

Health monitoring

Guide for arsenic (inorganic)



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Introduction

This guide is intended to be read by a registered medical practitioner with experience in health monitoring who is engaged by person conducting a business or undertaking (PCBU) to carry out or supervise health monitoring. It provides practical guidance to registered medical practitioners about requirements under the work health and safety (WHS) laws for health monitoring.

This guide applies to all workplaces covered by the WHS Regulations where health monitoring is required.

How to use this guide

This guide includes references to the legal requirements under the WHS Act and WHS Regulations. These are included for convenience only and should not be relied on in place of the full text of the WHS Act or WHS Regulations.

The words 'must', 'requires' or 'mandatory' indicate a legal requirement exists that must be complied with. The word 'should' is used in this guide to indicate a recommended course of action, while 'may' is used to indicate an optional course of action.

This guide provides information for those registered medical practitioners engaged by a PCBU to carry out or supervise health monitoring for workers. This guidance should be read in conjunction with the following:

- *Health monitoring guide for registered medical practitioners*
- *Health monitoring guides for hazardous chemicals*
- *Health monitoring guide for workers*
- *Health monitoring guide for persons conducting business or undertakings (PCBUs).*

Health monitoring under the WHS Regulations

In certain circumstances, the model WHS Regulations place duties on a PCBU to provide health monitoring to workers. These requirements arise if the worker is carrying out work with hazardous chemicals including lead and asbestos. In addition, the work being carried out must be the kind of work specified in the WHS Regulations. A PCBU has the duty to determine if health monitoring is required.

The WHS Regulations prescribe that health monitoring is carried out by or supervised by a registered medical practitioner with experience in health monitoring.

Arsenic (inorganic)

Arsenic (CAS 7440-38-2) is a widely distributed element found as part of the natural environment. It occurs in trace quantities in rock, soil, water and air. It is a common contaminant in most mineral ores.

Arsenic compounds can be classified as:

- the metalloid (As)
- trivalent compounds (As[III])
- pentavalent compounds (As[V]), and
- organoarsenic compounds.

Arsenic compounds in occupational settings occur predominantly as As(III) and As(V) compounds, as mists, fumes, vapours or dusts. Organoarsenic compounds are primarily found in seafood.

Work activities that may represent a high risk exposure

Under the Work Health and Safety (WHS) Regulations, inorganic arsenic is listed as a restricted hazardous chemical and must not be used for abrasive blasting at concentrations greater than 0.1 per cent without authorisation from a relevant WHS regulator.

Arsenic is found in a variety of work settings, such as smelting of non-ferrous metals, arsenic refining and production, use of arsenic-containing insecticides, and the manufacture of semiconductors.

Examples of work activities involving inorganic arsenic that require special attention when assessing exposure include:

- manufacture of arsenic compounds, the most important being the trioxide (As₂O₃)
- formulation and application of:
 - insecticides (lead arsenate, calcium arsenate, arsenic trioxide and pentoxide)
 - weed killers
 - rat poison, and
 - wood preservatives like copper chrome arsenic (arsenic pentoxide); in the past used as cattle dip (arsenic trioxide) and sheep dip (sodium arsenite)
- production of pigments (arsenic trisulfide and trioxide), ceramic enamels and anti-fouling paints (arsenic trioxide)
- hide preservation in the leather industry (arsenic trioxide)
- hardening copper, lead and other alloys, and
- copper, zinc and lead smelting.

Sources of non-occupational exposure

Fish, shellfish and seaweed contain organoarsenic compounds such as arsenobetaine. Seaweed can be consumed in the form of kelp as a dietary supplement or in Japanese cuisine. Seaweed contains a significant amount of arsenic predominantly in the form of arsenosugars. Examination of total urinary inorganic arsenic levels according to the method described above will be unaffected by these arsenic compounds.

Arsenic compounds can occur naturally in water, food and as an air pollutant.

- DMAv is present in seafood and may contribute to total urinary inorganic arsenic levels.

1. Health monitoring for arsenic (inorganic) under the WHS Regulations

Collection of demographic, medical and occupational history
Records of personal exposure
Physical examination with emphasis on the peripheral nervous system and skin
Urinary inorganic arsenic by speciation (inorganic arsenic plus methylated metabolites)

Health monitoring under the WHS Regulations is applicable to arsenic and its trivalent and pentavalent compounds, which are the primary species found in the workplace. Health monitoring for organoarsenic compounds and arsine is not covered by this guide. The toxicity of arsine differs from other arsenic compounds, and therefore different adverse effect thresholds exist between arsine and its trivalent and pentavalent compounds.

In this guide, 'arsenic' or 'inorganic arsenic' is used to refer to arsenic and its trivalent and pentavalent compounds.

Health monitoring before starting work in an inorganic arsenic process

Health monitoring for arsenic may be required before the worker starts work so that changes to the worker's health can be detected.

Initial discussions about a health monitoring program should include:

- possible health effects from exposure to arsenic
- how to recognise and report symptoms, and
- what is involved in the health monitoring program, for example the frequency of testing and the tests that may be needed.

A baseline concentration of arsenic in urine should be determined. The preferred analytical method involves speciation, i.e. quantification of each individual relevant species of arsenic present in urine.

An initial physical examination should place emphasis on the peripheral nervous system (PNS) and skin if work and medical history indicates this is necessary, for example through the presence of symptoms.

During exposure to an inorganic arsenic process

2. Monitoring exposure to inorganic arsenic

Where workers are exposed, suspected of being exposed or are concerned about exposure to inorganic arsenic, the person conducting the business or undertaking (PCBU) has a duty to arrange a health monitoring appointment with a registered medical practitioner. For example, an appointment should be arranged following spills or loss of containment of inorganic arsenic resulting in excessive exposure to workers or when workers develop symptoms of inorganic arsenic exposure.

Inhalation is the primary route of occupational exposure, though significant gastrointestinal absorption can occur after mucociliary clearance of inhaled dust. The extent of pulmonary absorption is dependent on particle size and solubility of the compound. Absorption from the gastrointestinal tract is greater than 90 per cent for water-soluble arsenic compounds. The extent of dermal absorption is not known.

The elimination of arsenic from the body primarily involves metabolism and excretion via urine. As(III) can be oxidised to As(V) in the body; the reverse reaction is also possible.

As(III) can be methylated to the less toxic compounds, monomethylarsonic acid (MMAv) and dimethyl arsinic acid (DMAv). If relatively high inorganic arsenic exposure occurs, not all of the arsenic is converted to the methylated species. Inorganic arsenic compounds are excreted in the urine as MMAv, DMAv, As(III) and As(V) species (the combination of all of these species corresponds to approximately 60 per cent of the absorbed amount). The relative amounts of each of these species in urine is dependent on exposed species, time after exposure and the exposure level.

Organoarsenic compounds are not metabolised, and hence do not form any of the above arsenic species.

Urinary levels of total arsenic would be representative of both occupational and dietary sources of arsenic. This method is not the preferred method due to this potentially confounding factor.

Therefore, urinalysis for each of the following arsenic species is preferred:

- MMAv
- DMAv
- As(III), and
- As(V).

As the relative contribution of each of the species to the total amount of inorganic arsenic excreted can be variable, the sum of the concentrations for each of these entities should be performed. This will best provide an indication of the extent of occupational exposure levels.

Where urinalysis is carried out, the following value should be considered when assessing exposure to inorganic arsenic:

Biological exposure standard for inorganic arsenic¹

Total urinary inorganic arsenic (MMAv + DMAv + As(III) + As(V)):

0.47 µmol/L (35 µg/L)

The elimination pattern of arsenic from the body suggests arsenic and its metabolites may accumulate in the body over the work week. Therefore, urine samples should be collected at the end of shift at the end of the work week. The results are reflective of exposure over the previous few days.

Precautions should be taken to prevent contamination during sampling (e.g. collect samples in an uncontaminated area and avoid contamination from exposed skin or clothes).

Testing should be carried out at 90 day intervals, unless results consistently show urinary arsenic levels are low and workplace exposure levels are stable, then the registered medical practitioner may decide less frequent testing is necessary. It is not recommended to carry out testing on the first day after a holiday, weekend or period of different exposure as it takes one to two days to achieve a systemic steady state.

Background levels of As(III), As(V), MMAv and DMAv in non-occupationally exposed individuals have been reported to be 0.5 µg/L, 0.5 µg/L, 2 µg/L and 10 µg/L, respectively, for a total urinary inorganic arsenic level of 13 µg/L².

¹ See [Chemical analysis branch handbook, 9th Edition, Workplace and biological monitoring exposure analysis, WorkCover NSW \(PDF 3.39MB\)](#) for more details

²Biological reference values (BAR) published by the German Research Foundation (DFG).

Seafood may contain small amounts of DMAv which may contribute to a worker's urinary total urinary inorganic arsenic levels. Seafood consumption, particularly over the previous few days prior to sample collection, should be noted.

Smokers may have higher background total urinary inorganic arsenic levels. Smoking status should be noted.

Other health monitoring methods

Other tests to test the worker's exposure to arsenic include:

- urinary total arsenic (without speciation)
- blood arsenic levels, or
- hair and nail arsenic levels.

These tests have limitations as quantitative tests to assess the extent of occupational exposure.

Where total urinary arsenic corrected for creatinine is assessed, the results may be confounded where workers have recently eaten seafood or smoke heavily. In this instance, workers should be advised to abstain from seafood (including fish sauce, shrimp paste, fish and shellfish) and red wine for three days and seaweed for at least four days prior to urine collection.

Inorganic and organic arsenic are cleared from blood fairly rapidly (90 per cent of arsenic clears from the blood with a half-life of one to two hours. Therefore, blood levels of arsenic are only elevated for a short period of time after absorption. Due to the rapidly changing blood arsenic levels, obtaining reproducible, reliable quantitative data would be difficult. Furthermore, the differentiation of arsenic species in blood samples is difficult. Therefore, this method is not considered suitable to use to quantify occupational exposure to arsenic.

The presence of arsenic in hair or nail samples provides an indication of arsenic exposure. However, these methods are not suitable as quantitative indicators of exposure due to the lack of a suitable database, large inter-individual variability and the high potential for contamination.

Workplace exposure standard

The workplace exposure standard for arsenic and soluble compounds is:

- eight hour time weighted average (TWA) of 0.05 mg/m³.

It should be noted that the estimated urinary arsenic levels in workers exposed to air concentrations of inorganic arsenic at the TWA value are likely to be higher than the biological exposure standard for arsenic (A total urinary inorganic arsenic level of 35 µg/L (the biological exposure standard) is expected to correspond with air concentrations of 0.01 mg/m³; ACGIH, 2017). Therefore, all reasonably practicable steps must be taken by the PCBU to eliminate or minimise arsenic exposure to a level well below the workplace exposure standard.

A physical examination and urinary testing may be indicated if the results of air monitoring indicate frequent or potentially high exposure.

Removal from work

Where the results of a medical examination indicate the worker is displaying symptoms of exposure to arsenic or where results of biological monitoring indicate exposure that may cause adverse health effects, the registered medical practitioner should consider recommending the worker be removed from arsenic-related work.

A spot urine test with a level of inorganic arsenic greater than 35 µg/L may indicate the worker has been occupationally exposed to inorganic arsenic. If this occurs, the registered

medical practitioner should consider recommending the worker be removed from work with arsenic.

When removal from arsenic-related work is indicated the registered medical practitioner must provide the PCBU with the following recommendations:

- the worker should be removed from work with arsenic, and
- the PCBU should review control measures and carry out recommended remedial action.

The worker must be informed of the results of health monitoring.

Return to work

Should a worker be removed from arsenic-related work, they must not return until the registered medical practitioner has:

- assessed them as medically fit, and
- made a recommendation to the PCBU that the worker can return to remediated arsenic-related work.

This assessment should take into consideration the clinical condition of the worker, the worker's urinary arsenic levels and remediation of the circumstances that led to the symptoms if possible.

At termination of work in an inorganic arsenic process

3. Final medical examination

A urine sample should be collected on the last day of the worker's final shift, and a final medical examination should be carried out at the same time or as soon as possible thereafter. This medical examination must include skin and neurological checks.

Workers with health conditions or continuing symptoms due to arsenic exposure should be advised to seek continuing medical examinations as organised by the registered medical practitioner supervising the health monitoring program.

A health monitoring report from the registered medical practitioner should be provided to the PCBU as soon as practicable after the completion of the monitoring program, and at regular intervals for longer term or ongoing health monitoring processes. The report must include:

- the name and date of birth of the worker
- the name and registration number of the registered medical practitioner
- the name and address of the person conducting the business or undertaking who commissioned the health monitoring
- the date of the health monitoring
- any test results that indicate whether or not the worker has been exposed to a hazardous chemical
- any advice that test results indicate that the worker may have contracted an injury, illness or disease as a result of carrying out the work that triggered the requirement for health monitoring
- any recommendation that the person conducting the business or undertaking take remedial measures, including whether the worker can continue to carry out the type of work that triggered the requirement for health monitoring, and
- whether medical counselling is required for the worker in relation to the work that triggered the requirement for health monitoring.

Potential health effects following exposure to inorganic arsenic

The relative toxicity of arsenic containing compounds depends primarily on its chemical type, valence state, solubility and physical form. Soluble compounds of arsenic (for example sodium arsenite), are more toxic than insoluble compounds like arsenic sulfide.

The toxicity of trivalent arsenite (As(III); for example arsenic trioxide or arsenic trichloride), is typically greater than that of pentavalent arsenate (As(V); arsenic pentoxide).

4. Route of occupational exposure

The primary route of exposure is via inhalation of airborne arsenic fumes or dusts. The particle size of airborne arsenic determines whether arsenic will reach the lower respiratory tract or be deposited in the upper airways and swallowed after mucociliary clearance.

5. Target organ/effect

The target organs and potential effects of inorganic arsenic exposure include:

Table 1 Target organs and potential effects of inorganic arsenic exposure

Target organ	Effect
Nervous system	<ul style="list-style-type: none"> Peripheral neuropathy
Skin and mucous membranes	<ul style="list-style-type: none"> Dermatitis Skin ulcers Hyperpigmentation Keratosis Skin cancer
Respiratory system	<ul style="list-style-type: none"> Irritation of nose, throat and lungs Perforation of nasal septum Lung cancer
Gastrointestinal system	<ul style="list-style-type: none"> Severe irritation
Circulatory system	<ul style="list-style-type: none"> Peripheral vascular disease
Bone marrow	<ul style="list-style-type: none"> Pancytopenia
Liver	<ul style="list-style-type: none"> Hepatocellular damage
Ears	<ul style="list-style-type: none"> Potential ototoxin

6. Acute effects

Acute clinical symptoms from arsenic exposure will vary widely with the type and chemical state of the arsenic involved. Acute effects are generally the result of short-term exposures to high concentrations of arsenic.

Acute poisoning by inorganic arsenic compounds can cause:

- convulsions
- coma, and
- death in severe poisoning.

Pulmonary effects

If inhaled, mucous membrane irritation, dyspnoea and pulmonary oedema may occur.

Exposure via oral ingestion to toxic doses of inorganic arsenic compounds leads to acute gastrointestinal symptoms of vomiting and severe abdominal pain within one to two hours.

Cardiovascular effects

Cardiovascular effects progress through vasodilation, cardiac depression then shock.

CNS effects

Possible CNS effects include:

- headache
- coma
- convulsions, or
- cerebral oedema.

Sensory loss in the peripheral nervous system and motor dysfunction can occur one to two weeks after high exposures.

Haemolytic effects

Anaemia and leukopaenia may occur a few days following exposure.

Hepatic effects

Arsenic intoxication may also result in hepatic toxicity including toxic hepatitis and elevated liver enzyme levels.

7. Chronic effects

Chronic effects from arsenic exposure include:

- contact dermatitis, scaling, blistering of the skin, hyperpigmentation and hyperkeratotic lesions on the skin
- in the presence of sweat:
 - skin abrasions
 - chafing or wounds, or
 - ulceration of the skin
- conjunctivitis
- mucous membrane irritation and perforation of the nasal septum
- weakness, loss of appetite, gastrointestinal disturbances
- liver cirrhosis and portal hypertension
 - may also be an increased risk of liver cancer
- peripheral neuropathy initially of hands and feet
 - essentially sensory; in more severe cases, motor paralysis may occur
- peripheral vascular insufficiency (observed in people with chronic exposure to arsenic in drinking water), or
- bone marrow depression with pancytopenia; anaemia and leukopaenia are common and often accompanied by thrombocytopenia and mild eosinophilia.

8. Carcinogenicity

Arsenic compounds have been classified as Category 1A carcinogens according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS) as they have been shown to cause cancer in humans.

Work-related exposure to inorganic arsenic, especially in mining, copper smelting and pesticide work, has been associated with an increased risk of cancer.

Basal cell carcinomas, squamous cell carcinomas, Bowen's disease of the skin and lung carcinomas have been associated with chronic arsenic exposure.

Skin cancers have been observed most commonly following exposure to medications containing As(III) compounds, particularly Fowler's solution, and environmental exposure to arsenic through drinking water.

Arsenic-induced skin cancer is frequently characterised by lesions over the entire body, mostly in unexposed areas like the trunk, palms and soles. Skin lesions manifest after a latent period of three to seven years for pigmentation changes and keratoses and up to 40 years for skin cancer.

A number of studies have shown an association between lung cancer and exposure to inorganic arsenic with the consistency between studies and biological gradient arguing for a causal relationship. There is a suggestion of an increased risk of liver, kidney and bladder cancer in some studies.

9. GHS classification

Different arsenic compounds may have different health hazard classifications. The specific arsenic compound to which a worker is exposed will need to be reviewed to ensure appropriate identification of the health hazards.

For further information on specific arsenic compounds refer to Safe Work Australia's Hazardous Chemical Information system or the relevant safety data sheet.

Source documents

Agency for Toxic Substances and Disease Registry (2007) *Toxicological Profile for Arsenic*, Agency for Toxic Substances and Disease Registry, United States Department of Health and Human Services, Public Health Service, Atlanta.

American Conference of Governmental Industrial Hygienists (ACGIH) (2017) *Biological Exposure Indices; Arsenic and Soluble Inorganic Compounds*.

[Chemical analysis branch handbook, 9th Edition, Workplace and biological monitoring exposure analysis](#), WorkCover NSW (PDF 3.39MB).

DFG (2017) List of MAK and BAT Values.

International Programme on Chemical Safety Poisons Information Monograph 042 – [Arsenic](#).

Lauwerys R.R. and Hoet, P. (2001) *Industrial Chemical Exposure Guidelines for Biological Monitoring*, 3rd Ed, Lewis Publishers, Boca Raton.

Safe Work Australia (2013); [Workplace Exposure Standards for Airborne Contaminants](#) (PDF 873KB).

Safe Work Australia; [Hazardous Chemicals Information System](#).

World Health Organisation/International Program on Chemical Safety (2001) *Environmental Health Criteria 224: Arsenic and Arsenic Compounds*, World Health Organization, Geneva.



Health monitoring report

Arsenic (inorganic)

This form contains confidential information and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with consent of the worker

Health monitoring report – Arsenic (inorganic)

This health monitoring report is a confidential health record and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with the consent of the worker.

There are two sections. Complete both sections and all questions as applicable.

Section 1 A copy of this section should be forwarded to the person conducting the business or undertaking (PCBU) who has engaged your services.

Section 2 may contain confidential health information. Information that is required to be given to the PCBU should be summarised in Section 1.

Section 1 – A copy of this section to be provided to the PCBU

Person conducting a business or undertaking

Company/organisation name: Click here to enter text.

Site address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Site Tel: Click here to enter text.

Site Fax: Click here to enter text.

Contact Name: Click here to enter text.

Other businesses or undertakings engaging the worker (include a separate section for each PCBU)

N/A

Company/organisation name: Click here to enter text.

Site address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Site Tel: Click here to enter text.

Site Fax: Click here to enter text.

Contact Name: Click here to enter text.

Worker details (tick all relevant boxes)

Surname: Click here to enter text.

Given names: Click here to enter text.

Date of birth: Click here to enter a date.

Sex: Male Female

Address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Current job: Click here to enter text.

Tel (H): Click here to enter text.

Mob: Click here to enter text.

Date started employment: Click here to enter a date.

Employment in arsenic risk work (tick all relevant boxes) (information provided by the PCBU)

Type of inorganic arsenic used (if known please specify): Click here to enter text.

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- New to arsenic (inorganic) work
- New worker but not new to arsenic (inorganic) work
- Current worker continuing in arsenic (inorganic) work

Worked with arsenic (inorganic) since: [Click here to enter a date.](#)

Risk assessment completed: Yes No

Work environment assessment (tick all relevant boxes)
(information provided by the PCBU)

Date of assessment: [Click here to enter a date.](#)

Arsenic (inorganic) industry/use

- Manufacture of arsenic compounds
- Hardening copper, lead and other alloys
- Leather industry
- Copper, zinc and lead smelting.

Formulation and application of

- Insecticides containing lead arsenate, calcium arsenate, arsenic trioxide or pentoxide
- Weed killers
- Fungicides
- Cattle or sheep dip
- Rat poison
- Wood preservatives (copper chrome arsenic)

Production of

- Pigments
- Anti-fouling paints
- Ceramic enamels
- Other (specify): [Click here to enter text.](#)

Other chemicals the worker may be exposed to: [Click here to enter text.](#)

Controls

Wear gloves	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Respirator use	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Respirator type	Click here to enter text.	
Local exhaust ventilation	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Overalls/work clothing	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Laundering by employer	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Wash basins and showers (with hot and cold water)	<input type="checkbox"/> Yes	<input type="checkbox"/> No
Other please specify		

Health monitoring results

Biological monitoring results

Include/attach test results that indicate whether or not the worker has been exposed

This form contains confidential information and must not be disclosed to another person except in accordance with the Work Health and Safety Regulations or with consent of the worker

Date	Tests performed	Recommended action or comment
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.

Comments about health monitoring results (for example any early indications or diagnosis of injury, illness or disease): Click here to enter text.

Recommendations (by registered medical practitioner) (tick all relevant boxes)

Further/additional health monitoring for worker

- This is the final health monitoring report
- Repeat health assessment in Click here to enter text. month(s) / Click here to enter text. week(s)
- Counselling required
- Medical examination by registered medical practitioner. On Click here to enter a date.
- Referred to Medical Specialist (respiratory/dermatology/other). On Click here to enter a date.

Recommendations to PCBU

- The worker is suitable for work with arsenic (inorganic)
- Review workplace controls
- The worker should be removed from work with arsenic (inorganic). On Click here to enter a date.
- The worker is fit to resume work. On Click here to enter a date.
- Biological monitoring results indicate unacceptably high exposure levels

Specialist's name: Click here to enter text.

Additional comments or recommendations: Click here to enter text.

Registered medical practitioner (responsible for supervising health monitoring)

Name: Click here to enter text.

Signature:

Date: Click here to enter a date.

Tel: Click here to enter text.

Fax: Click here to enter text.

Registration Number: Click here to enter text.

Medical Practice: Click here to enter text.

Address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

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Section 2 – This section to be retained by the registered medical practitioner

Person conducting a business or undertaking

Company/organisation name: Click here to enter text.

Site address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Site Tel: Click here to enter text.

Site Fax: Click here to enter text.

Contact Name: Click here to enter text.

Other businesses or undertakings engaging the worker

N/A

Company/organisation name: Click here to enter text.

Site address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Site Tel: Click here to enter text.

Site Fax: Click here to enter text.

Contact Name: Click here to enter text.

Worker details (tick all relevant boxes)

Surname: Click here to enter text.

Given names: Click here to enter text.

Date of birth: Click here to enter a date.

Sex: Male Female Pregnant/breastfeeding

Address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.

Current job: Click here to enter text.

Tel (H): Click here to enter text.

Mob: Click here to enter text.

Date started employment: Click here to enter a date.

Type of inorganic arsenic used (if known; please specify): Click here to enter text.

Past employment and exposure details (tick all relevant boxes)

Have you ever worked in any of the following jobs?

If you answered 'yes' to any of the questions, please advise if you experienced any symptoms such as cough or wheeze or asthma when working.

			Comments (all 'yes' answers)
Manufacture of arsenic compounds	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Leather industry	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Hardening copper, lead and other alloys	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

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			Comments (all 'yes' answers)
Copper, zinc and lead smelting	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Other (please specify)	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Formulation and application of:			
Insecticides	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Weed killers	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Rat poison	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Fungicides	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Wood preservatives (CCA)	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Cattle or sheep dip	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Production of			
Pigments	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Ceramic enamels	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

General health questionnaire (tick all relevant boxes)

			Comments (all 'yes' answers)
Did you suffer any incapacity lasting two weeks or longer in the last two years	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Have you ever had any operations or accidents or been hospitalised for any reason	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Are you currently being treated by a doctor or other health professional for any illness or injury	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Are you currently receiving any medical treatment or taking any medications. Please detail.	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Do you currently smoke	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Do you practice personal hygiene at work, for example nail biting, frequency of hand washing, eating or smoking, clean shaven, shower and change into clean clothes at end of shift	<input type="checkbox"/> No	<input type="checkbox"/> Yes	

Specific health questions (tick all relevant boxes)

Do you have or have you ever had:	Comments (all 'yes' answers)		
Loss of hearing or ringing in the ears	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Shortness of breath on exertion	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

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Do you have or have you ever had:			Comments (all 'yes' answers)
Wheezing, bronchitis or asthma now or in the past	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Any other lung or respiratory conditions (emphysema, pneumonia or sinusitis)	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Allergies, hay fever, or allergic bronchitis	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Does anyone in your immediate family (blood relatives only) have asthma, hay fever or eczema	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Nasal blockage, nose bleeds or lump in nose	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Liver disease (including alcohol related or other hepatitis)	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Severe stomach pain or peptic ulcers	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Vomiting or passing blood	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Kidney or bladder disease	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Chronic fatigue or tiredness	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Significant weight loss	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Any neurological condition affecting nerves in your feet or hands, your coordination or balance	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Skin disorders or dermatitis	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Any discolouration or pigmentation of the skin	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Any form of cancer	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Any other significant health conditions	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Blood problems	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

Possible alternative exposure (tick all relevant boxes)

In the past week have you eaten:			Comments (all 'yes' answers)
Fish	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Oysters, other shellfish	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Seaweed or kelp, including Japanese cuisine, supplements	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

General health assessment (if applicable)

Height: Click here to enter text. cm

Weight: Click here to enter text. kg

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BP: Click here to enter text. / Click here to enter text. mmHg

Urinalysis

Blood: Normal Abnormal

Protein: Click here to enter text.

Referred for further testing

Sugar: Click here to enter text.

No Yes

Cardiovascular system			Medical comments (for all yes/abnormal)
Blood pressure	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal	Click here to enter text.
Heart rate	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal	Click here to enter text.
Heart sounds	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal	Click here to enter text.
Murmurs present	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Evidence of cardiac failure/oedema	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Respiratory system			
Breathing normal and regular in character	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Click here to enter text.
Auscultation normal	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Click here to enter text.
Signs of past/present respiratory disease	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Nervous system			
Muscular tone, co-ordination	<input type="checkbox"/> Normal	<input type="checkbox"/> Abnormal	Click here to enter text.
Tremor	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Skin			
Eczema, dermatitis or allergy	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Skin cancer or other abnormality	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Evidence of nail biting	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.
Other	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Click here to enter text.

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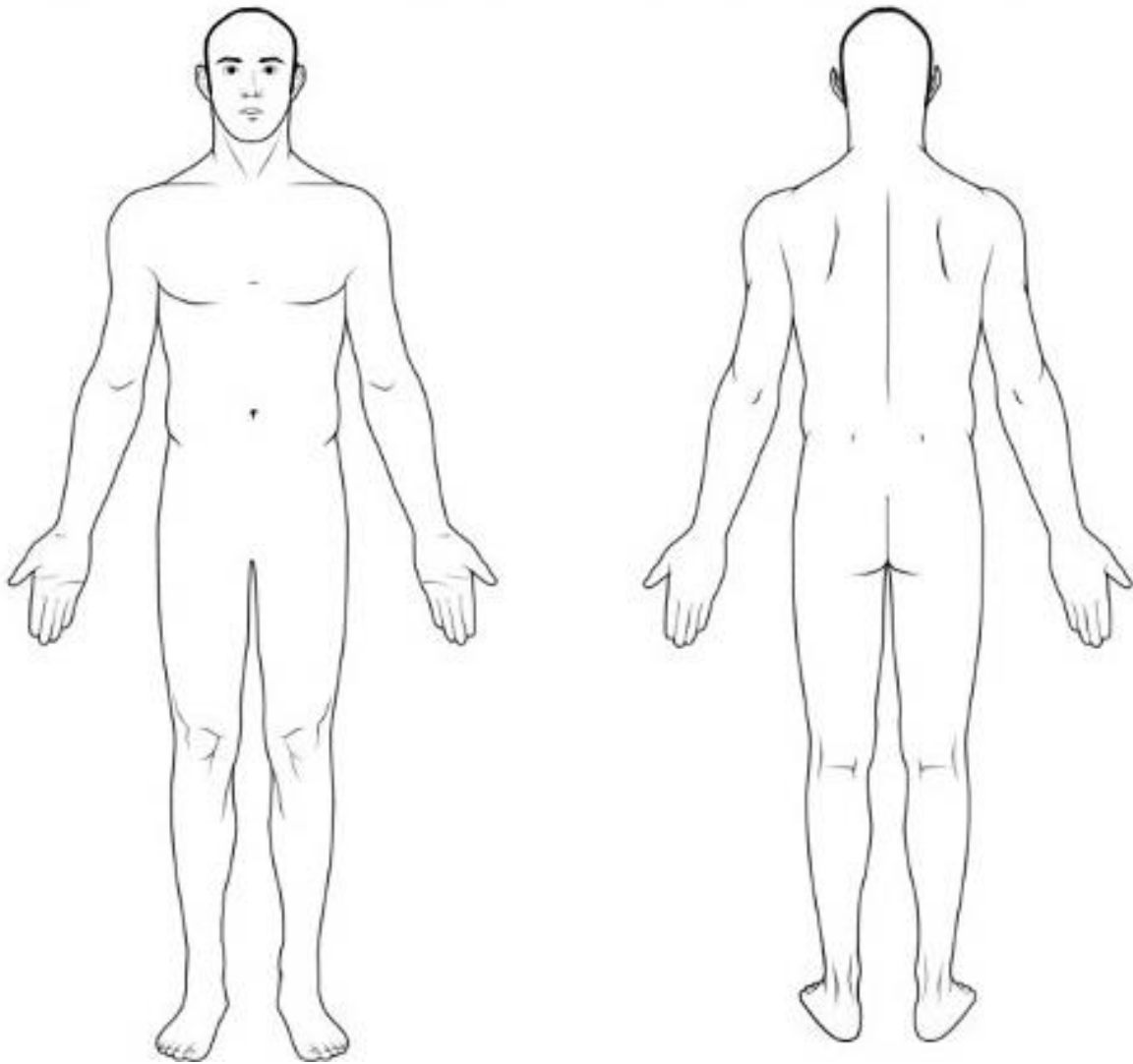


Figure 1 Template of the human body to indicate the location of abnormalities

Eye	Medical comments (for all abnormal)
Evidence of eye irritation <input type="checkbox"/> No <input type="checkbox"/> Yes	Click here to enter text.

Biological monitoring results

Include/attach at least the previous two test results (if available)

Date	Tests performed	Recommended action or comment
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.
Click here to enter a date.	Click here to enter text.	Click here to enter text.

Other medical history, family medical history, current medication, comments, tests or recommendations (use separate sheet if necessary)

[Click here to enter text.](#)

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Registered medical practitioner (responsible for supervising health monitoring)

Name: Click here to enter text.

Signature:

Date: Click here to enter a date.

Tel: Click here to enter text.

Fax: Click here to enter text.

Registration Number: Click here to enter text.

Medical Practice: Click here to enter text.

Address: Click here to enter text.

Suburb: Click here to enter text.

Postcode: Click here to enter text.