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1637a SHORT INTRODUCTION TO THE MINIMATA RESOLUTION AND HEALTH CONSEQUENCES OF MERCURY VERSUS MERCURY FREE GOLD MINING METHODS

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Extracting gold from the ore among artisanal farmers have traditionally involved metallic mercury in order to amalgamate the gold and afterwards evaporate the mercury. Mercury poses well-known hazards to health and environment. Therefore alternative methods have been introduced to replace mercury. An alternative method is using borax, which is mixed with a concentrate of the heavy metals collected by washing the ore, and heated with a burner thereby extracting the gold.

Substituting a method by another always leads to concern about introducing unwanted health risks to the miners, their families, and the environment.

Mercury on one hand is a neurotoxin and the concentrations reached during amalgamation and evaporation are within the levels causing health effects to the worker and to bystanders. Additionally, the exposure to the family may be considerable due to evaporation from spills and from the debris after mixing mercury with the ore.

On the other hand heating borax emits boron to the air and the worker may be exposed. In animals boron in high doses can cause testicular impairment and impairment of fetal and infant neurodevelopment must be considered. This and possible other hazards related to the method may be taken into account.

The presentation will discuss these pro and cons when introducing an alternative method to extract gold not using mercury.

1637b HEALTH EFFECTS OF MERCURY POISONING AMONG MINERS AND FAMILIES IN ASGM

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Introduction Mercury is used to extract the gold from the ore in artisanal small-scale gold mining areas (ASGM). The toxic mercury is a serious health hazard for miners and the general population. It is estimated that up to 100 million people are exposed.

Methods An extensive review of available data sources will be performed and combined with results of our own health assessments in ASGM.

Results Miners show tremor, ataxia and other neurological symptoms together with a raised body burden of mercury. Many of them were diagnosed with chronic inorganic mercury vapour intoxication. Children and the general population in mining areas show similar symptoms and have increased mercury levels. 14–19 million miners work globally, between 25% and 33% of those miners are intoxicated.

Conclusions ASGM is causing severe negative health effects for miners and their families including children. Political action is needed to address those issues and to reduce the exposure with mercury in ASGM. Possible interventions are mercury free gold mining methods which are available. The health care sector needs to be strengthened to be able to diagnose and treat mercury intoxications. Further research is needed to analyse the specific health hazards of pregnant women, and infants.

1637c OCCUPATIONAL AND ENVIRONMENTAL BORON EXPOSURE AND HEALTH EFFECTS

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Boron is a naturally occurring metalloid, widely distributed in nature. Boron is not essential for humans. People are exposed to boron mainly via drinking water, including bottled water, and food, but also occupationally. Little is known about potential health effects of boron exposure. In experimental animal studies, boron exposure has been shown to cause testicular lesions and affect early-life development, including bone malformations and lower birth weight. Studies on workers with occupational exposure to boron have, however, not revealed evidence for impaired fertility. On the other hand, our recent studies in the Andean part of northern Argentina, with elevated boron concentration in the drinking water in some villages, showed that serum boron concentrations above 80 μg/L during pregnancy were inversely associated with length and weight at birth. A follow-up study in the same study area showed that also infant boron exposure could be detrimental for the infant growth and that boys seem to be more susceptible than girls. In this presentation, a critical review of the scientific evidence available concerning occupational and environmental boron exposure and health effects will be presented and discussed.

1637d THE MERCURY-FREE GRAVITY BORAX METHOD IN ARTISANAL SMALL-SCALE GOLD MINING

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Artisanal small-scale gold mining (ASGM) is the largest single anthropogenic source of mercury emissions. Mercury is used