence of a hazardous waste site (restricted disposal options);
- Absence of indoor air quality (IAQ) assessment after spills;
- Reluctance to promote alternatives to mercury containing equipment;

- Jamaica has submitted a position paper to the UNEP Governing Council, regarding national actions to protect populations at risk and to reduce human generated releases of mercury.

Marsha Palmer explained that there is difficulty in adequately managing mercury spills, which are frequent in hospitals in Jamaica, given the lack of trained health professionals. She further reported that in Jamaica, hospitals do not store mercury items in appropriate containers. It was also mentioned that both chemicals and biological hazardous wastes are often not separated and the country lacks facilities for waste incineration. Dental amalgam phase-out is done in a voluntary basis; and dental amalgam can also be inadequately stored in hospitals. Marsha Palmer added that hospitals are not equipped to test vapors of mercury in storage rooms or to investigate occupational exposure.

It was reported that there was an audit of chemicals inventory for hospitals in 2010, which showed serious challenges in storage and management of chemicals. It was also mentioned that Jamaica does not have an overall chemical management regulations, but legislation exists governing pesticides, with some challenges for enforcement.

It was reported that the phase-out of mercury-containing instruments has started, however health workers are reluctant to use alternatives. Their main complaint is that the alternatives to mercury-added products are not of comparable quality or accuracy. Another challenge is that the instruments used in hospitals are donated and usually contain mercury. The general attitude is to continue the use of mercury-containing instruments if they are in working condition, or to reinstitute mercury instruments when digital thermometers break. It was highlighted that cost drives the decision in procurement in hospitals.

Plenary session:

- Ana Boischio mentioned that the WHO guidelines allow countries to decide if they replace thermometers at once or slowly as they break or need to be replaced. The Minamata Convention recommends provisional storage as the best possible practice for stored mercury-added products. She described the case of a hospital that made efforts to replace thermometers and stored them in a plastic bin that disappeared after a flooding event. Thus, with some connections with climate change impacts. Maria Della Rodolfa mentioned that the best practice for storage of mercury-added products is to build storages on the back of hospitals, and to store mercury-added products in plastic bins. She pointed out that floods are an issue, especially when materials are stored in basements. She recommended that the first step when starting the phase-out of mercury-added products should be to source good thermometer alternatives and let the health workers use both mercury and electronic thermometers, to feel the difference in accuracy.
- Launa Williams pointed out that persuasion of ministry of health to implement programs need to be based on evidence, and asked if there are studies on occupational health effects of mercury exposure, to prove the need for mercury-added product replacement. Ana

Boischio commented that there are studies available, and that the USBs distributed to the participants contain the study “Exposures of dental professionals to elemental mercury and methyl mercury” ([Basu et al., 2016](#)) on dental workers and health effects from mercury exposure.

#### *2.4. Current status of mercury in health services in St. Vincent and the Grenadines*

Carlos Wilson, Senior Environmental Health Officer, St. Vincent and the Grenadines, presented the current status of mercury in health services in St. Vincent and the Grenadines, highlighting the following:

- Chemical history of St. Vincent and the Grenadines;
- Achievement in chemicals management;
- Mercury in health care;
- Minamata Convention;
- Next steps.

St. Vincent and the Grenadines is signatory to the Basel, Stockholm and Rotterdam chemical conventions. In 2014, a review of chemical profile was conducted, followed up by a completion of the National Implementation Plans (NIP) for the Stockholm Convention, in 2015. Other achievements in chemicals management include the completion of SVG’s first SAICM chemical profile; regional project for the disposal of obsolete pesticides (Food and Agriculture Organization initiative); and a regional project for persistent organic pollutants (POPs) inventory (Basel Convention Regional Centre for the Caribbean)/United Nations Environmental Programme/Global Environment Facility).

Carlos Wilson reported that SVG is slowly phasing down/out equipment and mercury containing substances in health care (i.e., dental amalgam, etc.), especially in public health care facilities, where there is a lack of management of equipment and substances.

St. Vincent and the Grenadines is currently not a signatory of the Minamata Convention, and have not conducted a mercury inventory. There is a general lack of awareness in relation to the Minamata Convention. Standard Operational Procedures for health related activities is not always followed.

It was reported that there are plans for a discussion with the Ministry of Health and stakeholders to seek technical guidance from PAHO/WHO and other agencies. It was also mentioned that a mercury inventory will be conducted in 2017; and that SVG is seeking the phase down/out of equipment and products containing mercury, while implementing awareness raising strategies for health care workers. Finally, SVG is also planning on implementing smart hospitals through the [PAHO/WHO Smart Hospitals Project](#). The project is aimed at supporting Caribbean countries to improve their health care facilities by establishing an integrated approach to building and retrofitting; ensuring health care facilities are environmentally friendly and disaster resilient. This project will be piloted at the Georgetown Hospital in SVG and Pogson Medical Centre in St. Kitts and Nevis.

Carlos Wilson discussed that each island in the Caribbean has a different approach on the management of chemicals. In the case of SVG, there are no facilities for bio hazardous waste, thus it is sent to the regular land fill. Health workers are not trained to follow procedures for proper management of chemical materials. St. Vincent and the Grenadines lack legislation on occupational health, and information on health effects of mercury exposure is not available.

Plenary session:

- Jules de Kom pointed out that Caribbean countries very often share common issues regarding chemical management, and suggested that the region should join forces to resolve chemical management issues. He also commented on the difficulty often experienced in including chemicals in the national agenda, and suggested that PAHO/WHO could play an added role in assisting ministries of health to take action. Ana Boischio suggested the CARICOM as an entry gate for joint cooperation of Caribbean countries, quoting *Mercado Común del Sur*. MERCOSUR has a subcommittee of environmental and occupational health that follows up with the related policy implementation agenda. Ana Boischio added that PAHO could raise awareness among ministries of health regarding the Resolution WHA 67.11 on health sector in the Minamata Convention implementation; and the most recent WHA 69.4: “*The role of the health sector in the Strategic Approach to International Chemicals Management towards the 2020 goal and beyond*”. She noted these mandates could be used to trigger appropriate action from the ministries.
- Carlos Wilson mentioned the SVG’s Ministry of Health has embraced PAHO’s initiative aimed at reducing salt intake, as an example of PAHO/WHO’s influence on national agendas. Marsha Palmer concurred with several PAHO programs and initiatives embraced by Jamaica, and mentioned that the minister of health have promoted lifestyle changes. She highlighted that change is difficult to implement when costs are involved. Further, exposures to chemicals have long term effects detrimental to health, which are not necessarily perceived with its due severity by policy makers.
- Ana Boischio recalled the PAHO Directing Council meeting agenda (September 2016), included the Resolution WHA 69.4, addressing health in chemical safety, as part of the Sustainable Development Goal (SDG) report. The resolution includes the draft of a chemical road map, for which a global consultation has been placed by WHO Geneva. PAHO has implemented a discussion at the PAHO Virtual Campus, outlining concrete actions to enhance health sector engagement towards meeting the 2020 goal, and contributing to relevant targets of the 2030 Agenda for Sustainable Development. She mentioned suggestions to be included in the [draft road map](#) at PAHO virtual Campus were welcome.
- Availability of local data to support evidence of mercury health impact to persuade governments to adopt initiatives was discussed. Ana Boischio indicated that a wealth of knowledge is available and additional local data could cause a delay on adopting

initiatives. Marsha Palmer emphasized the importance in using local data to understand the exposure levels and effects of chemicals in the population. She illustrated that local evidence proved that high concentration of lead in Jamaican soil affected vulnerable population, thus persuading the Ministry of Health to control lead use and mitigate health effects among exposed populations. Jules de Kom suggested the use of appropriate examples from other countries as argument to assist and/or persuade governments to adopt policies.

- Tara Malcolm noted the importance of identifying drivers to move regulations forward - otherwise it would be difficult for countries to adopt regulations. Quotes were made regarding raising awareness at the ministry level. Maria Della Rodolfa mentioned that the Argentinian Ministry of Health works jointly with pediatric associations. They were able to show health impacts in vulnerable populations, to such a degree that regulations were approved. Ana Boischio suggested that health professional associations should write consensus letters to sensitize policy makers to push for regulations to strengthen health in chemical safety.

### **3. Products with added mercury used in health services: Dental amalgam**

#### *3.1. WHO experiences and PAHO's oral health plan*

Elida Vaught, Consultant, Sustainable Development and Health Equity, PAHO/WHO, presented an overview of the following topics:

- Current status of dental amalgam;
- Activities related to dental amalgam;
- Minamata Convention: dental amalgam;
- Projects to phase-down dental amalgam;
- PAHO's oral health plan;
- Online resources.

It was presented that dental amalgam is the only mercury-added product subject to a phase-down under the Minamata Convention's provisions. Alternative restorative materials are desirable; however, a progressive move away from dental amalgam would be dependent upon adequate quality of alternative materials, costs, and availability. Dental amalgam is still widely used and choice of materials for dental caries depends on several factors, such as size of caries lesion, healthcare provision, insurance preference, technology available, cost and environmental factors.

WHO and UNEP have organized an expert group meeting in Geneva: "Future of use of materials for dental restoration" in 2009, where the "phase-down" of dental mercury use was recognized worldwide. The publication "Future use of materials for dental restoration" (WHO, 2009) was presented.

It was shown that WHO and UNEP are also initiating demonstration projects to phase-down dental amalgam in different regions of the world, and the priority areas for this initiative were discussed in detail. One example of this initiative is the East Africa Dental Amalgam Phase-Down Project focused in Kenya, Tanzania and Uganda, which promoted training activities and capacity building for 196 dental personnel in these three countries.

The Caries free Communities initiative, PAHO's oral health plan, was presented, followed by a review of the WHO/UNEP publication "Promoting the phase down of dental amalgam in developing countries". The World Alliance for Mercury-Free Dentistry publication "Toward Mercury- Free Dentistry" was also reviewed to exemplify ways in which dental amalgam phase-down is possible in developing countries.

The role third-party payment systems play was highlighted. It was mentioned that the effective switch to non-amalgam materials should count with health insurance companies to incorporate reimbursement mechanisms, providing higher economic support to patients using non-amalgam material. She pointed out this can be established through direct work with ministries of health.

Finally, the oral health activity proposed by Professor Paul Erik Petersen (WHO, Oral Health Consultant) was presented. The activity consists of the formulation of national goals for prevention of dental caries; relevant national health surveillance system; and national monitoring system for measurement of reduction in the use of dental amalgam. Online resources on oral health available on the WHO and PAHO website were shown.

### *3.2. Best practices approach to medical waste management in dental and medical offices*

Homero Silva, Professor, University of Technology, Jamaica, presented the following topics:

- Current situation of mercury in dental and medical offices;
- Types/forms of wastes generated;
- Best practices approach to medical waste management in dental and medical offices;
- Fluoride health impacts.

Homero Silva explained that it is difficult to achieve the goals of many oral health and environmental initiatives implemented in Jamaica, because of the country's environmental problems and lack of infra-structure. He noted that Jamaica has a risk site issue with no adequate site for recycling, thus the waste is thrown directly into rivers and into the plumbing system.

It was mentioned that dental medical waste is the main source of mercury wastewater discharges. In Jamaica, 50% of mercury entering power owned treatment works (POTW) was attributed to dental offices. Homero Silva indicated that some of the waste amalgam particles that reach the sewer system settle in the sewers, while some are carried out to POTWs, where around 90% of mercury can be removed. The different types of waste generated by dental offices include chemicals for X-ray fixers and developers, disinfectants, cleaners, fluoride, and

sterilant solutions. The forms of waste were described as wastewater, medical waste and regular garbage.

The suggested best practices approach to medical waste management in dental and medical offices included: pollution prevention programs (i.e. education training, chemical inventory control, housekeeping practices, recycling) and pollution prevention practices (i.e. dental amalgam alternatives; non-hazardous, non-chromium and biodegradable materials; training of staff and cleaning services on pollution prevention). Best management practices also addressed measures to reduce the entry of pollutants into the environment. They were described as the use of amalgam capsules, vacuum pump filters, amalgam separators, plumbing replacement and repairs, recycling, use of alternative sterilant solutions and alternatives for X-ray fixers, cleaners, and developer solutions.

Homero Silva showed a map of Jamaica's endangered aquifers, and a map of Riverton city dump and Soapberry waste water treatment plant. He concluded by explaining that fluoride is an endocrine disruptor chemical (EDC) deserving of attention; and showed the many fluoride health impacts.

### *3.3. Oral health programmes and dental amalgam use in Jamaica*

Irving McKenzie, Dean and Chief Officer of Oral Health Sciences, University of Technology, Jamaica, presented the following topics:

- Core principles and oral health services;
- Oral epidemiological profile;
- Risk factor for oral diseases and common risk factor approach;
- Standard facilities;
- Oral health and curative programs;
- Current sales and distribution of dental amalgam;
- Waste management and waste disposal of dental amalgam.

Core principles and oral health services in Jamaica were overviewed, including access, quality and equity, and the approach to do no harm to the environment. The Jamaican oral epidemiological profile was described. It was highlighted that 16-40% of children in the range of 6-12 years old are affected by dental trauma, due to unsafe playgrounds and schools, road accidents or violence. Risk factors for oral diseases include social determinants, unhealthy diet, tobacco and alcohol use, and poor hygiene.

Irving McKenzie pointed out that Jamaica has rolled out the PAHO's Caries Free Community Initiative and several other oral health programmes: oral public health; oral cancer screening; oral disease surveillance; examination and charting; basic periodontal charting; restoration; anesthetic and pain management; and exortias programmes.

It was mentioned that the Ministry of Health is the major user of dental amalgam in Jamaica, which is used mainly in rural communities however there has been an overall 50% reduction in

the use of dental amalgam. Most of the dental amalgam is used for restoration because of the cost of alternative materials. Jamaica has already adopted the use of amalgam capsules to follow the recommendations of the Minamata Convention, and the use of enclosed triturators to keep practitioners away from mercury vapors. It was also noted that in Jamaica, dental practitioners do not remove amalgam of pregnant and breastfeeding patients, due to potential exposure to additional mercury vapor released during the removal process. It was further mentioned that dental professionals are not tempted to remove amalgam fillings because of lack of infrastructure to safely dispose the amalgam.

It was announced that Jamaica will launch a program using dental sealant and fluoride to prevent dental caries in November 2016.

Plenary session:

- Homero Silva announced he is conducting a study on fluoride. Irving McKenzie mentioned that fluoride is used in Jamaica only in populations at risk, in a limited way.
- Andrea Bennett noted that oral health in Jamaica is culturally important. She mentioned that implementing PAHO's oral health plan to educate the population on caries prevention is a good approach, as the cost of curative oral health in Jamaica is the same as in the United States, making it prohibitive for Jamaican patients.

#### **4. GEF projects and health sector experiences in the Minamata Convention**

##### *4.1. Introduction*

Jordi Pon, Chemicals and Waste Regional Coordinator, UNEP/LAC, Panama, presented the Global Environment Facility's role in the Minamata Convention. It was pointed out that there are 5 program objectives that are relevant to the Minamata Convention: reduction and elimination of mercury use in ASGM; reduction and control of mercury emissions; phase out of mercury in industrial processes; sound management of mercury storage; and life cycle management of mercury. It was also highlighted that there are two enabling activities eligible for GEF financing: Minamata Convention initial assessments (MIAs) (200,000 USD), and ASGM National Action Plans (NAPs) (500,000 USD); key MIA projects were also described.

Jordi Pon showed that UNEP in the LAC region has 3 regional and 3 national MIA approved projects. The Caribbean countries included in the regional project are: Jamaica, St. Kitts and Nevis, St. Lucia, and Trinidad and Tobago. These countries were represented in this workshop. Globally, UNEP MIA projects are on-going in a total of 52 countries. Other on-going UNEP mercury projects include the development of a plan for global monitoring of human exposure to environmental concentrations of mercury (global), and NAPs for artisanal and small-scale gold mining (19 countries on-going in LAC).

It was mentioned that the Caribbean MIA project was launched the week prior to the workshop. Also, that the Basel Convention Regional Center for the Caribbean is working on another project proposal for a group of countries: Antigua and Barbuda, Bahamas, Barbados, Grenada and Dominica.

#### *4.2. Jamaica*

Andrea Bennett, Director, Ministry of Economic Growth and Job Creation, presented the mercury related projects in Jamaica associated with implementing the Minamata Convention. Jamaica became signatory to the Convention at the conference of the plenipotentiaries (October 2013), and participated in all Intergovernmental Negotiating Committees (INCs). Jamaica is currently implementing phase 1 of the road map towards ratification of the Minamata Convention. The government is committed to the Environmentally Sound Management (ESM) of hazardous wastes, especially of mercury and mercury-added products. The country intends to ratify the Convention; however, among the plenary comments were made that the country will have difficulties to meet some of the obligations in the Convention.

It was reported that there are ongoing policies, programmes and projects aiming to address the ESM of hazardous wastes, including mercury. Jamaica has two GEF supported projects being implemented: UNEP BCRC regional project on mercury storage and disposal, and UNEP BCRC regional project on mercury initial assessment. It was mentioned that the sources of mercury and mercury products in Jamaica are: oil refining, natural occurrence with mining remobilization, waste and health sectors (cemetery). Potential sources of mercury atmospheric emission from the cement plant was not listed, yet discussed in other sessions. It was highlighted that there is a gap in pesticides studies conducted in Jamaica to link mercury content. It was further mentioned that the Ministry of Health has conducted an initial mercury inventory, in which the oral sector played a critical role. Regarding oral health, it was mentioned that mostly the public health sector uses dental amalgam.

Andrea Bennett noted that the ministry of Economic Growth and Job Creation is in charge of the coordination of mercury issues associated with the Projects being implemented, and will be Jamaica's focal point for the Convention. The GEF MIA project which is being implemented in four countries in the Caribbean: Jamaica, St. Lucia, St. Kitts and Nevis, and Trinidad and Tobago will assist the countries in early ratification and implementation of the Convention. There will also be another MIA project for at least four other Caribbean countries being implemented by next year.

Plenary session:

- Marsha Palmer mentioned cost as an important driver in procurement in the public health sector. She also mentioned mercury-added products in working conditions are not likely to be replaced by mercury-free alternatives. There is a branch of the Ministry of Health responsible for the management of chemicals and eliminating mercury-added

products. However, she noted that the Ministry of Health is also a consumer of these products.

#### *4.3. St. Lucia*

Cheryl Eugene, Senior Environmental Health Officer, Ministry of Health, pointed out that St. Lucia is in the initial stage of ratifying the Minamata Convention - currently pursuing the process, analyzing its legal ramifications and filling in the gaps. A GEF project was approved in July 2016, and is projected to start in February 2017, aiming at establishing mercury inventory.

St. Lucia does not manufacture mercury or mercury-added products and it does not mine heavy metals. All mercury-added products are imported and many are used in health services. The country has voluntarily initiated a phase-out of mercury-added instruments. Mercury-free thermometers account for 90% of thermometers used in health services - all new incoming supplies are digital. Dental amalgam is still in use, but slowly being phased-down and composite is the alternative material of choice. She noted that St. Lucia is in the process of commissioning two hospitals to adhere to the PAHO/WHO smart hospital Project; and concluded with St. Lucia's main challenges, which include the effective disposal of mercury-added products. For instance, new equipment will be donated to replace mercury-containing products and equipment; therefore their adequate disposal will be an issue.

#### *4.4. Guyana*

Armanauth Maraj, Director, Environmental Health, Ministry of Health, mentioned he was glad to participate in the workshop, with the opportunity to prepare the topic for his presentation and to know more about the Minamata Convention. He noticed that many of the Minamata Convention recommendations are included in Guyana's national strategies. However, the country is lagging behind on what needs to be done to reduce the use of mercury. It was noted that evidence is essential to make a robust case for the government to implement recommendations for mercury reduction.

He presented Guyana's national health strategy "Health Vision 2020", which is a strategy cognizant of the existing gaps in the legislative framework and the need to collaborate across agencies and sectors; while advocating at national and subnational levels for healthy environments.

It was mentioned that Guyana signed the Minamata Convention in 2013, and ratified in 2014. Initial assessments regarding mercury use in Guyana was initiated by consultants with UNDP funding. These final assessments are expected to be submitted in October 2016. Because these assessments are not finalized, the national action plan (NAP) has been delayed.

A few constraints have delayed current work in progress: inadequately trained human resources; unavailability of lab testing facilities; cost involved in testing samples overseas; unwillingness/ non-cooperation and resistance to change by small and medium scale miners and residents, and extensive and difficult terrain to access/cover. Armanauth Maraj concluded

by discussing the ministry of health's strategies to be included in the NAP mercury project in 2016, which include:

- Establishment of a system for monitoring levels of mercury in populations at greatest risk; strengthening the Ministry of Health's capacity to conduct analysis of mercury levels in human samples; establishment of a mechanism for phasing out the use of mercury-containing equipment and products in the health sector; strengthening of the health sector capacity in medical management of mercury poisoning; development and implementation of disease prevention and health promotion programs on mercury; and the promotion of production and consumption of alternative sources of dietary protein, instead of fish containing high levels of mercury.

#### *4.5 Suriname*

Jules de Kom, Senior Policy Advisor, Ministry of Health, highlighted that an extensive national stakeholder consultation was performed for the potential ratification of Suriname in the Minamata Convention. For GEF funding two projects have been submitted and approved, which are Minamata initial assessments (2015 and 2016). It was also mentioned that in the NAP project Public Health strategies were included. Jules de Kom noted that it is important to have the involvement of the health sector, especially at the initial phase of these projects, since the main drivers are usually from the environmental sector.

#### *4.6. Mercury: The present situation in the Bahamas*

Launa Williams, Public Analyst, Ministry of Environment, reported that the Bahamas have not signed the Minamata Convention, but have taken steps towards mercury use reduction. Mercury light bulbs in the Nassau airport have been replaced recently, with the support of an environmental officer at the airport. Old machines containing mercury are gradually being phased-out and replaced by mercury-free machines (e.g. sphygmomanometers). Launa Williams explained that the private sector is currently not using dental amalgam, but the public sector practices are unknown to her. Mercury thermometers are still being used in public schools, although there is an attempt to shift to alcohol thermometers.

In relation to projects being implemented in the Bahamas, one of the main concerns reported for successful implementation is the geography of the archipelago. Because the 700 Bahamian islands are scattered over 100,000 square miles, data collection and costs are a major issue. However, the government is willing to move forward with projects within its capability.

New Providence Island has a sanitary landfill with a hazardous waste storage facility, which is short staffed and currently only segregation takes place at the facility. Hazardous waste materials from other islands are transported by mail-boat to the Hazardous Waste Facility in New Providence for disposal.

Plenary session:

- It was mentioned that the reason certain countries have not ratified the Minamata Convention may be due to the challenges countries may face to comply with its obligations, once the Convention enters into force.
- Jules de Kom referred to the potential provisions within the Minamata Convention for specific cases such as the Bahamas, which foresees a difficulty in following up with recommendations because several islands are sparsely located (thus, access to them is costly). Andrea Bennett commented that the Convention makes considerations for small islands, and that there is a specific international funding program for these cases. She mentioned countries that have signed or ratified the Convention have better access to GEF support. To recall, GEF is the institution responsible for financial mechanisms for the Minamata Convention. Jordi Pon explained that there are exemptions but only for initial activities. He highlighted that once the Convention enters into force, countries which have not ratified the Convention have no obligations. However, these countries would be more exposed to lack of capacity, access to international assistance, and control of mercury-added products movements. Ana Boischio recalled that countries need to work on national legislation to ensure compatibility with the Convention for the purpose of ratification.

## 5. Analytical aspects

### 5.1. Mercury and health research in Jamaica using nuclear techniques

Mitko Voutchkov, Professor, University of West Indies, Jamaica, presented on mercury and health research in Jamaica, using nuclear techniques with handheld XRF analyzer. He explained that nuclear techniques (or non-destructive analysis) use radiation to analyze and measure the response and contents of materials. He showed different analysis equipment available at the UWI physics' lab, which measures mercury and other elements in water, air, objects, food and animals; and discussed the association of radon and cancer incidence. He explained he has conducted extensive *in situ* soil characterization in Jamaica using the handheld XRF analyzer. He concluded that mercury levels in Jamaican soils are high, especially in bauxite ore mining sites. He showed that mercury in soil is concentrated in the west part of Jamaica, because of wind direction; and that bauxite mine sites is likely to exacerbate the mercury level in local fish.

Mercury analysis has been performed in fish species of wide consumption in Jamaica. High mercury levels (up to 5.57µg/g ppm) were found in marlin fish. He indicated he has conducted similar fish analysis in Trinidad and Tobago with *Phyllicia Ricketts*.

Photographs were shown to exemplify mercury spill from old instruments (e.g. tensometers), and mercury lamps. It was mentioned that Jamaica does not have a collection site for mercury

lamps. Mitko Voutchkov demonstrated the use of the hand held X-ray analyzer. He added that among other things, the instrument can be used to measure radiation in in vivo specimens and measure lead in bone. Comments were made about the costs of the mobile equipment, in the order of 70,000 EUR, and the certification requirements to use the analyzer.

Mitko Voutchkov pointed out that he is able to provide similar analysis in other countries in the region, especially as a way to engage graduate students in these types of research.

### *5.2. Mercury analysis of shark in Trinidad and Tobago*

In his presentation, Terry Mohammed, Lecturer, University of the West Indies, Trinidad and Tobago, explained the importance of analyzing mercury levels in the Caribbean region, given the high fish consumption in the region. He pointed out that shark, marlin, tuna, king fish and mackerel can be heavily consumed in Trinidad – which are fish often found with high mercury levels. It was mentioned that in Tobago there are villages consuming 8kg of fish per week. Snapper, mackerel, croaker and shark are often the preferred choices.

It was reported that Trinidad has started importing shark from Asia, due to increase in shark consumption. In 2014, a note was published at the Food Recalls Europe website showing that Caribbean pearl shark steaks exported to Norway were recalled, because of high levels of heavy metals arsenic and mercury. Trinidad and Tobago consume shark meat and export fins to Asia, since finning has been banned in Trinidad and Tobago in 2014.

Terry Mohammed mentioned that fish is considered the healthiest diet option in the region, especially in Trinidad and Tobago, where sushi has become a trendy food option. It was noted that there are approximately 20 sushi restaurants in Trinidad - sushi is also available in bakeries, groceries and pharmacies. There have been two reported cases of mercury poisoning due to diet exclusive of fish in Trinidad.

In Trinidad and Tobago, fish consumption, oil production and deposits in natural gas plants are considered significant sources of mercury. It was also reported that Trinidad and Tobago have other potential sources of mercury, since it does not use coal combustion and the absence of other industries such as iron and steel, and chlor-alkali; and that mining is not a major source of mercury, as seen in other countries. In addition, it was mentioned that lead based paints are used in ships and there is a strong indication of ship repairs as a source of lead.

Trinidad and Tobago is a delicate region, as the recipients of external sources of mercury due to ocean currents from South America, Africa, the U.S. and Europe. Birds have also become a source of pollution, due to the soil contamination from feathers. Terry Mohammed also mentioned that dental amalgam fillings and mercury lamps are usually thrown in the regular garbage, for lack of proper waste management.

Terry Mohammed presented his current research, analyzing puppy shark, hammer head shark, which contain high mercury concentrations on muscle tissue in the range of 209-1900 parts per billion (ppb) and 120-3328 ppb, respectively. Ongoing research is updating the consumption patterns for various fish species and evaluating mercury levels in commonly consumed fishes

in the region; evaluating mercury levels in fishing communities in Trinidad and Tobago by the use of hair samples; and searching methods of reducing mercury absorption in the human body.

Plenary session:

- Based on the fish mercury levels observed, Ana Boischio alerted that maximum tolerable intakes should be considered in line with the WHO/FAO level, which is 500 ppb for a maximum amount of 200 grams of fish consumption per week to protect prenatal life. She also suggested that migration patterns of fish are important and helpful to understand mercury distribution in the aquatic food chain. Terry Mohammed mentioned that reef sharks don't usually migrate and smaller sharks stay within a smaller region. He mentioned similar mercury levels found in his research have also been found in sharks in other areas in the Atlantic. Ongoing projects will analyze different fish species in Trinidad and Tobago and Guyana.
- Carlos Wilson commented on the importance to include St. Vincent and the Grenadines in this type of research, as the same mercury levels found in Trinidad and Tobago might be found in other islands in the region.
- Terry Mohammed highlighted that large fish can have high mercury level and the population in Trinidad and Tobago prefers to consume large fish.
- Munair Dicks referred to the possibility of cross contamination by ships bringing organisms known to have high mercury content. Terry Mohammed explained that large transfers would have to take place for a cross contamination to occur.

## ***6. Health aspects: Fish consumption***

### *6.1. Health aspects in the Minamata Convention*

Ana Boischio, Regional Advisor in Toxicology, Sustainable Development and Health Equity, PAHO/HQ started her presentation highlighting the role of GRULAC in the inclusion of Article 16 (health aspects) in the Convention. Considering this particular article and other health related articles, the World Health Assembly resolution WHA67.11 formalize the health sector roles on the convention implementation.

She mentioned that the most important aspect in Article 16 is the implementation of strategies and programs to protect populations at increased risk and under vulnerable conditions. Article 16 includes specifications, such as for occupational exposure through small-scale artisanal mining and sets targets for mercury exposure decrease, with awareness among different sectors involved. Another important component of the article is health care services for prevention, diagnosis, and support of people affected by mercury exposure. In areas where exposures

occur, there is a need to identify availability of primary and secondary health care services and to implement capacity building on mercury toxicology.

It was noted that PAHO/WHO has a relevant agenda on universal health coverage, where chemical safety and mercury should be included. Mapping institutional capacities is needed to make advances and concrete proposals on health service on chemical safety, and in particular on mercury and its compounds. PAHO/WHO has a role on communicating human bio monitoring to different agencies and audience.

Plenary session:

- Marsha Palmer commented on the difficulty in diagnosing chemical exposure cases. She described a case in Jamaica, in which children were exposed by playing with batteries, and had been to the hospital several times prior to being diagnosed with lead poisoning. Ana Boischio noted that health services availability and capacity are important to conduct accurate diagnosis, which must include exposure history with considerations to symptoms that can be associated with multiple factors. Maria Della Rodolfa added that medical curriculum should provide environmental and chemical impact courses to better enable medical doctors on diagnosis of symptoms related to chemical exposure and treatment support.
- Ana Boischio mentioned that poison control centers could be a good source of information to the population and to health professionals. She noted that professionals with a toxicology background is key, and that 24/7 time schedule is preferable. Jules de Kom commented on the challenges to gather funds and persuade administrators to support poison centers. He added that sensitizing primary care and capacity building for prevention should be a priority – the focus of primary care should be on prevention and not exclusive on targeting acute cases. Prevention is an approach that might convince administrators to invest. Carlos Wilson indicated that St. Vincent and the Grenadines uses a health information system and surveillance instead of a poison control center (due to lack of funding); with the intent to further use it as a medium for dissemination of information among health care professional. Jules de Kom observed that it should be easier to disseminate information among professionals through websites and use of technology.

#### *6.2. Human placenta as a dual biomarker for dietary and environmental exposure to mercury in Jamaica and Trinidad and Tobago.*

Phyllicia Ricketts, PhD candidate, University of the West Indies, Jamaica, presented the objectives, methods and findings of research she has conducted in Trinidad and Tobago and Jamaica, on placenta as a dual biomarker for mercury exposure. Trinidad and Tobago was chosen because of its fish diet, where it was found that placenta is influenced by fish intake, in which a higher exposure to mercury is based on the type of fish consumed. However,

confounding exposure by the influence of the natural environment, especially from bauxite mining, could also explain high levels of mercury in placenta.

It was noted that bauxite mining is the primary economic activity in Jamaica, hence it cannot be eliminated. It was recommended the implementation of some sound management practices such as filter condensers to remove mercury from vapors. Regarding fish consumption, it was recommended that fish advisories should monitor the frequency, quantity and species of fish being consumed.

Plenary session:

- Elida Vaught suggested the use of food logs (or food diary) to analyze the variation in fish consumption and mercury level in placenta in different times of the pregnancy.
- Mitko Voutchkov mentioned that knowledge of toxicity should be expanded, and that a methodology to build a database for a Caribbean fish advisory in different countries needs to be developed.
- Terry Mohammed offered his resources from the University of the West Indies, St. Augustine, to analyze fish with potential low mercury levels (not included in Phylicia Ricketts' study); and suggested all Caribbean countries should join efforts to build a regional database.

### *6.3. Methyl mercury exposures during prenatal life: risk-benefits of fish consumption, fish advisories and risk communication strategies*

Jules de Kom, Senior Policy Advisor, Ministry of Health, Suriname, presented the many nutritional benefits of fish consumption and their impact on human growth, development and health maintenance - especially important for pregnant and breastfeeding women. Studies demonstrating the association between improved neurodevelopment and seafood consumption were discussed.

The risk of fish consumption was described, with attention to exposure to chemical pollutants, such as methyl mercury, posing adverse neurological and neurodevelopmental outcomes in infants and young children, by exposure during fetal development. The effects of prenatal methyl mercury exposure were overviewed.

In regards to fish advisory, it was noted that it is important to consider fish mercury content, but also other factors such as seasonal variation, personal preference, cultural influences, fish size, and species for fish advisories purposes. It was recommended that fish advisories format, design and detail should be specific for each target group. Different fish advisory samples were shown and proper design for fish advisories and proper risk communication strategies were

discussed in detail, with several recommendations (especially for information exchange and education, and effective communication strategies).

Plenary session:

- Ana Boischio pointed out that food lore is relevant in fish consumption and mentioned that in the Amazon, different types of fish are consumed depending on the person's health status (e.g. breastfeeding women eat certain fish species).
- Jules de Kom highlighted the difficulty in assessing what advice should be given in terms of fish consumption, due to the balance that is sought between benefit and risk. The type of message being disseminated needs to be analyzed carefully because of the impact it may cause.
- Jordi Pon announced that the Minamata Convention is open for discussion in regards to indicators and biomarkers to be used. Stakeholders, WHO and governments can submit information to the sub-secretariat until the end of October, 2016.

## ***7. Artisanal and small-scale gold mining***

### *7.1. ASGM: health impacts and public health strategy*

Ana Boischio, Regional Advisor in Toxicology, Sustainable Development and Health Equity, PAHO/HQ presented the health hazards caused by artisanal and small-scale gold mining practices, mercury exposures and public health strategy guidelines.

It was shown the ASGM processes where mercury is used and exposure occurs (i.e. smelting, evaporation of liquid mercury, amalgamation, etc.). Also, several environmental impacts brought by the release of waste materials from the extraction process and the effects of land use changes (i.e. impacts on local ecosystems and water resources). Ana Boischio described health effects of different mercury forms and compounds. She also noted the importance of providing capacity building for health personnel to promote mercury exposure mitigation, especially among people under vulnerable conditions.

An overview of a summary of health hazards related to ASGM was provided ([WHO, Artisanal and small-scale gold mining and health](#)). It included chemical, biological, biomechanical, physical and psychosocial hazards attributed to several sources of exposure that can occur in ASGM communities. Access to public health care was noted as a major concern, given ASGM miners work in the informal sector and have limited access to public health services.

Ana Boischio explained the association between ASGM and aquatic food chain contamination; described the methyl mercury health effects, and noted that children are affected differently by exposure of hazardous chemicals and substances, while carrying the effects longer than adults.

WHO documents on ASGM and health were presented and included: the guidance on developing public health strategies (under development) for the National Action Plan to reduce or eliminate mercury use; health situation assessments, and training materials for health care providers, to support the requirements under article 7 and annex C of the Convention. It was mentioned that the health sector needs an articulated framework.

Health assessment among ASGM communities was discussed and included the presentation of a summary of the publication “Rapid assessment of the health situation of artisanal miners and their families in Mongolia” (WHO, 2014). Current collaborative efforts were listed, including the development of health documents; collaboration with major NGO’s, such as HCWH and AGC; and GEF funded projects with UNDP, UNEP, and UNIDO. PAHO and WHO online resources were presented, such as training resources on mercury.

### *7.2. ASGM: national overview on social, environment and health aspects*

Armanauth Maraj, Director, Environmental Health, Ministry of Health, Guyana, quoted the Guyana’s national action plan, which was prepared with the Ministry of Natural Resources and Environment. It was reported that ASGM is the main source of mercury in the country. The national health action plan describes many public health concerns revolving ASGM, such as mercury pollution, prostitution, HIV, malaria and dengue. It was recommended that medical professionals should be encouraged to consider miners lifestyle, diet and environment to properly diagnose potential patients’ exposures to different mercury forms and compounds.

Plenary session:

- Armanauth Maraj mentioned mercury levels in fish and hair included in the World Wide Fund for Nature’s [report](#) regarding ASGM impact on freshwater in the Guianas.

### *7.3. ASGM Public Health strategy: The Peruvian scenario*

In his presentation, Arnaldo Sanchez, Project Director, Artisanal Gold Mining, Peru, explained the differences of artisanal and small-scale gold mining (ASGM). He pointed out that efforts for mercury use reduction have been made in other sectors (i.e. health services), but no significant changes have occurred in the artisanal mining sector in this regard.

The different ways in which mercury is released in the environment during the mining process (amalgamation and burning) were described. Health effects resultant from mercury exposure are difficult to diagnose because of cost and uncertainties – there is a need to rule out several diseases because of the nonlinear symptom manifestation caused by mercury exposure. Health issues revolving ASGM were described as relating to environmental, social and living conditions. It was pointed out that Article 7 of the Minamata Convention specifically addresses health and ASGM, but other articles (Art. 1, 4, 12, 16, 17, 18, 19 and 22) also address the need for involvement in targeting ASGM issues.

The main components for public health strategies to address ASGM issues were described: training of health professionals (it was mentioned that this should be included in curricula of local universities); occupational health training for artisanal miners; awareness raising in ASGM communities through health facilities; incorporation of mercury material into other health programs; and gathering of health data. He recommended that mercury information should be included in malaria programs, which are already established in many ASGM areas; and in cash transfer programs as one of the requirements.

The promotion of new technical interventions and cleaner ways to process gold, such as the use of retorts was encouraged. Retorts are not expensive and reduce the release and exposure of mercury. It was reported that they are already in use in Mozambique, Indonesia and South America. Financing technology is a cost efficient solution to the problem – it is less harmful to miners and environmentally friendly. Retorts do not require a large investment and can be done in a small scale. The Artisanal Gold Council has a [guide](#) on the use of retorts to reduce mercury use, emissions and exposures available. However, as below indicated, there are reasons that explain miners' resistance to use retort.

The Artisanal Gold Council has also been working on materials and products about health and ASGM for public health practitioners and community in general. There have been used in ASGM communities and also included in health projects.

Plenary session:

- Both Ana Boischio and Jules de Kom observed that there is usually resistance from miners to use retort because it is easier for miners to assess the amount of gold retrieved through the burning process, and thus miners will learn as soon as possible how much money was earned, given trust and legality issues often at play. Arnaldo Sanchez also added that there is resistance in the use of retorts. He mentioned, however, that education on proper use of retorts is important – miners are able recover more gold with the equipment, which is cheaper in the long run, albeit the larger initial investment. He recalled that change of attitude of gold producers is key.
- Jules de Kom also noted that slash and burning practices besides ASGM are possible sources of fish contamination. Ana Boischio recalled pristine ecosystems not directly impacted by gold mining with high fish mercury levels in the Brazilian Amazon. She commented that isotopic analysis would be helpful in determining the age of mercury distinguishing between recent (i.e., from gold mining) and ancient (i.e., from geological storage) with current remobilization of mercury distribution in the ecosystem.
- Arnaldo Sanchez mentioned that the AGC has not been able to engage at the government level, and welcomed collaboration between AGC and PAHO to implement strategies at the local level. Public health interventions should be oriented to the informal and illegal practices through private or public sectors.

## *8. Working group report and plenary discussion*

Working groups gathered to discuss the panel themes described in the agenda (Annex II), with the intention to produce objectives and recommendations for each topic.

### *8.1 Thermometer replacement in health care services.*

Carlos Wilson, Senior Environmental Health Officer, St. Vincent and the Grenadines; Cheryl Eugene, Senior Environmental Health Officer, Ministry of Health; Launa Williams, Public Analyst, Ministry of Environment, The Bahamas; Maria Della Rodolfa, Health Care without Harm, Argentina; and Marsha Ann Palmer, Ministry of Health, Jamaica presented:

#### *Objective:*

- Reduce use of products with mercury in health care facilities and academic institutions.

#### *Recommendations:*

1. Definition of health care facilities should include:
  - a. Hospitals; clinics; dental facilities; tertiary (academia); pharmacies; veterinary facilities; and laboratories.
2. Conduct audits to assess knowledge of mercury in terms of exposure; how mercury spills are managed; implemented policies for mercury management; and availability for alternative materials/equipment to replace what is being used;
3. Manage existing mercury stockpile by:
  - a. Assessing capabilities of staff to manage mercury;
  - b. Determining who should have access to mercury-added products;
  - c. Creating adequate storage facilities;
  - d. Implementing adequate methods of disposal.
4. Stakeholder consultation (pharmacists, all laboratory staff, importers and distributors, hospital, dental and academic staff);
5. Enhance and develop policies (occupational health and safety, chemical and workplace);
6. Promote continuous training and awareness among professionals in health care facilities and academic institutions.

### *8.2. Analytical aspects*

Mitko Voutchkov, Professor, University of West Indies, Jamaica; Munair Dicks, Intern, PAHO/Jamaica; Phylcia Ricketts, PhD candidate, University of the West Indies, Jamaica; Terry Mohammed, University of the West Indies, St. Augustine presented:

#### *Objective:*

- Create a Caribbean database containing data on mercury (including mercury in fish) and other heavy metals to improve the range of analysis among Caribbean countries; while seeking collaboration and support among countries, universities and institutions.

*Recommendations:*

1. Develop policies that require collaboration between universities and institutes to gather data;
2. Continue working on analysis of mercury while developing international data, knowledge practice and studies to improve capabilities in the Caribbean region;
3. Build a cross-country database and regional network of mercury labs and collaborate in measuring data while providing quality services in analysis from accredited institutions.

*8.3 Risk communication and fish advisories for different audiences*

Jody Ann Marston, National Environment and Planning Agency, Jamaica; Jules de Kom, Ministry of Health, Suriname; and Terry Mohammed, University of the West Indies, St. Augustine presented:

*Objectives:*

- Build awareness on safe fish consumption in easy understandable messages;
- Promote safe fish consumption in vulnerable groups to maintain the positive health effects of fish consumption while preventing its negative effects;
- Introduce fish advisories in the Caribbean taking into account the importance of the fish industry in these Caribbean countries in terms of tradition and economic value, while balancing the need for consumption guidance.

*Recommendations:*

1. Development of a roadmap for the design, draft, introduction and evaluation of fish advisories - the following actions may be included:
  - a. Perform KPA (Knowledge, Practices and Attitudes) analysis studies in consumer groups, fisher workers, fish importers, regulators, etc.;
  - b. Perform gap analysis on fish consumption data, communication strategies, etc.;
  - c. Identify the relevant scientific data to support the design, drafting, introduction and evaluation of fish advisories;
  - d. Focus on the positive health effects of fish consumption, while cautioning for the negative health effects;
  - e. Detail the fish advisories over time when more specific data becomes available;
  - f. Identify target groups, including health practitioners and outlets for information and guidance, such as maternity clinics;

- g. Incorporate the fish advisories into existing promotion activities and materials on fish consumption;
- h. Explore new options for fish resources, wild fish vs fish farming.
2. Design a screening list for sub-clinical and clinical health effects of methyl mercury exposure as a result of consumption of contaminated fish;
3. Medium and long term actions include development of a regional database on fish species consumption; elemental contents in consumed fish (i.e. proteins, vitamins, selenium, n-3 polyunsaturated fatty acids, etc.); KPA data studies for legislation to guarantee fish food security in the long term.

#### *8.4. Public Health strategy for the ASGM NAP*

Arnaldo Sanchez, Project Director, Artisanal Gold Mining, Peru; Armanauth Maraj, Director, Environmental Health, Ministry of Health, Guyana and Jordi Pon, Regional Coordinator, UNEP/LAC, Panama presented:

##### *Objectives:*

- Implement public health strategies to address the exposure of artisanal and small-scale gold mining, as per the Minamata Convention;
- Address issues of data gathering, training of health workers and risk communication to protect vulnerable populations through NAPs (as per Art. 7 of the Convention).

##### *Recommendations:*

1. Create collaboration mechanisms, including the designation of people in different ministries of health and agencies, such as those involved in the supply chain of mercury, to foster interactions, dialogue or promotion of ways to make public health strategies and interventions in the implementation of NAPs statutory;
2. Use secondary data whenever possible. These include data from agencies that buy gold or grant the concessions for mining. Institutions that control the importation of mercury should also be involved. Given the limited resources, looking at government data is important to estimate the magnitude of mercury use in ASGM;
3. Conduct baseline analysis at regional or local level whenever relevant information cannot be withdrawn from secondary data.
4. Build capacity for monitoring of mercury exposure in humans and the environment, baseline and follow up assessments;
5. Measure data on mercury use to assess exposure (beyond ASGM bio monitoring);
6. Develop practical guidelines for prevention, diagnosis and management of mercury poisoning at local level in ASGM communities. This can be part of the development of educational material to be disseminated among healthcare professionals and ASGM communities;
7. Creation of a monitoring of surveillance system while building capacity in rural health clinics, in order to establish public health strategies for the NAP;

8. Build a significant social marketing campaign to communicate risks to vulnerable populations, miners and mining communities, in order to create substantive changes in practices in the sector while raising awareness about mercury-free and cost-effective technologies that can be used in ASGM.

### **Workshop conclusion and recommendations**

Caribbean countries share common environmental issues and challenges in implementing the Minamata Convention. The region would benefit from collaboration mechanisms to tackle these issues while maximizing resources, such as the creation of a Caribbean fish advisory database and bio monitoring, with support of regional experts, agencies and institutions. Experts from the workshop are encouraged to initiate a Caribbean fish advisory.

It was evident through the discussions in this workshop that capacity building of health professionals and artisanal miners, and awareness raising of populations at risk is key to address regional issues across the different provisions of the Convention (i.e. mercury in health services, fish consumption advisories, and ASGM). Infra-structure to improve waste management practices and storage facilities to manage the existing mercury stockpile in the region is also deserving of attention.

Following up on the comments regarding the common use of skin lightning cosmetics, update notes on this issue will be prepared for consultation and dissemination.

At the conclusion of the workshop, an evaluation form (Annex III) was used to gather participants' feedback and comments on different aspects of the workshop. A total of 16 participants provided responses. Overall different aspects of the workshop were mostly rated as excellent and good (see annex IV). Some key recommendations are highlighted below:

- To increase workshop allotted time (possibly spread out over 3 days) and content;
- To improve communication prior to the workshop to better inform participants of the objectives of the workshop, its development and expectations;
- To make workshop activities (presentation, plenary discussions, coffee breaks, networking) more stimulating;
- To coordinate with the ministries of health to nominate more health professionals to use the workshop as a vehicle to raise awareness in the Public Health arena.

The valuable contributions and lessons learned described in this report will serve to guide supporting activities that WHO and PAHO should organize at country level. PAHO will expand upon its existing resources and materials on the topics related to the Minamata Convention, both at the PAHO/Toxicology website and the mercury virtual course, once available at the PAHO Virtual Campus. The virtual course will be presented as a self-learning tool and/or through WebEx sessions with tutors, with a regional or country format, depending on available funds and interest from countries in implementing the course.

At the end of the workshop, comments were made regarding the use of the CARICOM to address regional issues, as it has been done with lead in paint recently, and with the Declaration of Montevideo on mercury (Annex III), following the MERCOSUR approaches on similar issues. The Declaration of Montevideo was read and key points below indicated were considered to be brought formally at the CARICOM level:

“a) It is vitally important that WHO/PAHO support the implementation and coordination of activities to advise and support Member States in their efforts to enforce the Minamata Convention on Mercury, including mobilizing funds and in respect of all other health-related aspects envisaged in WHO/PAHO work programmes, with a view to promoting and protecting human health;

(b) WHO/PAHO must support Member States in developing and implementing strategies and programmes to identify and protect populations at risk, particularly vulnerable populations, including communities in areas affected by artisanal or small-scale gold mining, which could include the approval of science-based health guidelines relating to exposure to mercury and mercury compounds, setting targets for mercury exposure reduction, where appropriate, and public education, with the participation of public health and other involved sectors;

(c) It is necessary and appropriate that ministries of health in Member States should designate a focal point to implement national measures in accordance with the provisions of the Minamata Convention.”

## WORKSHOP PARTICIPANTS:

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## ANNEX II - AGENDA

### Health Sector in the Implementation of the Minamata Convention on Mercury

**Kingston, Jamaica**  
**Tuesday, 18 October 2016**

08:30 AM – 09:00 AM Registration

09:00 AM – 09:15 AM Welcome and opening remarks  
*Hedwig Goede, HSS Advisor, PAHO/WHO/Jamaica*  
*Archibald McDonald, Principal, University of the West Indies, Mona*

#### **Mercury and health, Mercury in products used for health**

09:15 AM – 10:00 AM Mercury as a pollutant of public health concern  
*Ana Boischio, Regional Advisor in Toxicology, PAHO/WHO/WDC*

10:00 AM – 10:15 AM Minamata Convention in Mercury: general overview and process  
*Jordi Pon, Regional Coordinator, UNEP/LAC, Panama*

10:15 AM – 10:45 AM Questions and answers

10:45 AM – 11:00 AM Coffee Break

#### **Products with added mercury used in health services: Thermometers and sphygmomanometers**

11:00 AM – 11:15 AM WHO guidelines and documents  
*Elida Vaught, Consultant, PAHO/WHO/WDC*

11:15 AM – 12:15 PM Health care mercury elimination: regional experiences on replacement  
*Maria Della Rodolfa, Health Care without Harm, Argentina*

12:15 PM – 12:30 PM Thermometers and sphygmomanometers replacement: experiences in  
Jamaica  
*Marsha Ann Palmer, Ministry of Health, Jamaica*

12:30 PM – 13:00 PM Questions and answers

13:00 PM – 14:00 PM Lunch

#### **Products with added mercury used in health services: Dental amalgam**

14:00 AM – 14:10 PM WHO experiences and PAHO's oral health plan  
*Elida Vaught, Consultant, PAHO/WHO/WDC*

14:10 PM – 14:30 PM Best practices approach to medical waste management in dental and  
medical offices.  
*Homero Silva, Professor, University of Technology, Jamaica*

14:30 PM – 15:00 PM Questions and answers

**GEF projects and health sector experiences in the Minamata Convention**

- 15:00 PM – 16:00 PM Introduction  
*Jordi Pon, Regional Coordinator, UNEP/LAC, Panama*
- GEF: Regional (Jamaica, T&T, St Lucia and St Kitts), Suriname and Guyana  
7-10 minutes/person
- Jamaica  
*Andrea Bennett, Director, Ministry of Economic Growth and Job Creation*
- St. Lucia  
*Cheryl Eugene, Senior Environmental Health Officer, Ministry of Health, St. Lucia*
- Guyana  
*Armanauth Maraj, Director, Environmental Health, Ministry of Health, Guyana*
- Suriname  
*Jules de Kom, Senior Policy Advisor, Ministry of Health, Suriname*
- Mercury – The present situation in the Bahamas  
*Launa Williams, Policy Analyst II, Ministry of Environment, Bahamas*

16:00 PM – 16:30 PM Questions and answers

16:30 PM – 16:45 PM Health break

**Analytical aspects**

- 16:45 PM – 17:05 PM Mercury and health research in Jamaica using nuclear techniques  
*Mitko Voutchkov, Professor, Dept. of Physics, University of West Indies, Jamaica*
- 17:05 PM – 17:15 PM Mercury analysis of shark in Trinidad Tobago  
*Terry Mohammed, Lecturer, University of the West Indies, St. Augustine*
- 17:15 PM – 17:45 PM Working group
- 17:45 PM – 18:00 PM Working group report and plenary discussion
- 18:00 PM Welcome remarks and Cocktail Hour  
*Dr. Christopher Tufton, Minister of Health, Jamaica*  
*Noreen Jack, Representative, PAHO/WHO/Jamaica*  
*Archibald McDonald, Principal, University of the West Indies, Mona*

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**Wednesday, 19 October 2016**

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**Health aspects: Fish consumption**

- 09:00 AM – 09:10 AM Health aspects in the Minamata Convention  
*Ana Boischio, Regional Advisor in Toxicology, PAHO/WHO/WDC*
- 09:15 AM – 09:45 AM Human placenta as a dual biomarker for dietary and environmental exposure to mercury in Jamaica and Trinidad and Tobago  
*Phylcia Ricketts, Dpt. of Physics, University of West Indies, Jamaica*
- 09:45 AM – 10:15 AM Methyl mercury exposures during prenatal life: risk – benefits of fish consumption, fish advisories and risk communication strategies  
*Jules de Kom, Senior Policy Advisor, Ministry of Health, Suriname*
- 10:15 AM – 10:35 AM Questions and answers
- 10:35 AM – 11:50 AM Coffee break
- 11:50 AM – 11:45 AM Working group on risk communication and fish advisories for different audiences
- 11:45 AM – 12:30 PM Working group report and plenary discussion
- 12:30 PM – 13:30 PM Lunch
- Artisanal and small-scale gold mining**
- 13:30 PM – 13:40 PM ASGM: national overview on social, environment and health aspects  
*Armanauth Maraj, Director, Environmental Health, Ministry of Health, Guyana*
- 13:40 PM – 13:50 PM ASGM: health impacts and public health strategy  
*Ana Boischio, Regional Advisor in Toxicology, PAHO/WHO/WDC*
- 13:50 PM – 14:15 PM ASGM Public Health strategy: the Peruvian scenario.  
*Arnaldo Sanchez, Project Director, Artisanal Gold Council, Peru*
- 14:15 PM – 14:45 AM Questions and answers
- 14:45 PM – 15:00 PM Coffee break
- 15:00 PM – 15:30 PM Working group on public health strategy for the ASGM NAP
- 15:30 PM – 16:00 PM Working group on thermometer replacement in health care services
- 16:00 PM – 16:45 PM Working group report and plenary discussion
- 16:45 PM – 17:15 PM Workshop wrap up and written evaluation
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## ANNEX III

### Montevideo Declaration on the Minamata Convention 8 October 2015

**The representatives of the Ministries of Health of Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Cuba, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela, and of civil society and academia, meeting in Montevideo, Uruguay, on 8 October 2015 at the WORKSHOP ON HEALTH IN THE IMPLEMENTATION OF THE MINAMATA CONVENTION ON MERCURY**

The Parties,

*Recognizing that mercury is a chemical of global concern owing to its long-range atmospheric transport, its persistence in the environment once anthropogenically introduced, its ability to bioaccumulate in ecosystems and its significant negative effects on human health and the environment,*

*Noting that the Minamata Convention contains an article on health-related aspects in addition to other relevant provisions, and that the Convention imposes a number of obligations on Parties, requiring, where applicable, the adoption of measures for the health and allied sectors such as the gradual elimination, through the prohibition of the manufacture, import or export prior to 2020, according to the dates of entry into force of the Convention, of mercury thermometers and sphygmomanometers, cosmetics containing mercury — including skin lightening soaps and creams — , topical antiseptics containing mercury and dental amalgam with added mercury, and the development of public-health strategies in national action plans to eliminate or reduce the use of mercury in the mining industry, unless the amounts involved are declared to be negligible;*

*Endorsing the implementation of World Health Assembly resolution WHA67.11 of May 2014 on the role of WHO and ministries of health in the Minamata Convention on Mercury;*

*Recalling the public health impacts of exposure to mercury and mercury compounds: the role of WHO and ministries of public health in the implementation of the Minamata Convention;*

*Recalling the renewed commitments of the post 2015 development agenda (25-27 September 2015), the sustainable development goals contained in the final document of the United Nations Conference on Sustainable Development (Rio+20) (Rio de Janeiro, Brazil, 20-22 June 2012) entitled “The Future We Want”, the 2010 Adelaide Declaration on Health in All Policies, and the 8th Global Conference on Health Promotion, held in Helsinki in 2013, which called for collaboration between all sectors to promote public health, with a plan of action adopted by PAHO in 2014, the Universal Health Coverage policy and strategy adopted by PAHO in 2013; and the Declaration of the Ministers of Health of MERCOSUR and Associated States on the Management of Chemical Substances (June 2013), signed at the 34th meeting in Montevideo, Uruguay;*

*Recalling that the objective of the Minamata Convention on Mercury is to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds;*

*Mindful that the Minamata Convention on Mercury encourages Parties to:*

*(a) Promote the development and implementation of strategies and programmes to identify and protect populations at risk, particularly vulnerable populations, and which may include adopting science-based*

*health guidelines relating to exposure to mercury and mercury compounds, setting targets for mercury exposure reduction, where appropriate, and public education, with the participation of public health and other involved sectors;*

*(b) Promote the development and implementation of science-based educational and preventive programmes on occupational exposure to mercury and mercury compounds;*

*(c) Promote appropriate health-care services for prevention, treatment and care for populations affected by exposure to mercury or mercury compounds; and*

*(d) Establish and strengthen, as appropriate, the institutional and health professional capacities for the prevention, diagnosis, treatment and monitoring of health risks related to exposure to mercury and mercury compounds;*

*Stressing the importance of financial, technical, technological, and capacity-building support, particularly for developing countries, and countries with economies in transition, in order to strengthen national capabilities for the management of mercury and to promote the effective implementation of the Convention;*

*Noting that nothing in this Convention prevents a Party from taking additional domestic measures consistent with the provisions of this Convention in an effort to protect human health and the environment from exposure to mercury in accordance with that Party's other obligations under applicable international law;*

*Have agreed that:*

*(a) It is vitally important that WHO/PAHO support the implementation and coordination of activities to advise and support Member States in their efforts to enforce the Minamata Convention on Mercury, including mobilizing funds and in respect of all other health-related aspects envisaged in WHO/PAHO work programmes, with a view to promoting and protecting human health;*

*(b) WHO/PAHO must support Member States in developing and implementing strategies and programmes to identify and protect populations at risk, particularly vulnerable populations, including communities in areas affected by artisanal or small-scale gold mining, which could include the approval of science-based health guidelines relating to exposure to mercury and mercury compounds, setting targets for mercury exposure reduction, where appropriate, and public education, with the participation of public health and other involved sectors;*

*(c) it is necessary and appropriate that ministries of health in Member States should designate a focal point to implement national measures in accordance with the provisions of the Minamata Convention.*

## ANNEX IV - WORKSHOP EVALUATION

At the conclusion of the workshop, an evaluation form (Annex V) was used to gather participants' feedback and comments on different aspects of the workshop. Among the 20 participants who attended the workshop, 7 were representing Guyana, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, The Bahamas and Trinidad and Tobago and 4 were from Jamaica, representing the Ministry of Health, Ministry of Economic Growth and Job Creation and National Environment and Planning Agency. A total of 16 participants provided responses, which are summarized below, using a scale ranging from excellent, to agree, neutral, disagree and strongly disagree.

The survey included several aspects of the workshop: design, content and organization. Workshop contents were well regarded, with attention to effective activities (fig. 1). Workshop activities consisted of workgroup sessions divided by thematic panels, followed by a short presentation of key points discussed during workgroup sessions. From open ended question participants indicated their preferred workshop topics (table 1).

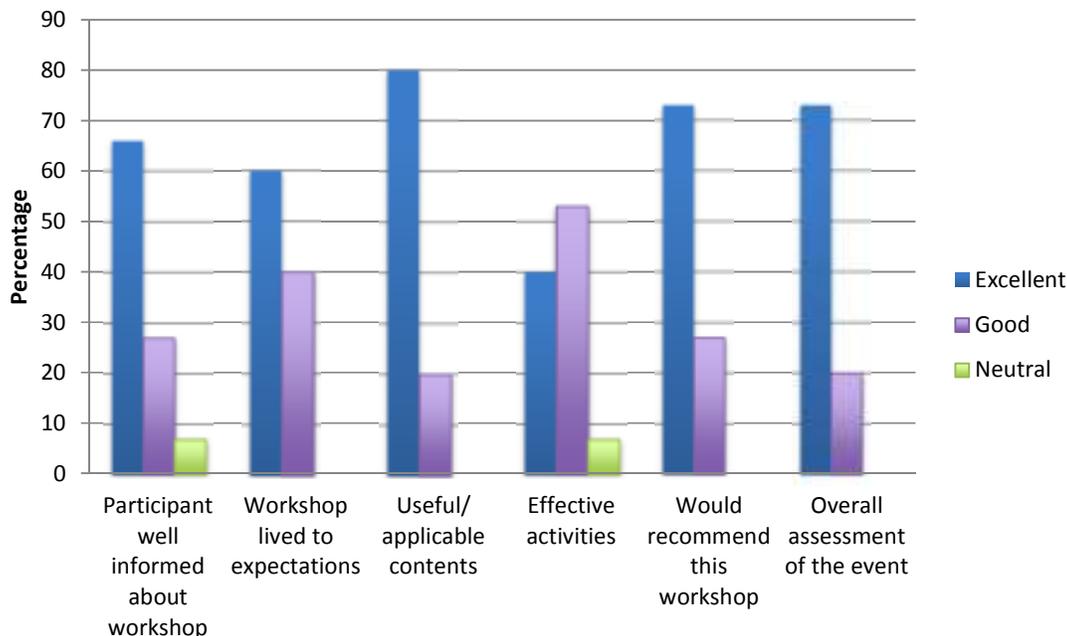
Participants also had an opportunity to rate each thematic panel according to its presentation and discussion. All panels received positive and encouraging ratings (fig. 2 and 3). The fish consumption panel presentation received the highest score. This is compatible with the relevance of fish consumption as part of daily life in the Caribbean countries. The presentation from Trinidad and Tobago with fish mercury concentration from local species, including high concentrations in shark and marlin species received major attention and raised awareness about the issue (fig. 2). Many participants appreciated the analytical aspects panel discussion (fig. 3), which counted with the visual impact of the demonstration of XRF analyzer equipment, as a tool to perform on the field analysis of mercury and other contaminants without sampling preparation in laboratory. Interesting to note the comparison of panel presentation (fig. 2) and panel discussion (fig. 3), as the former received higher perceived values than the latter. Some of the panel topics received low ratings, which indicates room for improvement.

The overall workshop design received favorable ratings (fig. 4). Many participants rated the length of the workshop appropriate (fig. 5), whereas some participants also indicated that improvements could be achieved by increasing the allotted time for the workshop (table 2). These responses indicate there was not much of consensus on workshop time length between two and three days. When asked for suggestions for ways in which the workshop would improve, many participants responded that there should be an increase of content being covered. Thus, this comment also indicates the demand to increase the workshop length to over 3 days (table 2).

The workshop organization was well rated (fig. 7) despite logistical challenges due to the Matthew Hurricane, which were overcome by participants' kind understanding and concerted effort among PAHO HQ and country offices. In general, the workshop was highly regarded through participants' positive and encouraging feedback. Constructive recommendations, not necessarily under consensus, for a future edition were noted and include (table 2):

- To increase workshop allotted time (possibly spread out over 3 days) and content;

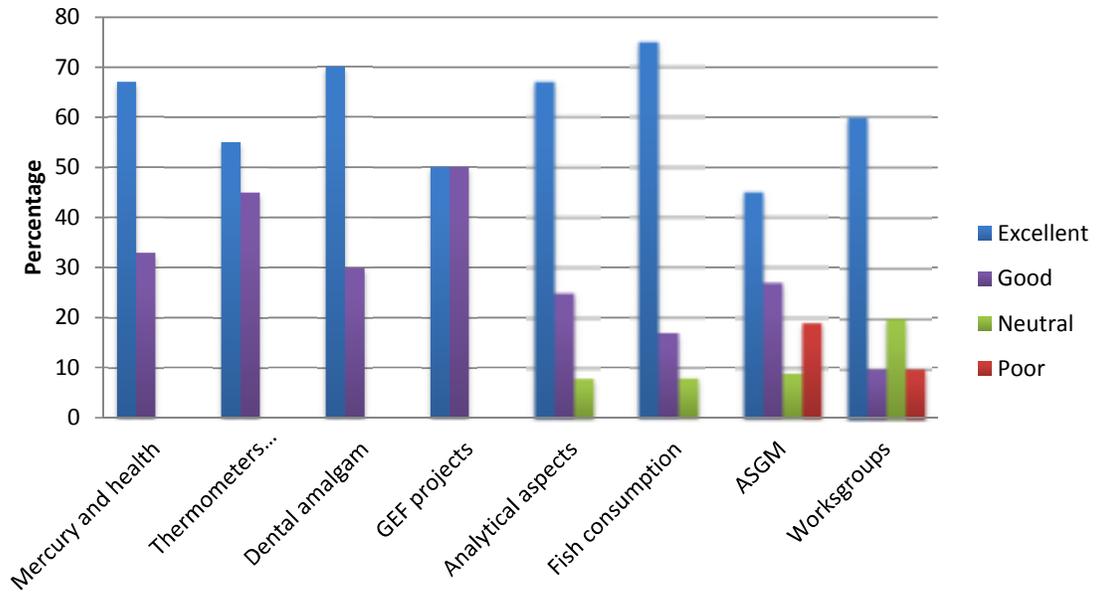
- To improve communication prior to the workshop to better inform participants of the objectives of the workshop, its development and expectations;
- To make workshop activities (presentation, plenary discussions, coffee breaks, networking) more stimulating;
- To coordinate with the ministries of health to nominate more health professionals to use the workshop as a vehicle to raise awareness in the Public Health arena.



**Figure 1.** Percentage of ratings on the workshop content (n=15).

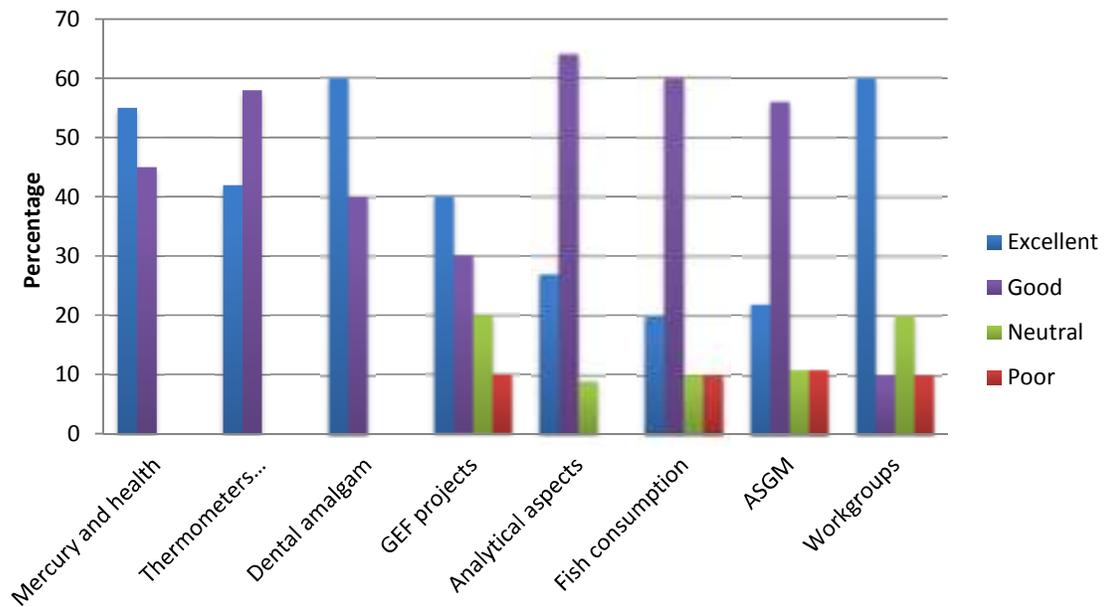
**Table 1** Topics and aspects of the workshop quoted as most interesting and useful based on open-ended responses (n=13).

Topics/Aspects
ASGM health impacts and public health strategy
Best practices for waste management
Communication through advisories to the public
Countries' perspectives
Dental amalgam
GEF projects procedures
Health aspects
Health care without harm
Health impact and Public Health strategies
Health risks to exposures
Human placenta as a biomarker for dietary and environmental exposure to mercury in Jamaica and Trinidad and Tobago
Interesting presentations, information and team
Mercury-added products in health services and elimination
Mercury analysis in shark in Trinidad and Tobago Mercury and health research in Jamaica using nuclear techniques
Mercury as a pollutant of Public Health concern
Mercury compounds
Mercury in fish/fish consumption
Minamata Convention on mercury



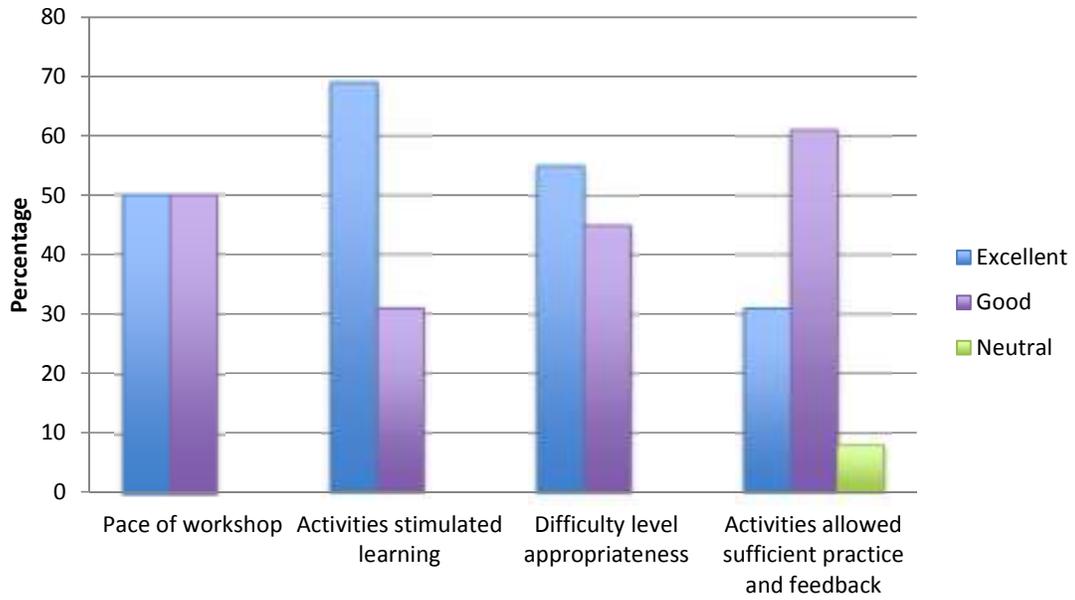
**Figure 2.** Percentage of ratings on the quality of thematic panel **presentation** (n=13).

Note: 6 respondents did not evaluate all the panels.

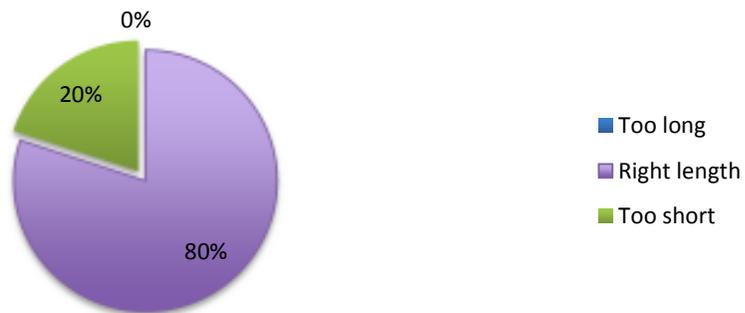


**Figure 3.** Percentage of ratings on the quality of thematic panel **discussion** (n=13).

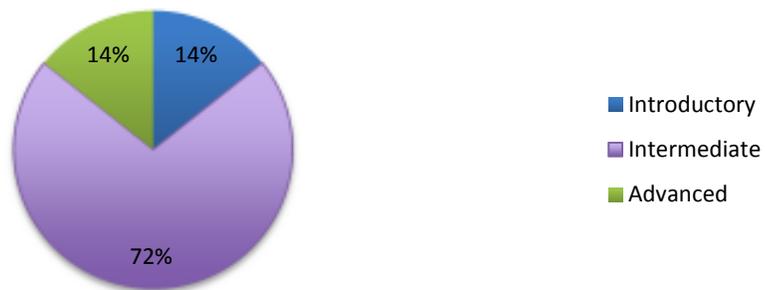
Note: 6 respondents did not evaluate all the panels.



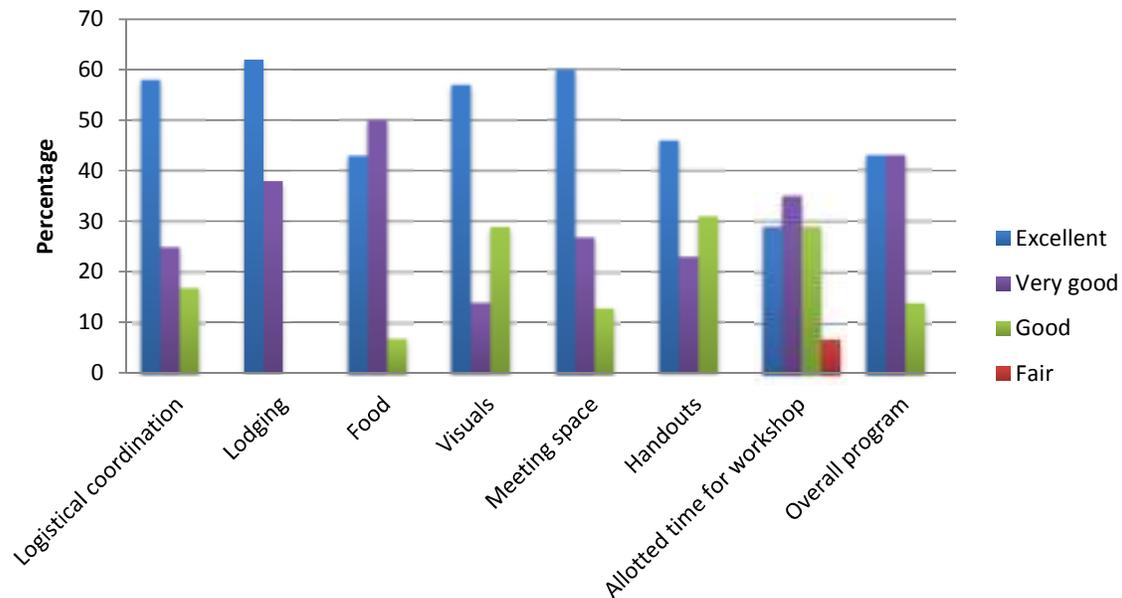
**Figure 4.** Percentage of ratings on aspects of the workshop design (n=13).



**Figure 5.** Percentage of perceived workshop length appropriateness according to amount of content covered (n=15).



**Figure 6.** Percentage of perceived workshop content difficulty level (n=14).



**Figure 7.** Percentage of ratings on the quality of workshop organization and logistical arrangements (n=15).

**Table 2.** Frequency of suggested workshop aspects to be improved based on close-ended question for workshop improvement (n=12).

Aspects	Frequency (%)
Allot more time for the workshop	26
Provide better information prior to workshop	17
Increase content covered in the workshop	17
Clarify workshop objectives	13
Improve workshop organization	9
Make workshop activities more stimulating	9
Update content covered in the workshop	4
Shorten the time for the workshop	4

**Table 3.** Suggested workshop aspects to be improved based on open-ended question.

Aspects
Use of tool kit for mercury inventory
Drafting of risk communication documentation
Include more medical professionals to increase awareness within the field
Monitoring process for the formal roll out to ensure sufficient collaboration to accomplish the objective of this initiative, as it is a useful venture for the Caribbean islands

Note: 1 participant expressed the workshop was well received.



Evaluation form

Participant Name (Optional): \_\_\_\_\_

Job title: \_\_\_\_\_

Country: \_\_\_\_\_

Years in present position? <1 1-3 3-5 5+

**INSTRUCTIONS**

Please circle your response to the items. Rate aspects of the workshop on a 1 to 5 scale:

1 = “Strongly disagree” or insufficient

2 = “Disagree”

3 = “Neither agree nor disagree”, or neutral

4 = “Agree”

5 = “Strongly agree”, or excellent

Check N/A if the item is not appropriate or not applicable to this workshop. Your feedback is sincerely appreciated. Thank you.

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**WORKSHOP CONTENT** (Circle your response to each item)

	Level of satisfaction
I was well informed about the objectives of this workshop	1 2 3 4 5 N/A
This workshop lived to my expectations	1 2 3 4 5 N/A
The contents are useful/applicable in my work	1 2 3 4 5 N/A
Effective activities	1 2 3 4 5 N/A
I would recommend this workshop	1 2 3 4 5 N/A
What is your overall assessment of the event?	1 2 3 4 5 N/A

Which topics or aspects of the workshop did you find most interesting and useful?

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**OVER, Please →→→**



Please rate the panels (Circle your response to each item)

Panels	Presentation	Discussion
Mercury and Health	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Thermometers and Sphygmomanometers	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Dental Amalgam	1 2 3 4 5 N/A	1 2 3 4 5 N/A
GEF Projects	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Analytical Aspects	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Fish Consumption	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Artisanal and small-scale gold mining	1 2 3 4 5 N/A	1 2 3 4 5 N/A
Workgroup	1 2 3 4 5 N/A	1 2 3 4 5 N/A

**WORKSHOP DESIGN** (Circle your response to each item)

Level of satisfaction

- The pace of this workshop was appropriate 1 2 3 4 5 N/A
- The workshop activities stimulated my learning 1 2 3 4 5 N/A
- The difficulty level of this workshop was appropriate 1 2 3 4 5 N/A
- The activities in this workshop gave me sufficient practice and feedback 1 2 3 4 5 N/A

Given the topic, was this workshop:  a. Too short  b. Right length  c. Too long

In your opinion, was this workshop:  a. Introductory  b. Intermediate  c. Advanced

**OVER, Please →→→**



**WORKSHOP ORGANIZATION**

Please rate the following:

	Excellent	Very Good	Good	Fair	Poor
a. Logistical coordination	<input type="checkbox"/>				
b. Lodging	<input type="checkbox"/>				
c. Food	<input type="checkbox"/>				
d. Visuals	<input type="checkbox"/>				
e. Meeting space	<input type="checkbox"/>				
f. Handouts	<input type="checkbox"/>				
g. Allotted time for the workshop	<input type="checkbox"/>				
h. The program overall	<input type="checkbox"/>				

How would you improve this workshop? Check all that apply

- a. Provide better information before the workshop
- b. Clarify the workshop objectives
- c. Reduce the content covered in the workshop
- d. Increase the content covered in the workshop
- e. Update the content covered in the workshop
- f. Improve workshop organization
- g. Make workshop activities more stimulating
- h. Slow down the pace of the workshop
- i. Speed up the pace of the workshop
- j. Allot more time for the workshop
- k. Shorten the time for the workshop

What are other improvements would you recommend in this workshop?

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**Thank you! Please hand this form to one of the organizers.**

## Annex VI



