



safe work australia

Health monitoring

Guide for registered medical
practitioners

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1. 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 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.

2. What is health monitoring?

Health monitoring means monitoring a worker to identify changes in health status because of exposure to hazardous chemicals at work. The purpose of health monitoring is to identify if exposure to a workplace hazardous chemical is impacting worker health. If carried out routinely it can be described as a health monitoring program.

There are different types of health monitoring procedures (outlined below) used to assess exposure to hazardous chemicals and their impacts on worker health:

Interview questions

This involves asking the worker questions about:

- previous occupational history, medical history and lifestyle habits
 - for example dietary, smoking and drinking habits and where they live or have lived, and
- the presence of symptoms related to exposure.

It may also involve simple questions about:

- how workers carry out their work
- what they understand about the nature of their work
- personal protective equipment that they may use or have access to, and
- their personal hygiene at work or where they eat in the workplace.

These questions provide information to assess current or previous exposure to hazardous chemicals.

Counselling

Counselling includes providing advice to the worker regarding the health effects of the hazardous chemicals including symptoms and health conditions that may develop. It should include information about both the acute and chronic or bioaccumulative effects of exposure.

This involves educating the worker about specific activities or medical conditions that may impact on symptoms of exposure. For example, for a worker with diagnosed renal impairment, the additive effects of smoking or eating seafood during a testing period should be discussed.

Counselling may also include discussing issues surrounding family planning, reproductive effects or possible effects on pregnancy or breast fed children if exposure to certain chemicals occurs.

Medical examination

This involves the use of standard clinical and medical assessments, tests and techniques to assess the presence of early or long term health effects, often at set intervals.

It could include a clinical examination, and tests like spirometry (lung function) and radiography, for example chest X-ray.

Biological effect monitoring

This is the measurement and assessment of early biological effects before health impairment occurs in exposed workers. For example, haematological (blood) profiling, monitoring of liver or kidney markers or measurement of the reduction of cholinesterase activity levels.

Biological exposure monitoring

This involves measurement and evaluation of the levels of a hazardous chemical or its metabolites in:

- body fluids including urine or blood
- body tissues such as build-up of a hazardous chemical in lungs, or
- exhaled breath.

In many cases, more than one monitoring method is used. Choosing the most appropriate health monitoring methods will depend on:

- the regulatory requirements for the chemical under the WHS laws

- the type of chemical involved
- the way the worker is exposed
- the level of exposure, and
- if it is possible to use a proactive method, like biological exposure monitoring, rather than a reactive method, like a medical examination.

Examinations and sampling procedures used in a health monitoring program should be safe, easy to perform, acceptable to workers and, where possible, non-invasive. However, when planning a health monitoring program and when interpreting results it is important to understand the limitations of the test method and results.

It is also important to remember the level of a hazardous chemical or its metabolites in the body may not necessarily correlate with workplace exposure to the hazardous chemicals (e.g. lifestyle behaviours may confound results), symptoms or adverse effects to health.

2.1. Experience needed to carry out health monitoring

The model WHS Regulations provide that health monitoring must be carried out by or under the supervision of a registered medical practitioner with experience in health monitoring.

Before agreeing to supervise or carry out health monitoring program you should ensure you have the necessary skills, qualifications and experience for this work.

Registered medical practitioners should be able to carry out the key requirements of a health monitoring program including:

- planning a health monitoring program specific for exposures to the relevant hazardous chemical that requires health monitoring
- implementing, monitoring and managing a health monitoring program
- recognising and harnessing specialist assistance when required
- sourcing, interpreting and applying best practice, medical, toxicological and epidemiological literature and integrate this knowledge into health monitoring programs, and
- advising and supervising other registered medical practitioners carrying out health monitoring.

Further guidance on the elements of a health monitoring program can be found at [Appendix B](#).

3. When is health monitoring required?

3.1. Health monitoring requirements

A PCBU must ensure health monitoring is provided to a worker if the worker:

- is carrying out ongoing work using, handling, generating or storing hazardous chemicals, and there is a significant risk to the worker's health because of exposure to a hazardous chemical listed in Schedule 14 to the WHS Regulations

- is carrying out ongoing work using, handling, generating or storing hazardous chemicals and there is a significant risk the worker will be exposed to hazardous chemicals other than those listed in Schedule 14 and either:
 - valid techniques are available to detect the effect on the worker's health, or
 - a valid way of determining exposure is available and it is uncertain on reasonable grounds whether exposure has resulted in the biological exposure standard being exceeded
- commences or is conducting lead risk work, or
- is carrying out licensed asbestos removal or other asbestos related work.

A list of chemicals for which health monitoring may be required is provided at [Appendix A](#). The minimum health monitoring requirements as specified in the WHS Regulations are also provided.

The PCBU has a duty to determine 'significant risk' and to decide if a program of health monitoring is necessary. Significant risk decisions are made taking into consideration the likelihood of exposure to a hazardous chemical in conjunction with the known health effects of the chemical. Consultation with you may be needed to determine if testing for exposure to the chemical being used is available to monitor potential effects on a worker's health status.

The PCBU, in consultation with you, should consider instigating a health monitoring program for chemicals with severe known health effects, for example chemicals that are known, or are presumed to be, carcinogenic, mutagenic or toxic to human reproduction, respiratory or skin sensitisers or those with other known severe toxic effects.

3.2. Significant risk

It is the responsibility of the PCBU to determine whether or not the risk to workers is significant and whether or not health monitoring is required. However, the PCBU may need to seek expert advice, for example from you or an occupational hygienist, to assist in determining the level of risk.

For chemicals listed in Schedule 14 to the WHS Regulations, a significant risk is considered to be one where a worker's health is adversely affected by exposure to the hazardous chemical. For other hazardous chemicals, including lead and asbestos different tests for deciding health monitoring apply. Further information can be found in the *Health monitoring guide for PCBUs*.

In deciding if risk is significant, the PCBU should consider:

- the nature and severity of the hazard for each hazardous chemical taking into account:
 - the classification of the chemical according to the Globally Harmonized System of Classification and Labelling of Chemicals (GHS)
 - for example irritant, sensitiser, carcinogen, acute toxicant
 - the form of the chemical in workplace processes
 - for example solid, granulated, dust, mist, fume, and
 - the route of entry by which the chemical can adversely affect health
 - for example inhalation, ingestion, skin contact and absorption
- the degree of exposure to workers, taking account of:
 - where in the workplace the chemicals are used, handled, stored or generated
 - who could be exposed and at what levels or concentrations exposure could occur

- the quantities and concentrations (pure or dilute) of chemicals being used, handled, stored or generated
- standard work practices, procedures and control measures
- the way individual workers carry out their daily tasks
- whether existing control measures adequately control exposure, and
- how often and for how long exposure is likely to occur.

If the PCBU has determined there is significant risk, they should provide you the information leading to this decision.

More information about how a PCBU decides if health monitoring is needed can be found in the *Health monitoring guide for PCBUs*.

4. Health monitoring process

4.1. Planning a health monitoring program

Information to be provided by the PCBU

The PCBU must provide you with the following information:

About the business or undertaking and the worker

- name and address of the person conducting the business or undertaking, and
- the name and date of birth of the worker¹.

About the work

- the work the worker is, or will be, carrying out that has triggered the requirement for health monitoring, and
- if the worker has started that work, how long the worker has been carrying out that work.

Additional information that should be supplied to the registered medical practitioner may include:

- a list of the hazardous chemicals that the worker is or will be exposed to
- the dates that the worker last used the chemicals
- the safety data sheet (SDS) for the chemicals, and
- relevant risk assessment reports, details of workplace exposure standards and results of any air monitoring carried out at the workplace.

Risk assessment reports should contain information about:

- likely exposures at the workplace
- control measures that are in place to minimise exposure
- investigations of results where workplace exposure standards have been exceeded, or
- where surface wipe testing indicates accumulation of chemicals on surfaces.

Information about other hazardous chemicals to which the worker may be exposed, may help you determine if additive or synergistic effects are possible. For example, if the adverse effects of the hazardous chemical may be exacerbated or if the threshold for adverse effects may be lower.

¹ Any additional information about the worker must not be supplied without the worker's consent.

To gain a better understanding of the workplace, you may wish to organise a workplace visit with the PCBU.

Decide what health monitoring techniques and tests to use

Deciding what health monitoring procedure to use involves making decisions about the entire health monitoring program, as well as individual test methods to use. For example it includes details like the frequency of testing needed during the health monitoring program. It should also include consideration of implementing action levels or identifying key symptoms that will allow proactive review of work processes and controls to ensure that adverse health effects and conditions are not experienced by workers. For example, where a disease is caused by chronic exposure to a hazardous chemical, you could use the workplace exposure standard as a measure to decide if an X-ray is required. Where exposure to a hazardous chemical results in an effect on lung function, you could use the action level for a workplace exposure standard (fifty per cent of the relevant standard) if spirometry or other lung function testing is required.

The clinical and medical assessments undertaken as part of a health monitoring program for asbestos or a hazardous chemical listed in Schedule 14 is specified in the WHS Regulations ([Appendix A](#)) and described in the individual chemical documents. There are provisions where alternative tests may be used for example where new technology or equipment becomes available. Given your medical experience, you may be aware of alternative tests that are of equivalent or superior quality to detect the same endpoint. You may consider these alternative tests as more appropriate, depending on the individual worker. Any alternative tests to those specified in the WHS Regulations should be discussed with the PCBU, who has a duty to ensure appropriate health monitoring is provided, and formally recommended.

The potential chemical-associated adverse effects differ from one chemical to another. The individual chemical guides provide some information about the potential acute and chronic toxicity effects associated with exposure to asbestos or a chemical listed in Schedule 14. This information is provided to assist you in identifying potential signs of injury, illness or disease that may be associated with exposure to the relevant hazardous chemical. Depending on discussions with the worker and the results of the specified medical tests or biological monitoring results, you may wish to perform additional medical examinations to assess potential effects on a worker's health. The target organ, acute and chronic toxicity sections in the individual chemical documents provides information to help guide what these follow up examinations may look like.

Asbestos

Under the model WHS Regulations², there are specific health monitoring requirements for workers exposed to asbestos. These are listed in [Appendix A](#) and detailed further in the health monitoring guidance for asbestos and the Code of Practice: *How to safely remove asbestos*.

Chemicals listed in Schedule 14 to the WHS Regulations

Schedule 14 to the WHS Regulations lists hazardous chemicals, including inorganic lead that must be considered for health monitoring if they are used at a workplace.

Further information, including detailed information on the health monitoring tests and procedures, and the information required for the preparation of a health monitoring program, can be found in the separate *Health monitoring guides for hazardous chemicals* for each hazardous chemicals listed in Schedule 14 and asbestos.

² WHS Regulations, regulation 436.

Chemicals that are not listed in Schedule 14

The determination of appropriate techniques and test methods for hazardous chemicals not listed in Schedule 14 to the WHS Regulations is a matter for you and the PCBU.

Techniques and test methods used in a health monitoring program should be practical, accurate and safe. A health monitoring program should be proactive and assess the risk of adverse health effects or detect adverse health effects at an early stage.

Researching and understanding the health effects of a hazardous chemical and the symptoms of exposure can inform decisions about what an appropriate technique or test method might be. The following examples are provided to illustrate how a test method may be chosen:

Table 1 Examples of how a test method may be chosen

Situation or type of chemical	Test method
For a chemical that is known to cause respiratory irritation or reduction in respiratory function	Respiratory questionnaire or spirometry (lung function test) or both may be used to assess effects of inhaling a chemical.
For a chemical that is known to cause specific observable health effects including skin or eye irritation or a rash	Health monitoring may involve simple observation of the worker's eyes and skin by a competent person (for example an occupational nurse) or through trained self-observation and reporting.
Where exposure to the chemical is known to cause that chemical or a metabolite to be present in urine, blood or exhaled air	<p>Urine, blood or exhaled air analysis for levels of a chemical or metabolite may be used to assess exposure from any route (ingestion, inhalation or absorption through the skin).</p> <p>For monitoring to be useful, the correlation between urine, blood or exhaled air levels and health effects or the no observed adverse effects (NOAEL) or lowest observed adverse effects level (LOAEL) needs to be known.</p> <p>For example, if a level of 50 µg/L of the chemical in urine correlates with a specific exposure level (e.g. concentration of the hazardous chemical in air) or known health effects, this may be used in health monitoring to inform action levels and medical recommendations.</p> <p>Validated analytical test methods must also be available. The analytical method needs to be specific to the chemical, should not deliver false positive results, and be reproducible and accurate.</p>

Where there are no valid methods to detect levels of exposure at which injury, illness or disease may occur or the link between work and illness is uncertain, health monitoring may take the form of a review of absence due to illness records and symptom reporting.

Health monitoring may also include self-checks, for example skin checks for redness, itching or other symptoms. Self-checking is only effective as a health monitoring method if workers are trained on what to look for and how to report symptoms.

Biological exposure monitoring

For some chemicals, biological monitoring is a way of assessing chemical exposures by measuring and evaluating biological levels of the chemical or its metabolites in body tissues, body fluids (for example, urine or blood), or in exhaled breath of an exposed worker.

Biological monitoring assesses total exposure from all routes:

- inhalation
- ingestion, and
- absorption through the skin.

Biological monitoring is particularly useful where skin absorption of the hazardous chemical is significant and where controls rely upon the use of personal protective equipment, such as gloves and respirators. Results can be compared to baseline test results or biological exposure standards.

Biological exposure monitoring allows you as the registered medical practitioner to proactively inform the:

- worker of potential adverse health outcomes, and
- PCBU of possible problems with work practices or control measures.

When interpreting results from these tests, you may need to consider the specificity of the test and any potential confounding factors. Information about specificity and potential confounding factors have been included in the individual chemical guides.

Biological exposure monitoring methods can be quantitative or non-quantitative. Quantitative tests, where there is a correlation of the result with worker exposure and potential adverse health effects, are considered more appropriate for a health monitoring program. However, there may be circumstances where use of a non-quantitative method is appropriate as a follow up test to confirm exposure to a hazardous chemical if the available quantitative method lacks specificity. The individual chemical guides provide further information on monitoring methods including specificity, quantitative nature of the tests to inform your recommendations for alternative or follow up biological exposure monitoring.

Where test results show there is a significant increase over time or where the levels approach the biological exposure standard, remedial action should be recommended to the PCBU to reduce exposure. Remedial action by the PCBU may include an investigation into the level of exposure, changes to workplace controls or the worker's temporary transfer to an alternative job.

Preferred tests for biological exposure monitoring are those that are less invasive and provide the same degree of accuracy and reliability. For example, collection and analysis of urine samples is generally preferable to taking blood samples.

Biological exposure standards

A biological exposure standard is a specified concentration of a chemical or chemical metabolite in body tissue, fluid or breath or a measurable biochemical change in the worker.

Biological exposure standards and biological guidance limit values are provided in the individual hazardous chemical guides to assist your assessment of the level of exposure to a chemical in the workplace and the risk of adverse health effects.

Where appropriate, a worker's test results should be compared with the biological exposure standard or biological exposure guidance value provided in *Health monitoring guides for hazardous chemicals*.

Respiratory questionnaires

Respiratory questionnaires can be used to assist you to carry out health monitoring programs for those chemicals that affect the respiratory system, and these can be combined with spirometry to give a full view of adverse respiratory effects.

Special considerations - pregnancy and breastfeeding

Workers may express concern about the potential effects of workplace exposure on pregnancy, pregnancy outcomes and breastfeeding, for example:

- an increased rate of spontaneous abortion
- teratogenic effects leading to foetal abnormalities, and
- developmental effects on infants.

Some examples of chemicals that may have adverse effects on reproduction and development include:

- organic solvents
- aromatic hydrocarbons – benzene, toluene, xylene
- halogenated hydrocarbons – tetrachloroethylene, trichloroethylene, dichloromethane
- ketones – methyl ethyl ketone, and
- heavy metals – lead and cadmium.

For some hazardous chemicals, such as lead, the effects on reproduction and development of the foetus, infants and children are well documented. Maternal exposure to organic solvents as a group is consistently associated with a modest increased risk for birth defects and, somewhat less consistently, for spontaneous abortion. In such cases, the need for avoiding further exposure is obvious.

However, for many hazardous chemicals there is limited quality information regarding potential embryofetal effects. The GHS profile of the hazardous chemicals may provide information regarding the classification of the health hazards. Alternatively, you may need to independently source further information. Any potential exposure should be eliminated or minimised wherever possible.

4.2. Commencing the health monitoring program

As the registered medical practitioner, you should prepare a program of health monitoring in consultation with the PCBU.

This program needs to be specific to the worker and the workplace chemical being used. It may include examinations that can be undertaken by another suitably qualified person, for example an occupational health nurse, or by the worker themselves after they have received proper training and education. The program should also consider the personal preferences and situation of the worker, including religious and cultural sensitivities.

The frequency of health monitoring will depend on the hazardous chemical that has triggered health monitoring and the test results. There are specific requirements for lead and asbestos. However for other hazardous chemicals the frequency of health monitoring may vary depending on:

- frequency of chemical use
 - for example daily, weekly or seasonal use of certain chemicals
- results from previous health monitoring, air monitoring or surface wipe testing, and
- reports of any symptoms of exposure or signs of injury, illness or disease associated with worker use of hazardous chemicals.

If a spill, leak or loss of containment of the hazardous chemical occurs, a worker may experience high acute exposure to a hazardous chemical posing a risk to health. If a spill, leak or loss of containment incident occurs, the PCBU should organise a health monitoring

appointment as soon as practicable after the incident, even if this is outside of the health monitoring timetable scheduled for the individual.

The PCBU may also refer a worker for health monitoring if they feel their health is at risk or if they do not feel well and think that it may be related to the use of or exposure to chemicals within the workplace.

As the registered medical practitioner, you have the overall responsibility for carrying out the health monitoring. However, you may need to seek advice from other professionals such as an occupational physician, a pathology laboratory or workplace health and safety professionals.

When discussing the health monitoring program with the worker for the first time you should explain:

- health monitoring as a legal requirement under the model WHS Regulations
- what is involved in the health monitoring program, for example
 - the frequency of testing and
 - which tests may be needed (e.g. blood tests and respiratory tests)
- any requirement for them to see a doctor or specialist
- how a registered medical practitioner is chosen and their qualifications
- who pays for the health monitoring
- if and how monitoring results may affect their work tasks, for example explaining circumstances where the worker may need to move to other tasks, and
- the record keeping requirements.

4.3. Before work starts – baseline monitoring

Baseline health monitoring of the worker may be required before the worker starts work with a hazardous chemical, so that changes to the worker's health can be detected.

For chemicals that require health monitoring, the following information should be collected and included on the health monitoring report. A template health monitoring report is available for asbestos and each of the hazardous chemicals listed in Schedule 14. Some of this information will be provided by the PCBU.

Demographic data—provided by the PCBU

- name and date of birth of the worker.

Demographic data—collected by the registered medical practitioner

- sex³, and
- current residential address of the worker.

Details of the work—provided by the PCBU

- a description of the work that triggered the requirement for health monitoring
- details of control measures used in current work, including whether suitable personal protective equipment is used, and
- if the worker has started that work, how long the worker has been carrying out that work.

³ It is important that the sex of the worker is recorded and not the gender that the worker identifies with. This is because certain chemicals have effects that are seen at different levels of exposure for different sexes e.g. female reproductive effects of lead.

Previous work history—collected by the registered medical practitioner

- past work history, including previous known or suspected exposures to the hazardous chemical currently being used and other hazardous chemicals, and
- potential for exposure in current work.

Medical history—collected by the registered medical practitioner

- presence of symptoms that may be due to or exacerbated by exposure
- relevant medical conditions that may increase health risk from exposure, and
- other relevant information, for example smoking history.

Discussions about the health monitoring program—performed by the registered medical practitioner

A discussion about the health monitoring program should be conducted with the patient. Information about the program including what is involved, for example the frequency and type of testing, and information about the effects of exposure to the chemical and how to recognise and report symptoms should be provided to the worker.

Discussions should also include instances when health monitoring may change. For example, this may be required if it is indicated by test results or symptoms or if the worker falls pregnant.

Physical examination—performed by the registered medical practitioner

A physical examination may be required and should place emphasis on the target organs or systems for the chemical being used.

Details of the physical examinations required for each chemical are provided in *Health monitoring guides for hazardous chemicals*. For some chemicals a physical examination is only required if work and medical history indicates this is necessary, such as where symptoms are present. In other cases, collection and analysis of biological samples, for example urine or blood may also be required.

4.4. During health monitoring

As the registered medical practitioner, you should ensure that the health monitoring program, test methods and procedures are followed throughout the program.

Regular feedback should be provided to both the PCBU and the worker if results indicate the worker is being or has been exposed to a chemical or if the worker is showing adverse health effects as a result of exposure.

Quality Assurance

You should ensure the quality of the health monitoring program through quality assurance practices. Where specific tests are required, the analytical laboratory providing the test service should be accredited for the procedure with the [National Association of Testing Authorities](#).

Sample collection

If the collection of biological samples is part of the health monitoring program, any instructions from the laboratory providing the test service regarding the collection, storage and transport of the samples should be followed to ensure results are accurate.

Health Monitoring Report

A health monitoring report is required by the PCBU as soon as practicable after the health monitoring is carried out in relation to a worker.

A health monitoring report template is provided in *Health monitoring guides for hazardous chemicals* for each hazardous chemicals listed in Schedule 14 and asbestos. Other templates, forms and formats of health monitoring reports are acceptable and may also be used.

Removal from work

Should test results or symptoms indicate the worker has been exposed to a hazardous chemical that has triggered health monitoring and is suffering from symptoms or a health condition due to exposure, the supervising registered medical practitioner may make a recommendation to the PCBU to have the worker removed from work with the chemical.

In such instances, the PCBU will be required to remove the worker immediately from carrying out such work. This recommendation should be provided with a request for review of control measures.

It is important that if the decision for removal is based on the results of biological tests and that the results are confirmed either through re-testing the sample or collecting a subsequent sample.

Return to work

Should a worker be removed from work, they must not return to work until they have been assessed as medically fit and, where relevant, test results are below the biological exposure standard. This should include your assessment of resolution of symptoms and remediation undertaken by the PCBU. As the registered medical practitioner, you must formally recommend the worker can return to work with the specified chemical to the PCBU.

In some cases such as lead, there are specific regulatory requirements for blood lead levels for the worker to return to work. For more information see *Health monitoring guides for hazardous chemicals*.

4.5. Termination of health monitoring – data to be collected

Final medical examination

A final medical examination should be conducted by you when the worker has finished working with the chemical that triggered health monitoring.

As with baseline monitoring, the focus of the final medical examination varies for individual chemicals and may involve collection of biological samples. The final examination should also place emphasis on any symptoms or conditions observed during the health monitoring program.

Workers with continuing symptoms of exposure or health conditions due to exposure should be advised to seek continuing medical examinations.

Health monitoring report

A final health monitoring report must be provided to the PCBU.

5. Health monitoring report

As the registered medical practitioner, you are expected to provide a health monitoring report to the PCBU as soon as practicable after health monitoring is carried out in relation to a worker, or at regular intervals for longer term or ongoing health monitoring programs.

A health monitoring report template is provided in *Health monitoring guides for hazardous chemicals* for each hazardous chemicals listed in Schedule 14 and asbestos to assist you to provide the relevant information and recommendations to the PCBU. Other templates, forms and formats of health monitoring reports are acceptable and may also be used if they meet the requirements set out in the WHS Regulations.

The health monitoring report template provided in *Health monitoring guides for hazardous chemicals* contain two sections. Section one contains the information and recommendations to the PCBU to comply with their duties under the WHS laws. A copy of section one should be provided to the PCBU who has engaged your services. Further information on the content of this section is included in Section 5.1 below. Section two contains confidential information that you use for making a decision whether or not the worker may have contracted an injury, illness or disease as a result of exposure during carrying out the work. Section two is to be retained by you to maintain confidentiality for the worker undergoing the health monitoring. Confidential information about a worker that has no bearing or relevance to their work must not be disclosed to another person without their written consent, including to the PCBU. Further information on confidentiality is included in Section 5.2 below.

5.1. Content of health monitoring report

Section one of the health monitoring report must contain:

- the name and date of birth of the worker
- the name, registration number and signature of the registered medical practitioner
- name and address of the business or undertaking
- the date(s) of health monitoring
- for health monitoring in relation to hazardous chemicals and lead – any test results that indicate whether or not the worker has been exposed to a hazardous chemical (biological exposure monitoring), for lead this also includes any test results that indicate the worker has reached or exceeded the relevant blood lead level, the date blood sampling was conducted and details of the pathology service used
- any advice that results indicate the worker may have contracted an injury, illness or disease as a result of exposure during carrying out the work that triggered the requirement for health monitoring
- any recommendation that remedial measures are to be taken, including whether the worker can continue to carry out the type of work that triggered the health monitoring, and
- whether medical counselling or specialty medical advice is required for the worker in relation to the injury, illness or disease caused by exposure during work that triggered the requirement for health monitoring.

Section one should also contain:

- the date of sampling if blood or urine samples are taken,
- results of biological monitoring and other tests carried out.

Section two of the health monitoring report contains the information and test results that you collected to assess if a worker has been exposed to hazardous chemical and impacts on worker health. This may include:

- information on the exposure history
- the questionnaire on general health
- the questionnaire on chemical specific symptoms
- results of the medical examination
- results of the biological effect monitoring
- results of the biological exposure monitoring

When the full report is complete, both section one and section two should be signed by you. A copy of section one is sent to the PCBU who has engaged your services. The PCBU will provide a copy of this report and any recommendations to the worker.

Section two is to be retained by you to maintain confidentiality for the worker undergoing the health monitoring. Confidential information about a worker that has no bearing or relevance to their work must not be disclosed to another person without their written consent, including to the PCBU. This means that you should not include detailed results in the section one. However, you should include a recommendation or advice based on the test results, for example biological exposure test shows early indication or diagnosis of injury, illness or disease, or other interpretation of X-ray or spirometry readings recommending review of workplace controls. You may provide a copy of section two to the worker at the conclusion of the examination.

Considerations for work involving lead

There are specific additional requirements for lead risk work that must be considered when preparing the health monitoring report for workers involved in lead risk work, including:

- the frequency of biological monitoring
- the circumstances when the frequency of monitoring must be increased
- when workers must be removed from lead risk work
- the requirement to arrange a medical examination for the worker within seven days after the worker is removed from the lead risk work, and
- when workers can return to lead risk work.

Further information on lead in *Health monitoring guides for hazardous chemicals* and Part 7.2 of the WHS Regulations for further details.

5.2. Confidentiality of health monitoring records

Health monitoring records must be kept confidential. The report and results must not be disclosed to another person without the worker's written consent unless the records are required to be given under the model WHS Regulations to:

- the WHS regulator
- another PCBU who has a duty to provide health monitoring for the worker, or
- a person who must keep the record confidential under a duty of professional confidentiality.

The report must not be used for any purpose other than providing the PCBU with information on the results of the health monitoring program. For example, the report should not contain details of medical conditions disclosed during the health monitoring program if these have no relevance or bearing on the work being performed.

Similarly, blood or tissue samples, X-rays, questionnaires or other materials taken for health monitoring must not be used for any other purpose.

5.3. Requirements for ongoing medical treatment

If health monitoring indicates further medical treatment is necessary, referrals for specialist treatments should be made by the registered medical practitioner supervising the health monitoring program. Treatment programs for adverse health effects or medical conditions should only be discussed between the worker and the registered medical practitioner.

6. Further information

Further information on health monitoring requirements, including information on individual scheduled chemicals, can be found on the Safe Work Australia website:

- *Health monitoring guide for persons conducting a business or undertaking*
- *Health monitoring guide for workers, and*
- *Health monitoring guides for hazardous chemicals.*

Further information may also be available from the [WHS authority](#) in your jurisdiction.

Appendix A – Hazardous chemicals requiring health monitoring

The information in this Appendix is taken from regulation 436 (asbestos) and Schedule 14 of the model WHS Regulations.

Hazardous chemicals requiring health monitoring

The information in this Appendix is taken from regulation 436 (asbestos) and Schedule 14 to the WHS Regulations.

Table 2 Hazardous chemicals requiring health monitoring under the WHS Regulations

Hazardous chemical	Type of health monitoring
1. Acrylonitrile	<ul style="list-style-type: none">– Demographic, medical and occupational history– Records of personal exposure– Physical examination
2. Arsenic (inorganic)	<ul style="list-style-type: none">– Demographic, medical and occupational history– Records of personal exposure– Physical examination with emphasis on the peripheral nervous system and skin– Urinary inorganic arsenic
3. Asbestos	<ul style="list-style-type: none">– Demographic, medical and occupational history– Records of personal exposure– Physical examination
4. Benzene	<ul style="list-style-type: none">– Demographic, medical and occupational history– Records of personal exposure– Physical examination– Baseline blood sample for haematological profile
5. Cadmium	<ul style="list-style-type: none">– Demographic, medical and occupational history– Records of personal exposure– Physical examination with emphasis on the respiratory system– Standard respiratory questionnaire to be completed– Standard respiratory function tests including for example, FEV1, FVC and FEV1/FVC– Urinary cadmium and β2-microglobulin– Health advice, including counselling on the effect of smoking on cadmium exposure

Hazardous chemical	Type of health monitoring
6. Chromium (inorganic)	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Physical examination with emphasis on the respiratory system and skin – Weekly skin inspection of hands and forearms by a competent person
7. Creosote	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Health advice, including recognition of photosensitivity and skin changes – Physical examination with emphasis on the neurological system and skin, noting any abnormal lesions and evidence of skin sensitisation – Records of personal exposure, including photosensitivity
8. Isocyanates	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Completion of a standardised respiratory questionnaire – Physical examination of the respiratory system and skin – Standardised respiratory function tests, FEV1, FVC and FEV1/FVC
9. Lead (inorganic)	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Physical examination – Blood lead level
10. Mercury (inorganic)	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Physical examination with emphasis on dermatological, gastrointestinal, neurological and renal systems – Urinary inorganic mercury
11. 4,4'-Methylene bis(2-chloroaniline) (MOCA)	<ul style="list-style-type: none"> – Demographic, medical and occupational history – Physical examination – Urinary total MOCA – Dipstick analysis of urine for haematuria – Urine cytology
12. Organophosphate pesticides	<ul style="list-style-type: none"> – Demographic, medical and occupational history including pattern of use – Physical examination – Baseline estimation of red cell and plasma cholinesterase activity levels by the Ellman or equivalent method – Estimation of red cell and plasma cholinesterase activity towards the end of the working day on which organophosphate pesticides have been used

Hazardous chemical	Type of health monitoring
13. Pentachlorophenol (PCP)	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination with emphasis on the skin, noting any abnormal lesions or effects of irritancy - Urinary total pentachlorophenol - Dipstick urinalysis for haematuria and proteinuria
14. Polycyclic aromatic hydrocarbons (PAH)	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination - Records of personal exposure, including photosensitivity - Health advice, including recognition of photosensitivity and skin changes
15. Silica, crystalline	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Standardised respiratory questionnaire to be completed - Standardised respiratory function test, for example, FEV1, FVC and FEV1/FVC - Chest X-Ray full PA view (baseline and high risk workers only)
16. Thallium	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination - Urinary thallium
17. Vinyl chloride	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination - Records of personal exposure

Additional examples of chemicals to consider for health monitoring

Below are some examples of hazardous chemicals and testing methods which are not listed in schedule 14 of the WHS Regulations where you may wish to consider implementing a health monitoring program for your workers.

Table 3 Some hazardous chemicals which may require health monitoring

Hazardous chemical	Type of health monitoring
1. Antimony	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination with emphasis on the respiratory system and skin - Urinary antimony level

Hazardous chemical	Type of health monitoring
2. Arsenic (inorganic)	<ul style="list-style-type: none"> - Additional: Urinary inorganic arsenic by speciation (inorganic arsenic plus methylated metabolites)
3. Benzene	<ul style="list-style-type: none"> - Additional: Urinary S-phenylmercapturic acid (s-PMA)
4. Beryllium	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination with emphasis on respiratory and dermatological systems - Urinary beryllium level
5. Butanone (methyl ethyl ketone, MEK)	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the central nervous system and skin - Urinary MEK (2-butanone) level
6. Carbon disulfide	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the respiratory system and skin - Urinary 2-thiothiazolidine-4-carboxylic acid level
7. Chromium (inorganic)	<ul style="list-style-type: none"> - Additional: Urinary chromium
8. Cobalt	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on respiratory systems and skin - Urinary cobalt level
9. Creosote	<ul style="list-style-type: none"> - Additional: Urinary 1-hydroxypyrene
10. Cyclophosphamide	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Urinary cyclophosphamide level
11. Dichloromethane	<ul style="list-style-type: none"> - Collection of demographic, medical and occupational history - Physical examination with emphasis on the central nervous system - Urinary dichloromethane
12. Ethyl benzene	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination - Baseline blood sample for haematological profile - Urinary mandelic acid level

Hazardous chemical	Type of health monitoring
13. Fluorides (including soluble fluorides and aluminium fluoride)	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the respiratory system - Pre and post shift urinary fluoride level
14. Isocyanates	<ul style="list-style-type: none"> - Additional: Urinary isocyanate metabolites
15. 4-methylpentan-2-one (methyl isobutyl ketone) MIBK	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the respiratory system and skin - Urinary MIBK level
16. Nickel	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on dermatological and respiratory systems - Urinary nickel level
17. Organophosphate pesticides	<ul style="list-style-type: none"> - Additional: Urinary organophosphate metabolites
18. Polycyclic aromatic hydrocarbons (PAH)	<ul style="list-style-type: none"> - Additional: Urinary 1-hydroxypyrene
19. Styrene	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination - Baseline blood sample for haematological profile - Urinary mandelic acid
20. Tetrachloroethylene (perchloroethylene)	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the central nervous, respiratory and reproductive systems and skin - Tetrachloroethylene blood level prior to shift
21. Toluene	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Records of personal exposure - Physical examination - Baseline blood sample for haematological profile - Urinary o-cresol
22. Trichloroethylene	<ul style="list-style-type: none"> - Demographic, medical and occupational history - Physical examination with emphasis on the central nervous system - Urinary trichloroacetic acid or trichloroethane level
23. Vinyl chloride	<ul style="list-style-type: none"> - Additional: Annual liver function tests (AST, ALT, GGT, ALP, and bilirubin)

Hazardous chemical	Type of health monitoring
24. Uranium	<ul style="list-style-type: none">- Demographic, medical and occupational history- Physical examination- Post shift urinary uranium level- Urinary dipstick analysis for proteinuria- Urinary cytology
25. Xylene	<ul style="list-style-type: none">- Demographic, medical and occupational history- Records of personal exposure- Physical examination- Baseline blood sample for haematological profile- Urinary toluric acid

Appendix B – Key elements of a health monitoring program

The registered medical practitioner carrying out or supervising a health monitoring program is expected to have the appropriate skills, qualifications and experience. The following information outlines the key elements of a health monitoring program that a registered medical practitioner engaged to carry out or supervise this work is expected to show.

Planning a health monitoring program

Establish and maintain arrangements for the development of a health monitoring program:

- consult the person conducting a business or undertaking (PCBU) and workers to establish the relationship between the health monitoring program and the risk assessment process, and
- ensure a mechanism is established to consider worker concerns.

Establish the relevant hazardous chemical(s) to which the workplace population is exposed and the appropriate type of health monitoring:

- utilise the workplace risk assessment to identify:
 - the hazardous hazardous chemical(s), and
 - the degree of likely worker exposure, and
- identify the appropriate type(s) of health monitoring.

Establish an information base for the performance of the health monitoring program:

- source all relevant information including guidelines for health monitoring and safety data sheets (SDS) for the hazardous chemical of concern
- ensure the information is readily available.

Establish mechanisms for specimen collection, transport and analysis:

- identify an accredited laboratory and engage them to carry out and report on the specified tests within agreed timelines
- establish a protocol which is approved by the accredited laboratory for specimen collection and testing which specifies:
 - appropriate collection techniques (including spirometry and lung function tests)
 - specimen containers, and
 - specimen transport conditions prior to receipt for analysis, and
- specify a protocol and measures to prevent specimen contamination, control infection and dispose of biological wastes.

Establish delegation in the performance of health monitoring:

- develop a protocol to define the roles and responsibilities of all persons involved in health monitoring based on skills relevant to activities to be performed.

Ensure that all staff required to perform health monitoring activities are adequately trained to perform the activities assigned to them:

- provide sufficient instruction to all staff required to perform health monitoring activities to enable them to competently perform the activities assigned to them.

Implementing a health monitoring program

Undertake the prescribed history, examination and testing with reference to the *Health monitoring guides for hazardous chemicals*:

- list occupational and medical history
- perform and record the appropriate physical examination, and
- prescribe the appropriate tests to monitor exposure.

Ensure specified procedures for collection, transport and storage of biological specimens are followed to reduce the sources of error:

- perform the correct procedure for the collection of the specimens
- observe special requirements for transport of the specimens
- ensure special conditions for storage of the specimens while awaiting analysis are available, and
- recognise and minimise likely sources of error for each test procedure.

Advise workers of potential health effects of chemicals used in the workplace:

- recognise and explain the potential health effects related to the hazardous chemicals
- explain in lay terms any symptoms or signs, which suggest exposure to hazardous chemicals, and
- explain the routes of entry into the body and the most likely route of exposure for the work conditions for the hazardous chemicals.

Recognise the limitations of tests:

- recognise the limitations to routine tests used to monitor worker exposure to hazardous chemicals and consider these when interpreting results, and
- arrange a confirmation, repeat or additional testing when indicated.

Interpret the results of tests in the light of the individual's general state of health:

- interpret test results by reference to appropriate standards and clinical findings
- assess serial results to establish the significance of any trend that suggests an adverse reaction caused by exposure to a hazardous chemical, and
- identify individual or group results requiring corrective action at the workplace.

Notify PCBU of results and implications of health monitoring:

- provide a report that explains the results of health monitoring to the duty holder
- reports of health monitoring:
 - clearly indicate if elevated levels of exposure or abnormal results and their possible association with workplace exposures are explained
 - clearly indicate if a worker has been advised to have further tests or medical counselling, and
 - are written with appropriate safeguards on worker confidentiality
- interpret the results of health monitoring, including any trends, with regard to implications for the workplace
- advise appropriate preventive and remedial action at the workplace in the report, and
- recommend further investigations or referrals as indicated by health monitoring results.

Arrange appropriate management of the worker including:

- treatment or referral for workers with abnormal results
- rehabilitation of a worker with a clinical abnormality related to hazardous chemicals affecting work capability, and
- referral to treating doctor for management of incidental findings.

Decide on recommendations in relation to a review of control measures by the PCBU, including considerations of when a worker should be removed from work that triggered the requirement for health monitoring or return to work with that hazardous chemical:

- determine when:
 - removal from working with a relevant hazardous chemical is indicated by the results of health monitoring
 - return to work with the relevant hazardous chemical is permitted by the results of health monitoring, and
 - the PCBU should be recommended to provide the health monitoring report to the WHS regulator.

Evaluating a health monitoring program

Ensure that the health monitoring procedures follow the health monitoring requirements of the model WHS Regulations and this guide.

Ensure that health monitoring procedures are developed in consultation with the PCBU and workers:

Ensure that examination and testing procedures used for health monitoring are appropriate and adequate:

- demonstrate appropriate and consistent examination techniques
- demonstrate the ability to differentiate abnormal clinical signs
- demonstrate the ability to assess clinical and testing competencies of any delegated person involved in health monitoring
- demonstrate knowledge of the appropriate tests for a given hazardous chemical, and
- ensure all samples are collected, transported and analysed in accordance with the laboratory protocol.

Ensure correct interpretation of individual test results:

- interpretation of individual test results is based on the health monitoring guidelines where relevant
- knowledge of the implications of cumulative exposure is demonstrated
- knowledge of potential actions in response to individual health monitoring results is demonstrated
- selection of appropriate diagnostic testing and/or referral for confirmation of test results is demonstrated, and
- a random sample of decisions is audited by peer review.

Interpret group data to identify adverse trends in health monitoring:

- knowledge of the importance of determining adverse health monitoring trends is demonstrated, and
- group results are referred for specialist advice where appropriate.

Communicate with the PCBU:

- ensure all health monitoring results, and actions from those results are communicated in a form and language (written or oral) that is understandable to the PCBU
- provide information in a timely manner
- inform the PCBU in writing of the appropriate action to modify individual or group exposures
- follow-up to ascertain the PCBU has acted on advice, and
- know the information that the PCBU should provide.

Ensure that the practitioner's decisions concerning actions based on health monitoring are correct:

- a random sample of cases is audited by peer review, and
- the decisions and recommendations made are consistent with this guide and the WHS Regulations.

Ensure that the practitioner assesses dissatisfaction expressed by the PCBU or worker:

- information is sought as to the reasons for dissatisfaction and
- corrective action is taken where appropriate.

Seeking advice on a health monitoring program

Recognise when to seek advice regarding health monitoring from health and safety specialists:

- advice is sought to:
 - implement a program of health monitoring
 - interpret results of health monitoring
 - review individual results and aggregate data
 - explain the meaning of results to the PCBU or workers in the context of the workplace, and
 - assess the need for a review of control measures.

Consult with the PCBU where the involvement of other professionals is recommended:

- the reasons for further specialist advice are discussed with the PCBU.

Recognise when to seek advice from an occupational physician on the requirements for health monitoring for chemical(s) not listed in the model WHS Regulations:

- advice is sought where workers may be exposed to undesirable levels of chemical(s) not listed in the model WHS Regulations.

Additional elements relevant for occupational physicians

Planning, implementing and advising on a health monitoring program

A registered medical practitioner who is also an occupational physician, is able to plan, implement, evaluate and advise on health monitoring programs for any hazardous chemical requiring health monitoring revealed by the assessment processes, including those for which there are no existing guidelines.

For chemicals that do not have existing guidelines, develop a program of health monitoring:

- develop protocols for health monitoring for the chemical
- implement the program of health monitoring where required
- evaluate the effectiveness of any health monitoring protocol

- identify health effects of specific hazardous chemicals and carry out appropriate health examinations
- identify biological monitoring tests suitable to assess exposure to specific hazardous chemicals
- identify biological effects of specific hazardous chemicals, and
- identify the limitations of any investigation selected to monitor exposure to a specific hazardous chemical.

Advise on special sub-groups and individuals who may have characteristics that increase their susceptibility to hazardous chemicals:

- identify individuals likely to be more susceptible to adverse health effects of hazardous chemicals
- identify subgroups having increased susceptibility to particular adverse health effects of hazardous chemicals
- advise existing and prospective workers with identified increased susceptibility to hazardous chemicals, and
- advise the PCBU about the fitness for work in specific processes of individuals with increased susceptibility.

Consult with the PCBU on the need for review of control measures:

- identify and consult the appropriate personnel in the workplace
- advise the PCBU on appropriate procedures to control exposure to hazardous chemicals, and
- advise the PCBU when there is a need to review the control of hazardous chemicals when indicated by the results of health monitoring.

Updating and monitoring a health monitoring program

A registered medical practitioner who is also an occupational physician is able to interpret the medical, toxicological and epidemiological literature and apply this knowledge in order to adopt best practice in health monitoring.

Review new information and testing techniques to ensure the most appropriate current health monitoring:

- regularly peruse the peer reviewed literature
- conduct relevant computerised data base searches, and
- interpret the significance of literature reports in the light of the particular workplace.

Review the assessment documents for changes to technology and use of hazardous chemicals in the workplace:

- regularly access the workplace assessment documents and reports, and
- review the health monitoring program when changes occur either in technology or how the relevant hazardous chemical is used in the workplace.

Advising other workplaces and practitioners on a health monitoring program

A registered medical practitioner who is also an occupational physician is able to provide advice to other registered medical practitioners, workplaces and other health professionals on the appropriateness, planning, implementation and evaluation of health monitoring programs.

Advise on the appropriateness of proposed or existing health monitoring programs:

- review the proposed or existing program of health monitoring, and
- provide appropriate advice in the context of the given workplace.

Advise on the interpretation of individual and aggregate data.

- provide advice on the interpretation of individual or aggregate health monitoring data, and
- consider the particular workplace processes and control measures when interpreting data.

Advise on the appropriate consultation with the workplace concerning health monitoring results:

- provide advice on adverse results in the context of the particular workplace, and
- provide advice on the need for a review of control measures.