



Health sector roles in the Minamata Convention on mercury

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Artisanal and small scale gold mining: health impacts and public health strategy

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Overview

- · Health hazards in ASGM
- Mercury exposures
- · Public health strategy guidelines







Mercury exposures in ASGM



Environmental impacts

- · Release of waste materials from extraction process
 - · Impacts on quality of air, water and soil
- Magnitude of land use changes
 - · impacts on local ecosystems
 - water resources
 - · biodiversity
 - availability (and utility) of land for agriculture











Metallic mercury health effects

- Metallic mercury Hg^o
- Inhalation
- o Central Nervous System -Tremor, nausea, irritability (had matter), skin & eye effects, gengivites
- Inorganic mercury Hg++
- Kidneys functions





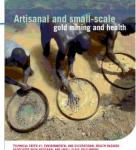


HEALTH HAZARDS

Chemicals **Biological Biomechanical** Physical Others

Men, women and children

Capacity building health personal

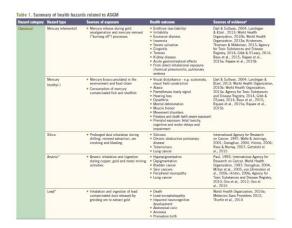


World Health Organization





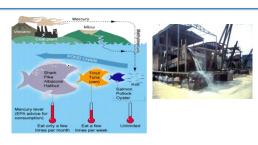




Hazard category	Hazard type	Sources of exposure	Health outcome	Sources of evidence*
	Methane, sulfur dioxide, nitrous oxide	Methane gas released in underground coal mines Sulphur dicoide and nitrous oxide released during the blasting phase and tailings collection	Respiratory tract irritation Asphysiation from lowered oxygen levels due to displacement by gases.	Hinton, 2006; Landrigan & Etzel, 201:
	Carbon monoxide	 Produced when petrolidiesel-fuelled equipment is used in a poorly ventilated space 	Headache Nausea, vorniting Confusion Drowiness Coma Death	Agency for Toxic Substances and Disease Registry, 2012
	Cyanide	 Gold estraction/feaching for example from tailings 	Neuropathological lesions Visual impairment Chemical apphysiation/death	Hinton, Veiga & Beinhoff, 2003a; Hinton, Veiga & Beinhoff, 2003b; Agency for Toxic Substances and Disease Registry, 2011b Lu, 2012; Eltimie et al., 2012
Biological	Pathogenic microorganisms such as those causing cholera, malaria, dengue fever	Contaminated and stagnant water in mines and homes	Cholera Malaria Dengue transmission Other vector-borne diseases	Phillips, Semboja & Shukla, 2001; Hentschel, Hruschka & Priester, 2003; Pommier de Santi et al., 2015
	Sexually transmitted infections, HIV	High risk sexual activity Unsafe health behaviours	STIs HIV AIDS	Campbell, 1997; Centre for Development Studies: University of Wales, 2004; Hinton, 2006
Biomechanical	Musculoskeletal disorders	Heavy lifting Awkward working positions	Shoulder disorders Lower back pain Chronic injuries Fatigue	Hinton, Veiga & Beinhoff, 2003b; Danoghue, 2004
	Overexertion	Uncomfortable postures Repetitive tasks using non-mechanized tools	Muscle strain Tendinitis Nerve impingement (e.g. carpal tunnel syndrome)	Hinton, 2006
	Trauma	Use of inappropriate equipment Rock falls Explosions	Contusion Fractures Fractures Spinal cord injuries Electrical shocks Electrical burns Thermal burns Chemical burns Exe injuries Exe injuries	Hentschel, Hruschka & Priester, 2003; Hinton, 2006; Scott et al., 2009; Kyeremateng-Amoah & Clarke, 2015

Hazard category	Hazard type	Sources of exposure	Health outcome	Sources of evidence*
Physical	Loud noise and sibration	Noisy tools Blasting Drilling Crushing Ore processing	Hearing impairment or loss Numbriess in hands and arms Gangrene (extreme cases)	Amedotu, 2002; Eisler, 2003; Hinton, 2006; Brits, 2012; Saunders et al., 2013
	Heat and humidity	* Underground mines	Dizziness Faintness Shortness of breath or breathing difficulties Palpitations Excessive thirst	Walle & Jennings, 2001; Danoghue, 2004
	Radiation*	 Raden (naturally occurring in some places including in soil) 	Lung cancer	International Atomic Energy Agency, 2002; International Atomic Energy Agency, 2011; International Atomic Energy Agency, 2013
	Low oxygen levets	Displacement of oxygen by other gases	Increased breathing rate Dizziness Nausea Headache Coma Asphysiation Death (extreme cases)	Walle, 2007
	Electricity	 Direct or indirect contact with live wires or faulty electrical equipment 	Burns Electrocution	Donoghue, 2004; Long et al., 2015a
	Explosives	Black powder Nitroglycerine Dynamide Dust Noise Vibration	Heart attack Hearing loss Vibration-related injuries	Harari & Harari Freire, 2013
Psychosocial	Drug and alcohol abuse	* Transient lifestyle	Liver inflammation Neurological diseases In extreme cases, violence against partners, co-workers and community members	Hinton, Veiga & Beinhoff, 2003b; Donoghue, 2004; International Labour Organization, 2006; Hinton, 2006; Thorsen, 2012
	Stress	 Lifestyle factors (poverty, separation from family, long working hours, social isolation, cramped living conditions, loss of work due to injury, feer of authorities, fear of injury or death) 	 Stress reaction (e.g. arxiety, depression, insomnia, somnolence, changes in appetite) 	Hinton, 2006
	Fatigue	 Artisanal and small-scale mining work characteristics Gong work shifts, heavy workloads, repetitive actions? 	Fatigue Pre-disposition to injury	New South Wales Mine Safety Advisory Council, 2009

ASGM and aquatic food chain contamination





Methyl mercury health effects

- Methyl Hg (CH₃Hg⁺) unevenly bioaccumulated in food chain fish consumption
- Numbness of extremities, impairment of gait, speech and hearing; constriction of visual fields hair Hg 50 120 ppm
- Delays/impairment on neurodevelopment- motor function, attention, manual dexterity, visual constrast sensitivity (maternal hair Hg 10 – 20
- Maternal hair Hg increase of 1 ppm will correlate with 0.18 points IQ loss*
- Teratogenic high maternal exposures Minamata*







Children more vulnerable to environmental risks

- · Higher body metabolic rate (not little adults)
- · Different exposure, because of places they spend time, activities and behaviors
- · State of continual cellular division and growth
- · Longer time to develop health adverse effects
- Politically powerless by themselves





Madeira river and Tanzania







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WHO guidance and technical materials (ASGM)

- · Requirements under Article 7 and Annex C of the Convention
 - Item (h) development of a public health strategy on the exposure of ASGM miners and their communities to mercury as an integral part of the National Action Plan
 - This is to include inter-alia:
 - o Gathering of health data
 - Training of health care providers
 - o Awareness raising through health

Initial elements of WHO toolkit on ASGM and health:

- 1. Guidance on developing a public health strategy
- 2. Conducting a health situation assessment
- 3. Training materials for health care providers

WHO Guidance Public Health Strategy on ASGM¹

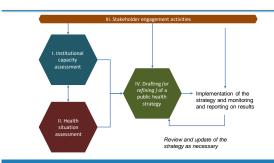
- 1. Developing a public health strategy on ASGM2;
- Training of health providers³;
- 3. Human biomonitoring on ASGM related context
- Health hazards associated with ASGM⁴.







Model process and inputs







Required Health Sector Actions

Core competencies of health care providers at local level, i.e. where mercury exposure is taking place;

Access to appropriate interventions to reduce/prevent and support mercury poisoning symptoms;



Adequate information systems (to support clinical and laboratory data);

Global good practice standards/references.







Public Health Strategy Guidance for National Action Plans on ASGM

- · Focuses on the process (steps and inputs involved) and provides suggestions on areas for intervention
- Aims to provide guidance to support the development of Public Health Strategies, in the context of the Convention
- Adjustments on the Public Health Strategy Guidance to the National Action Plans being developed through the Global Mercury Partnership group on ASGM





Recommended intervention areas strengthening health systems

- Training of health care providers
 - Occupational health and
 - Identification and management of poisoning; Environmental health in
 - ASGM;
 - Health promotion in ASGM communities
 - Inter-sectoral engagement; Responding to needs of
 - special groups, e.g. children, pregnant women, others.
- Strengthening of core functions and
 - Access to Public Health units;
 - Laboratory resources;
 - Toxicology and poison control centre capabilities;
 - Emergency preparedness, prevention and response, in the context of the International Health Regulation;
- Setting reduction target with monitoring, information technology and reporting.







Health assessment among ASGM communities

- · Intended to inform design and selection of themes to be included in the public health strategy
- · Focused on:
 - · Identification of main health issues
 - · Health-seeking behaviour
 - · Health systems readiness to address ASGM-related health issues







Collaborative efforts

- Development health documents compatible with those under work by the UNEP Global Mercury Partnership with the Natural Resources Defence
- Collaboration with major NGOs working in related areas, such as Health Care Without Harm and Artisanal Gold Council;
- Implementing partners with UNDP, UNEP and UNIDO on several GEF funded projects;
- Inter-Organization Programme for the Sound Management of Chemicals (IOMC), including sub-group on ASGM and Minamata Inicial Assessments.



Resources on WHO website

http://www.who.int/ipcs/assessment/public_health/mercury/en/

- · Short information documents
- · Tools for action
- Norms & guidance
- · Educational & Training
- Burden of disease estimates
- · Fact sheets & QA







PAHO/WHO training resources



Artisanal Gold Council, Canada









Thanks for your attention

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