

INORGANIC ARSENIC (As)

MEDICAL SCREENING GUIDELINE FOR WORKERS

Manitoba Department of Labour and Immigration

Workplace Safety and Health

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July 2023



INORGANIC ARSENIC (As)

- Why:** - As is used in pharmaceuticals, metallurgy, glass and semiconductor production, wood preservation, and as an insecticide, rodenticide, and fungicide.
- As is found in seafood, natural, groundwater, & as a by-product of smelting/pesticide application
 - As is a skin and mucous membrane irritant (eye, nose, lungs)
 - As may cause gastrointestinal disturbances, neuropathies, bone-marrow depression, and cardiomyopathies
 - As may cause skin disorders (eyelid, temple, axilla, neck, nipple, groin hyperpigmentation, palm/sole hyperkeratosis, epidermal carcinoma), weakness, anorexia, GI disturbances, CNS/PNS abnormalities, lung, liver, bladder, kidney cancer

A. Medical examinations for all workers exposed to arsenic:

- Who:**
- Occupational Exposure Limit (inorganic arsenic and cpds) = 0.01 mg/m³
 - >action level of 5 ug /m³*
 - exposure > 30 days/year
- When:**
- preplacement - baseline
 - periodic - annual
- What:**
- work and medical history - smoking history, respiratory symptoms, dietary habits (seafood), personal hygiene
 - chest x-ray
 - nasal and skin examination
 - other as indicated: respirator use requirements, complete blood count, etc..

B. Biological Monitoring:

Urine Arsenic: the Biological Exposure Index (BEI) for *inorganic* As & compounds = 35 ug/L (0.47 umol/L) – best tested at the end of the work week.

- urine inorganic As correlates with airborne arsenic levels: i.e. airborne As of < 2ug/m³ will not increase urine As levels.

- Quantitative 24 hour urine: (provides best information) - Normal: < 100 ug/24 hrs. (*total* arsenic)
- Urine for *total* arsenic concentration (inorganic plus organic): (end of work week best)
- Action Levels:
 - < 50 ug/L (< **0.67 umol/L**) is definitely normal and acceptable
 - >100 ug/L but < 200 ug/L (> **1.3 umol/L and < 2.7 umol/L**) may be cause for concern:
 - assess for workplace exposure
 - rule out arsenic-rich food ingestion (seafood, kelp, etc.) within last 48 hrs.
 - >200 ug/L (> **2.7 umol/L**) may be indicative of exposure and possible toxicity; medical exam indicated.

Blood arsenic: Correlates poorly with As exposure except where immediate, high exposure is suspected. A blood sample taken within a few hours of the exposure might be elevated and thus provide useful diagnostic information.

Hair, skin arsenic: Can only indicate exposure, NOT toxicity; a difficult test to do accurately; not readily available.

***Inorganic arsenic compounds are classified carcinogens. Manitoba Health Hazard Regulation 36.5(1)(b) demands that exposure control must be "as close to zero as is reasonably practicable but not to exceed the TLV."**