Health sector roles in the Minamata Convention on mercury

Kingston, Jamaica, 18-19 October 2016

Mercury as a pollutant of public health concern

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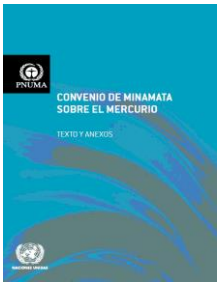
Overview

- Mercury toxicology
- Health in the Minamata Convention
- Roles for the health sector in the implementation of the Minamata Convention



Chemical Safety

- REACH Europe > 100,000 chemicals in use
- 2013: 3.2 trillion euros
- Multiple sector in governments and stakeholders (public, private, social representation and others) – consensus vs competing interests
- Chemical industry – proof of harm, limited tests of toxicity
- Short term development benefits vs long term health adverse effects
- Chemical management beyond health: legacy, safer alternatives

Conventions, Frameworks and Resolutions Health in Chemical Safety

- Health in all (chemical) policies
- Universal health care
- Global plan worker's health
- International Health Regulation – notification of events global health concerns
- Multi-lateral environmental agreements and frameworks:
  - Strategic Approches to International Chemical Management
  - Global Alliance to Eliminate Lead in Paint
  - Montreal (1989): Protection of ozone layer
  - Basel (1992): Transboundary movements of hazardous waste
  - Rotterdam (2004): Previous informed consent
  - Stolckholm(2004): Persistent Organic Pollutants
  - Minamata (2013): Mercury and its compounds

WHO: Chemical Safety

International Programme on Chemical

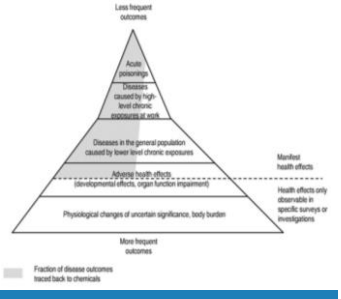
Change in paradigm – LD50 (proof of harm) to modes of action (integration of molecular and epidemiological levels

Ten chemicals of major public health concern

Endocrine disruptors, nanotechnology, e-waste, pharmaceuticals, etc.

Health in Chemical Safety

- Health effects: multiple factors, subclinical, perceived severity (IQ loss or sperm quality)
- Health agenda: communicable and non-communicable diseases with diagnostic, treatment, potential cure



Mercury as a pollutant of global concern

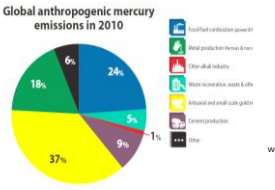
Global scope

- Long-range transport in the atmosphere
- Persistence in the environment
- Ability to bio-accumulate in food chains
- Negative effects on human health (even at relatively low doses of exposures during prenatal life) and on the environment

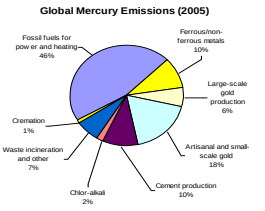
Forms, compounds and transformations

- Metallic mercury: Hg^0
- Inorganic mercury: Hg^+ & Hg^{++}
- Oxide reduction cycles – gains and loss of electrons
- Organic mercury: Methyl Hg (CH_3Hg^+) and Ethyl Hg ($CH_3CH_2Hg^+$)
- Salts of inorganic mercury: Hg^{++} (mercuric salts) and Hg^+ (mercurous salts)

Sources of mercury emissions to the atmosphere

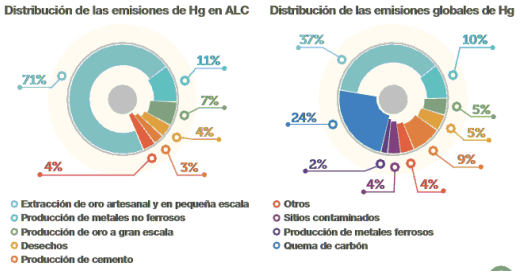


Source: UNEP 2013 Global Mercury Assessment

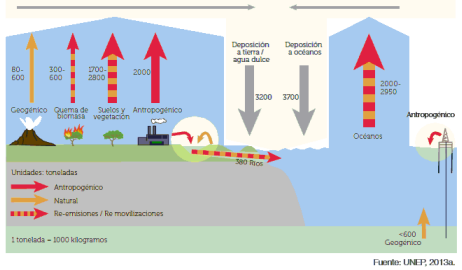


Source: UNEP 2009 Global Atmospheric Mercury Assessment

Main sources of mercury emissions: LAC region and globally

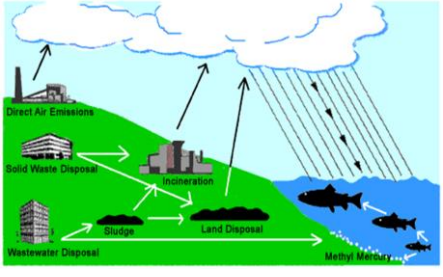


Mercury sources of emissions and environmental distribution

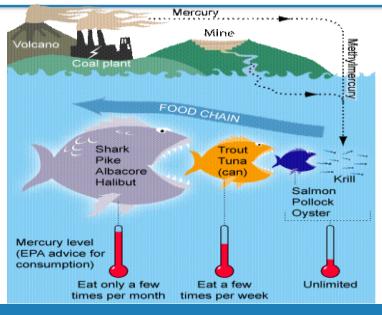


Fuente: UNEP, 2013a.

Environmental fate of mercury



MeHg: Food chain



Fish advisories at the local level

Health effects of metallic mercury

Sources of exposures: mercury use in process (chlor alkali industry), dentistry, amalgam burn (artisanal small scale gold mining)

Mercury vapor (dose dependent):

- Tremor, gum irritation, corrosive bronchitis and pneumonitis
- Central nervous system: excitability, tunnel vision

Chronic exposure:

- Depression, weight loss, muscle weakness, behavioral changes ("mad hatter"), memory loss and delirium
- Thyroid dysfunction and enlargement have been observed

Effects: sub-clinical, multi-causal, varied severity perception

Biomarker: urine [Hg]

Health effects of methyl mercury

Sources of exposures: consumption of fish with methyl mercury (CH_3Hg^+)

Biomarker: hair [Hg]

Adults and children

• Numbness of fingers, constriction of visual fields, difficult to walk in straight line, and speech and hearing impairments [hair Hg 50 – 120 ppm];

• Difficulty concentrating, hearing loss, immune system effects, kidney disfunctions

Health effects of methyl mercury

- Prenatal high level exposures
- Exposure levels: [Hair Hg 200- 500 ppm]
- Cerebral palsy, microcephaly, hyperreflexia, gross motor and mental impairments, blindness and deafness

Tomoko Uemura in her Bath-Minamata

Health effects of methyl mercury

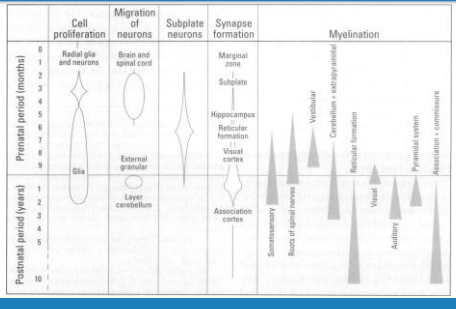
- **Prenatal exposures:** relatively low exposure levels
- Delays/impairment of neurobehavioral developments – observed on cognitive, language, motor, adaptive behavior, and social-emotional domains

Hair Hg levels (ppm)

- New Zealand: 8-10 or 20-25 ppm
- Faroes Islands: 10-20 ppm (similar to Iraq)
- Seycheles: 20-30 ppm

Benefits of fish consumption: omega 3 fatty acids, selenium antagonistic effects to MeHg toxicity

Timeline of development process in humans



Health effects of mercury salts

Mercuric salts (Hg^{++})

Corrosive, gastro intestinal ulceration, bleeding, necrosis and bloody diarrhea; renal toxicity and failure

Mercurous salts (Hg^+)

Less corrosive, used in medicinal preparations – allergic reactions in children: acrodynia (redness of palms and soles), irritability, edema, rough dry skin, vasodilatation, fever

Ethyl mercury ($C_2H_5Hg^+$)
Thiomersal – blood half life shorter than MeHg

Obs: Mekako can be used as skin lightening soap by adults

Children's vulnerability

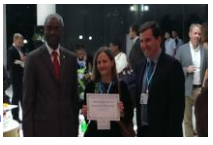
- Higher metabolic body rate
- Continual cellular division and growth
- Different exposures, due to their place closer to the floor, behaviors
- Longer time to develop and suffer health adverse effects
- Reliance on adults to raise political voices

Madeira river and Tanzania, WHO

Roles of the health sector in the Minamata Convention implementation

Intergovernmental Negotiating Committee: Recognition of WHO roles

- WHA Resolution 67.11 approved in 2014
- WHO/PAHO participation in sub-regional workshops
- New guidelines for replacement of mercury thermometers and sphygmomanometers in health care under development
- New guidelines regarding the public health strategy in the context of ASGM under development;
- Projects on biomonitoring (Euro) and dental amalgam (WHO HQ oral health program)



World Health Assembly Resolution 67.11

Encourages Member States:

- To promptly sign, ratify & implement
- To address health aspects of exposure to mercury
- To recognize inter-relationships between health & environment & to ensure close cooperation
- To promote appropriate health care services for prevention, treatment & care
- To facilitate exchange of epidemiological information

Requests WHO:

- To facilitate & support Member States & work in cooperation with Minamata Convention bodies

The role of WHO

- Minamata Convention recognizes the role of WHO, references to collaboration between WHO and IGOs in the Convention
- Diplomatic Conference resolution on the Convention invites WHO to support implementation of the Convention
- 67th World Health Assembly (May 2014) adopted the resolution on the role of WHO and ministries of health in implementation of the Convention (WHA67.11)

Convention Article 16 – Health Aspects

- Development & implementation of strategies & programs - identify and protect populations at risk and vulnerable people
- Strategies and programs on occupational exposures
- Setting targets for mercury exposure reductions & public education, with public health & other sectors
- Health care services for prevention, treatment & care of people affected by mercury exposure
- Capacity building for prevention, diagnosis, treatment & monitoring health risks of mercury & mercury compounds
- Conference of parties to consult, collaborate, cooperate & exchange information with WHO, ILO & other IGOs.

Convention Articles

Art 4 and Annex A: Mercury-added products

- Phase-out manufacture, import and export by 2020: thermometers, blood-pressure monitors, antiseptics and skin-lightening cosmetics
- Phase-down use of dental amalgam

Art 7 and Annex C: ASGM

- Development of public health strategies is required

Art 12: Contaminated sites

- Human health risk assessment

Convention Articles

Art 17: Information exchange

- Health information

Art 18: Public information, awareness & education

- Human health

Art 19: Research, development and monitoring

- Health assessments and monitoring levels of mercury &mercury compounds in vulnerable populations

Health Sector Roles in the Minamata Convention Workshops

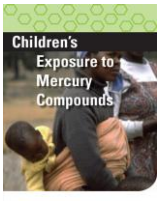
- Bonn, Germany (June 2015)
- Montevideo, Uruguay (October 2015)

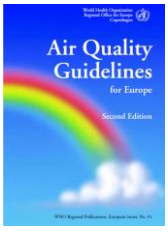
Global initiative aiming at:

- Promoting the understanding of the roles of the health sector in the Minamata Convention
- Facilitating the implementation of Resolution WHA 67.11
- Exchange of information on health, public awareness, monitoring and surveillance in health in different sectors

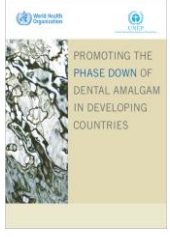
PAHO/WHO training resources

WHO documents





WHO documents



Health Information
(Articles 17, 18, 19)

Exchange of information on health, public awareness, monitoring and surveillance in health in different sectors