Occupational Cancer Risk Series

BENZENE.

There may be hazards where you work that increase your risk of developing cancer. This fact sheet discusses occupational hazards related to **benzene**.

KEY MESSAGES

- In Australia, more than 1 in 10 male workers and 1 in 20 female workers are exposed to benzene at work.
- Benzene is a cancer-causing agent, increasing the risk of myelodysplastic syndrome (MDS) and leukaemia.
- Eliminate or reduce exposure to benzene by using the recommended controls.

WHAT IS BENZENE?

Benzene is a colourless, flammable liquid found in a range of materials and products like crude oil, petroleum, and in laboratories. Benzene is also released during fires, from burning fuels, and through tobacco smoking[1] or e-cigarette vaping.[2]

BENZENE AND CANCER

Repeated or long-term exposure to benzene increases the risk of myelodysplastic syndrome (MDS) and leukaemia (and possibly lymphoma) by damaging a person's stem cells.[3-5] Not everyone exposed to benzene will develop cancer, but the risk increases if a person is regularly exposed to benzene.

Exposure to higher levels of benzene can also increase the risk of chronic conditions like anaemia, while short-term exposure can cause eye, skin, and lung irritation, and poisoning at high concentrations.[1]

EXPOSURE TO BENZENE AT WORK

In Australia, it is estimated that over 1 in 10 male workers and 1 in 20 female workers are exposed to benzene while working.[6] Benzene exposure most commonly occurs by breathing in benzene vapours in the air. However, workers can also be exposed through contact with the skin.[6] People may be exposed to benzene both during and outside of work, with vehicle exhaust and cigarette smoke/e-cigarette vapour being the most common sources of exposure.[1,2] Jobs and industries at greater risk of exposure are highlighted in Figure 1.[3,6]

Oil, gas, and coal production	**Chemical manufacturing**
Plastics and rubber manufacturing	**Transport, storage and tanker workers**
Working at service stations	**Mechanics and automotive workers**
Firefighting	**Laboratory workers**

Figure 1. Examples of jobs and industries where you might be exposed to benzene.

Benzene is a restricted carcinogen under Australian WHS laws. This means that workplaces using or storing benzene require authorisation from their state WHS regulator.

EFFECTIVE CONTROLS

All workplaces operating in Australia must follow WHS laws. While these vary slightly between states and territories, the duty of care for employers and responsibilities of workers is similar throughout Australia:

- Employers are required to ensure the health and safety of workers and others at their workplace.
- Workers must take reasonable care of their own health and safety.
- Workers must not negatively affect the health and safety of other people.
- Workers must follow workplace health and safety policies and any reasonable instruction.
- Workers should always be involved in the risk management process, including the identification of hazards and the selection of control measures that suit the workplace.

The risk of occupational benzene exposure can be managed using the hierarchy of control (Figure 2), which provides a framework for eliminating or reducing benzene exposure. Involving workers in the risk assessment and risk management process helps ensure that all risks have been identified and that controls are appropriate for the job.

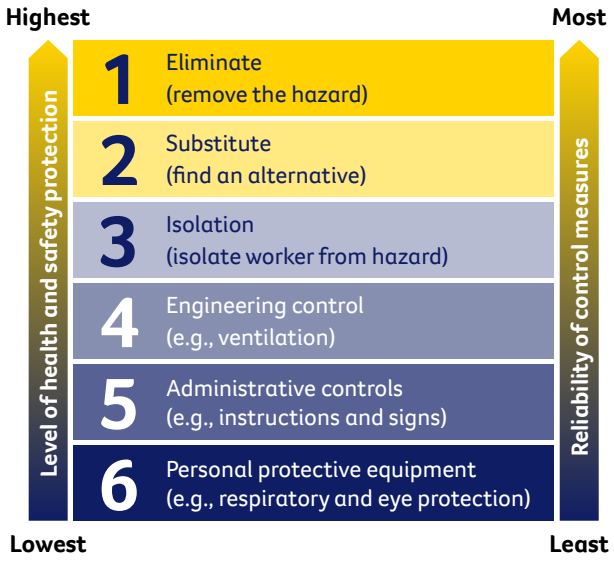


Figure 2. Hierarchy of control

AIR MONITORING

Regulations require air monitoring to be carried out to determine levels of benzene in the air and ensure that controls are effective. This should be performed by a competent and accredited person, like an occupational hygienist.

The exposure limit set by Safe Work Australia requires workplace benzene exposure to be kept below 1 ppm (or 3.2 mg/m^3), averaged over an eight-hour period. However, the American Conference of Governmental Industrial Hygienists (ACGIH) have recommended this be limited to 0.02 ppm (0.64 mg/m^3). Even if exposure levels are being met, employers should aim to reduce exposure to as low as reasonably practicable.

HEALTH MONITORING

Under WHS regulations, health monitoring must be arranged for those who may be exposed to harmful levels of benzene at work. Health monitoring aims to detect high levels of benzene metabolites (chemicals produced when the body breaks down benzene) before irreversible changes like cancer occur. Workers should undertake health monitoring before, during, and after terminating high-risk benzene work. Safe Work Australia's Health Monitoring Guide for Benzene outlines the process of conducting health monitoring.

HOW DO I DETECT CANCER EARLY AND REDUCE MY CANCER RISK?

It's important you speak with your doctor if you are concerned about your exposure to benzene or have been having symptoms like:

- Tiredness
- Shortness of breath
- Recurring infections
- Increased bruising and bleeding
- Tiredness
- Shortness of breath
- Recurring infections
- Increased bruising and bleeding

To find out what you can do to reduce your cancer risk, speak to an experienced health professional on 13 11 20 or visit www.cancer.org.au/support-and-services/cancer-council-13-11-20

SUMMARY OF CONTROL MEASURES FOR BENZENE

Activity	Control
Elimination	Where practicable, eliminate the use of benzene.
Product/material choice	Replace petrol engines with other energy sources (e.g., electric). If the use of a benzene fuel source or engine is necessary, opt for those with low emissions (e.g., using a biogas or a hybrid vehicle). Refer to Material Safety Data Sheets to determine the concentration of benzene in a particular solvent or chemical.
Engine refurbishment	Install devices that reduce emissions, such as a catalytic converter.
Ventilation	Use Local Exhaust Ventilation (LEV) to remove benzene vapours from the source at which they are produced. Use vapour recovery when filling tankers with petroleum.
Worker education and training	Train and educate workers on the risks of benzene exposure and the controls that reduce these risks. This may occur through e-Learning, presentations/toolbox talks, workshops, and demonstrations of how to correctly use controls. Workers should also be made aware of the need to report incidents or conditions that may increase exposure (e.g., changes in engine emissions or a chemical spill).
Share activities	Rotate jobs between your workers to reduce the amount of time each worker is exposed to benzene.
Administrative	Display signs warning workers of the risks of benzene and the need to use controls. Implement policies preventing unnecessary benzene exposure (e.g., those requiring engines to be turned off when not in use). Ensure materials containing benzene are labelled appropriately and stored as per the Safety Data Sheet.
Personal Protective Equipment (PPE)	Wear an air supplied or air-purifying respirator to prevent inhalation of benzene vapours. When handling benzene, use PPE like chemical-resistant gloves to prevent contact with the skin.
Quit smoking/vaping	Smoking can result in being exposed to up to ten times as much benzene as someone who does not smoke.[7] Quitting or cutting down on smoking and vaping reduces the amount of benzene you are exposed to both during and outside of work.[1,2]

For more information on workplace cancer and cancer-causing agents, visit cancer.org.au/go/workcancer

REFERENCES

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