

Overview



- Hazardous substances in the workplace
- A **systematic** approach to managing risks, including:
 - **identifying** hazardous substances
 - **assessing** risk
 - **controlling** risk
- **Maintaining** a safe workplace
- *Victorian Occupational Health and Safety (Hazardous Substances) Regulations 1999*

Topic 1. Hazardous substances in the workplace



- ⌘ What are hazardous substances?
- ⌘ Forms of hazardous substances
- ⌘ Routes of exposure
- ⌘ Harm from hazardous substances

What are hazardous substances?

- ⌘ chemicals and other substances which can cause injury or illness
- ⌘ classified as hazardous by the manufacturer or importer, using:
 - 'The List', or
 - strict criteria
- ⌘ once classified as hazardous:
 - must be labelled as hazardous or have other warnings
 - 'Material Safety Data Sheet' (MSDS) must state product is "hazardous".



Dangerous goods?



Hazardous substances:

classified on the basis of *health effects* only

> *Hazardous Substances Regulations* apply

Dangerous goods:

classified on the basis of immediate physical or chemical effects (e.g. fire, explosion, corrosion, poisoning)

> *Dangerous Goods Act 1985* and associated regulations apply

Many hazardous substances are also dangerous goods

> Both sets of legislation apply

Potentially harmful substances not covered by the Regulations



⌘ substances not related to a **work activity**

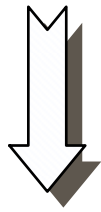
⌘ substances covered by **other legislation**, e.g. radioactive substances, micro-organisms, asbestos, some forms of lead

⌘ Substances produced as **by-products or waste products**, of work processes not involving hazardous substances

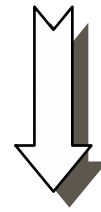
Occupational Health and Safety Act 1985 applies if the Regulations don't.

**'Hazardous substances'
& their by-products**

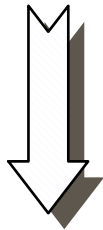
**Substances not classified as
'hazardous'**



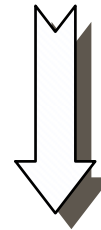
Hazardous Substances Regulations apply



General duties of care apply



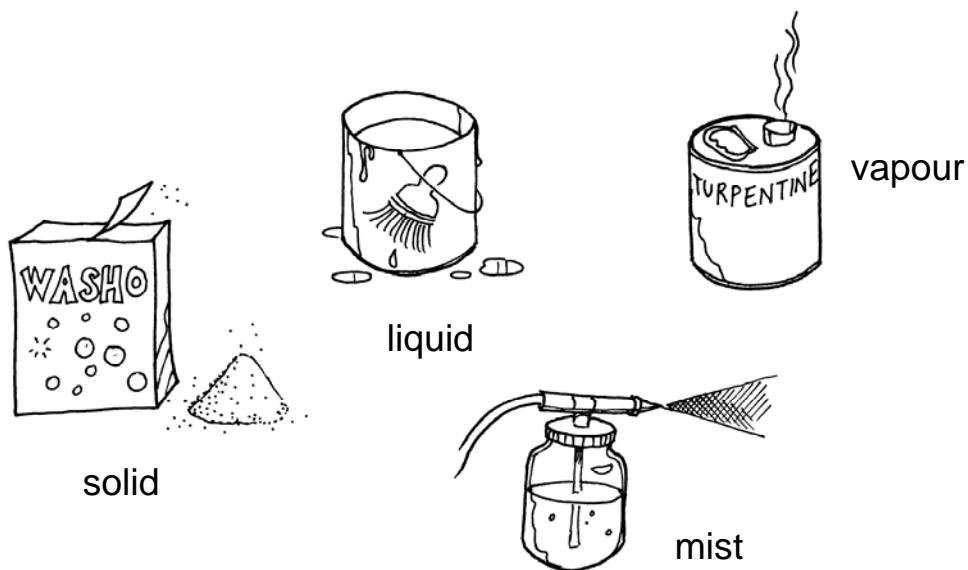
Compliance with the Regulations is compliance with the Act



OHS Act

Forms of chemicals

- ☒ **solids** (including dusts & powders) - have a definite shape
- ☒ **liquids** - substances that flow
- ☒ **mists** - when a liquid is broken up into small droplets
- ☒ **vapours** - liquids that have evaporated into the air
- ☒ **gases** - move freely in the air



Routes of exposure

- ☒ breathing (inhalation)
- ☒ direct contact (skin or eyes)

☒ ingestion



Direct contact
with skin



Inhalation

Ingestion



Eye absorption

Effects of hazardous substances can be:



⌘ Acute

- ☑ resulting, usually immediately, from a short-term exposure (e.g. corrosive burns, inhaling a toxic gas, eye irritation)

⌘ Chronic

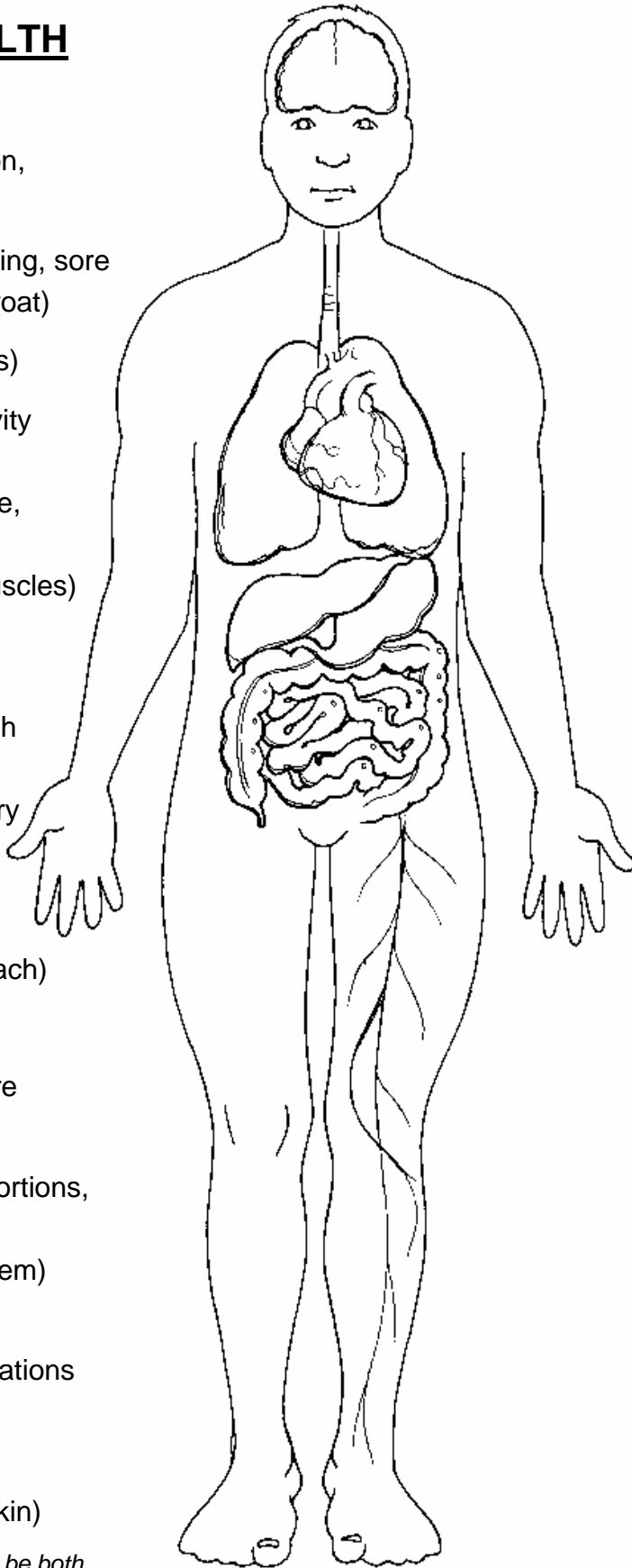
- ☑ resulting from long-term, often low-level, exposure;
- ☑ might not appear for many years;
- ☑ are hard to predict;
- ☑ it can be hard to work out what caused them.

Some effects can present as both acute & chronic symptoms

HARM FROM HAZARDOUS SUBSTANCES

ACUTE HEALTH EFFECTS

- Redness, irritation, watery (eyes)
- Sneezing, coughing, sore throat (nose & throat)
- Blue gums (gums)
- Lower brain activity convulsions, headaches, fatigue, muscle weakness (brain, nerves, muscles)
- Bronchitis, asthma attacks shortness of breath chemical burns (lungs & respiratory system)
- Death (heart)
- Poisoning (stomach)
- Jaundice (liver)
- Acute renal failure (kidney)
- Spontaneous abortions, miscarriages (reproductive system)
- Anaemia metabolic complications (blood)
- Skin irritation chemical burns (skin)



CHRONIC HEALTH EFFECTS

- Blindness (eyes)
- Nasal & throat cancer (nose & throat)
- Corrosion of tooth enamel (teeth)
- Loss of brain function behavioural changes to personality & thinking (brain)
- Fibrosis, cancer, asthma (lungs & respiratory system)
- Immune system damage (spleen)
- Arrhythmias (heart)
- Metabolic disorders (digestive system)
- Cirrhosis (liver), fibrosis
- Chronic kidney disease (kidneys), bladder cancer
- Loss of reproductive capacity, birth deformities, genetic mutations (reproductive system)
- Aplastic anaemia leukemia (blood)
- Dermatitis (skin)

NB: some effects can be both acute and chronic

A 'safe' level of exposure?



Exposure standards—

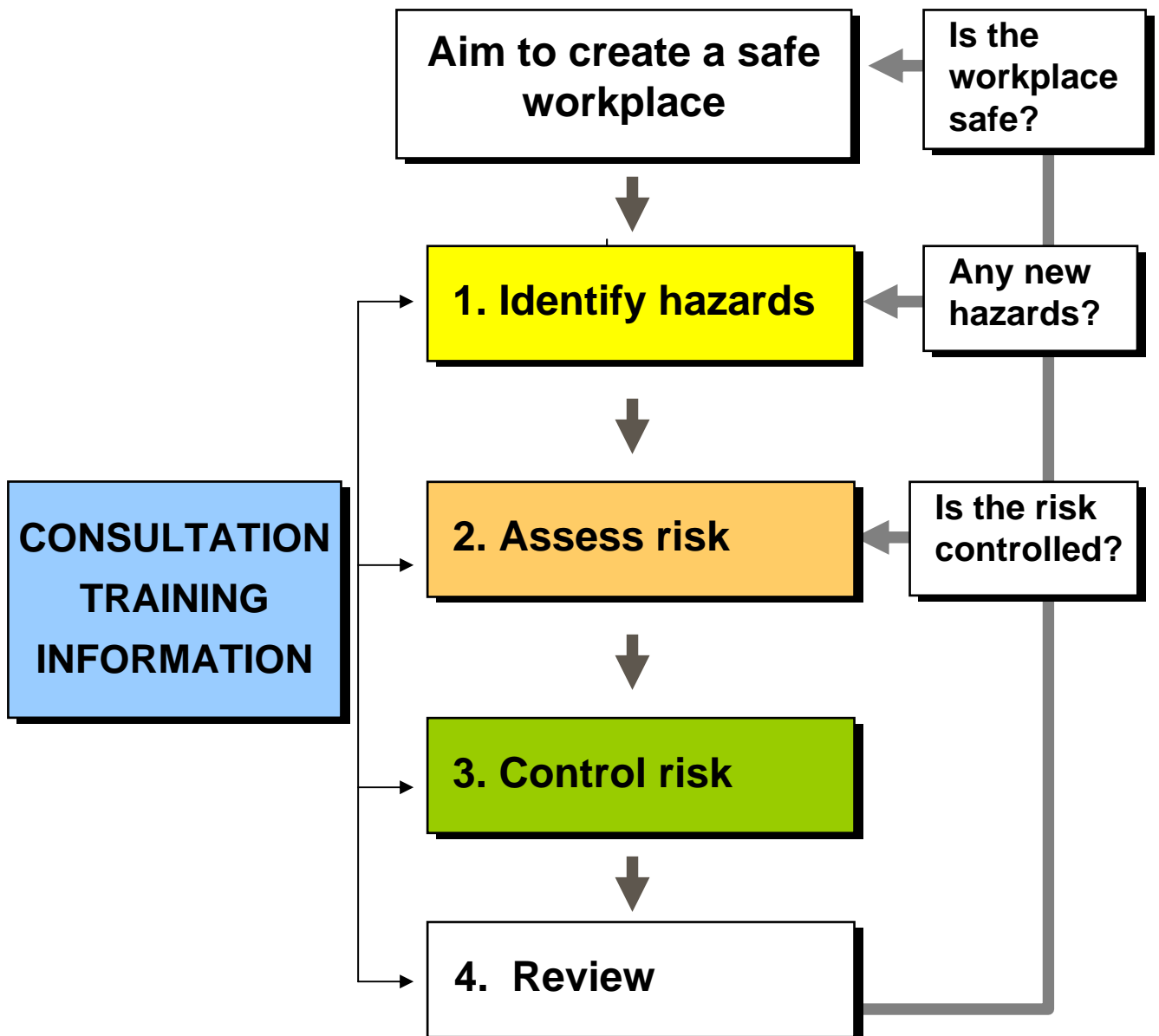
'Airborne concentrations of individual substances [in a person's breathing zone], which, according to current knowledge, should neither impair health nor cause undue discomfort to nearly all workers'

Not fine dividing lines between safe and dangerous concentrations

Concentration must be kept as low as practicable below any exposure standard

Topic 2.

A systematic approach



Consultation

- ⌘ **Regulations:** Health and safety representatives must be consulted when assessing and controlling risks arising from the use of hazardous substances
- ⌘ **Code of Practice:** Recommends consultation with employees, as well as health and safety representatives:
 - when identifying hazardous substances, to establish priorities for assessment;
 - during the risk assessment process;
 - when determining which control strategies should be applied;
 - when reviewing the effectiveness of control measures



Induction and training



Training should take account of:

- ⌘ employees' existing knowledge and expertise
- ⌘ language and literacy levels
- ⌘ adult learning principles
- ⌘ needs of people of non-English speaking background

Training for people who use or maybe exposed to hazardous substances must cover:

- ⌘ nature of the risk
- ⌘ the need for and proper use of safety measures

Induction and training



Other topics that should be covered are:

- ⌘ hazard ID, risk assessment and control processes
- ⌘ first aid and emergency procedures
- ⌘ reasons for monitoring and health surveillance
- ⌘ employees' rights and obligations
- ⌘ MSDSs, labels, the Hazardous Substances Register

Information on labels

- ⌘ product name
- ⌘ details of Australian manufacturer or importer
- ⌘ the word “hazardous” (or other “signal” words if relevant)
- ⌘ information relating to each ingredient
- ⌘ relevant health & safety information



Labelling requirements



Employers must ensure containers are labelled with manufacturers or importer's label

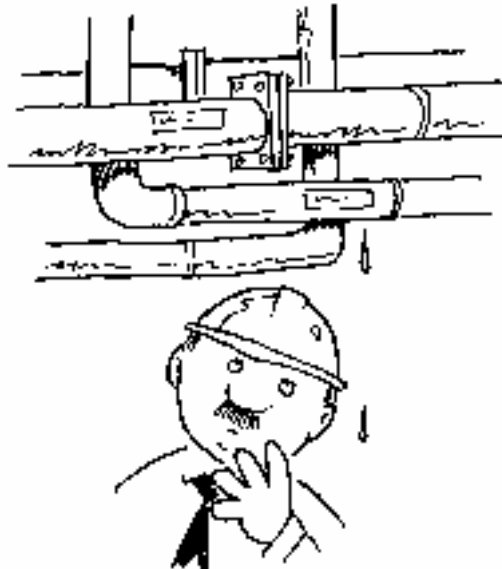
Label must remain legible and not be defaced or altered

⌘ Exceptions

- Substances contained in systems
- Decanted substance

Labelling requirements

- ⌘ Hazardous substances contained in a system
eg: pipes, reactor vessels
 - Must be identified to employees potentially exposed to them



Decanted substances



- ⌘ Decanted substances ie:
hazardous substances transferred from the original container to another one
- Need to be clearly labelled with the product name or
 - Identified in some other way or
 - Don't need a label if the substance is used immediately and the container cleaned immediately after use, or
 - Contents/residue neutralised, cured or chemically deactivated after use

Information on an MSDS



- ⌘ Hazard statement
- ⌘ Company details
- ⌘ Identification, including
 - ⌘ product name
 - ⌘ chemical and physical properties
 - ⌘ ingredients (name and proportions)
- ⌘ Health hazard information:
 - ⌘ health effects
 - ⌘ first aid
- ⌘ Precautions for use
 - ⌘ including exposure standard if any
- ⌘ Safe handling information
- ⌘ Date prepared or last reviewed

Topic 3. Identifying hazardous substances

- ⌘ The Hazardous Substances Register
- ⌘ Locating substances currently used in the workplace
- ⌘ Are they hazardous?
- ⌘ What about new substances?



The Hazardous Substances Register



Minimum required:

- ⌘ List of all hazardous substances used in the workplace
- ⌘ current MSDS for each hazardous substance

Must be accessible

Can also contain information about:

- ⌘ Risk assessments
- ⌘ Safety measures

Exemptions for retailers



- ⌘ Don't have to keep a Register of Hazardous Substances for goods intended for retail sale (only those actually used)
- ⌘ Exemption applies as long as the substance is in consumer packages which are handled without opening them

Still have general duty of care to maintain a safe workplace and to obtain copies of current MSDS for all hazardous substances.

Identifying hazardous substances

Locating substances currently in use:

- ⌘ Inspect workplace
- ⌘ Talk to employees
- ⌘ Check company records

Also consider by-products and waste products



Checking for msds in file



Are they hazardous?

- ⌘ Check the MSDS
- ⌘ Check the label
- ⌘ Ask the manufacturer, importer or supplier
- ⌘ Look for the substance or the ingredients on the NOHSC list.



New substances



Is it hazardous? To determine:

- ⌘ request information from the supplier through purchasing guidelines, tenders, etc.
- ⌘ request information from different suppliers
- ⌘ talk to other workplaces
- ⌘ check labels and check whether MSDS supplied states product is hazardous

Ensure new hazardous substances are added to the Register.

Topic 4. Risk assessment



Steps:

- ⌘ gather and review **information about the substance**
- ⌘ analyse the **nature of the work** involving the substance
- ⌘ **evaluate the risk**

Record keeping and review

Information about the substance



- ⌘ forms and possible routes of exposure
- ⌘ health hazard information
- ⌘ precautions for use and safe handling information

How?

- ☑ Label
- ☑ MSDS
- ☑ alternative sources of information

Information about the substance



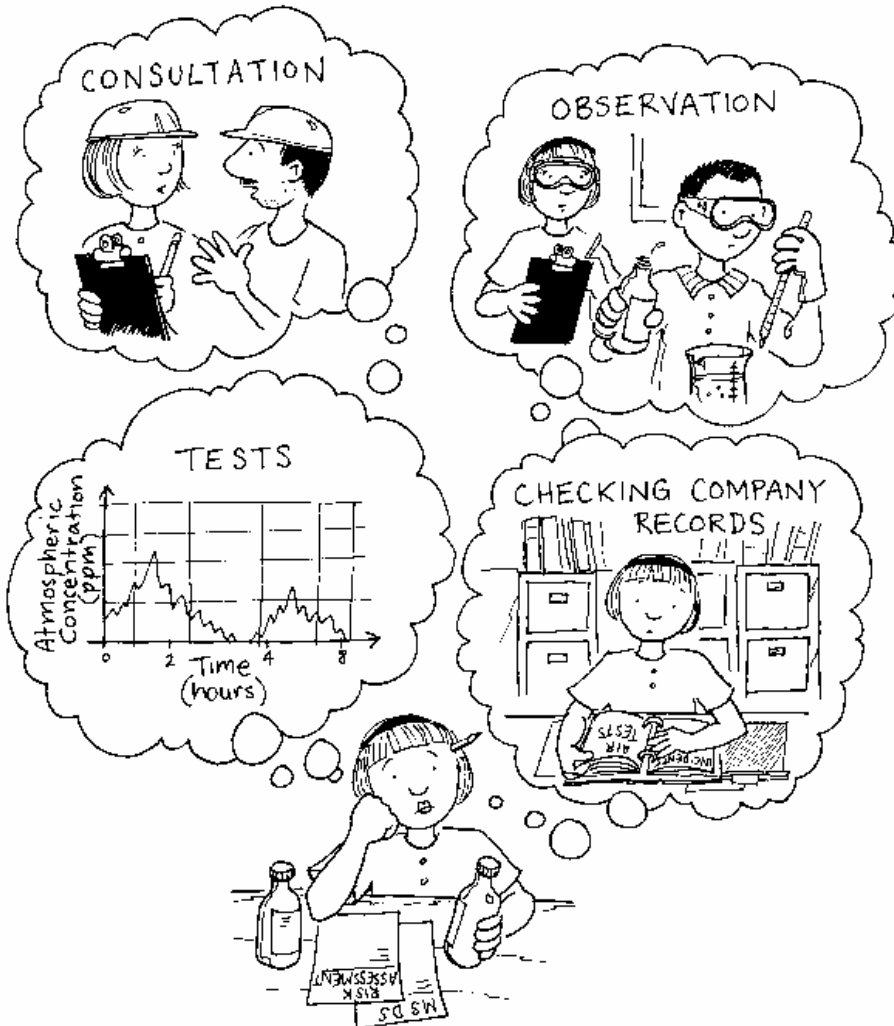
Nature of the work



- ⌘ How is the substance used?
- ⌘ How people might be exposed?
- ⌘ The “nature” of the exposure (how often? for how long? how much?)
- ⌘ Who is or will be exposed?
- ⌘ Are health effects present?
- ⌘ Safety measures in place and their effectiveness?

How?

- ☑ consultation
- ☑ observation
- ☑ tests
- ☑ company records



Generic assessments



- ⌘ when a substance(s) is used in same or very similar ways at a number of workstations
- ⌘ one “generic” risk assessment can be made for all these workstations
- ⌘ employer is responsible for ensuring a generic assessment is appropriate and all risks have been taken into account

Evaluating the risk (1)



For substances **currently in use**, possible outcomes are:

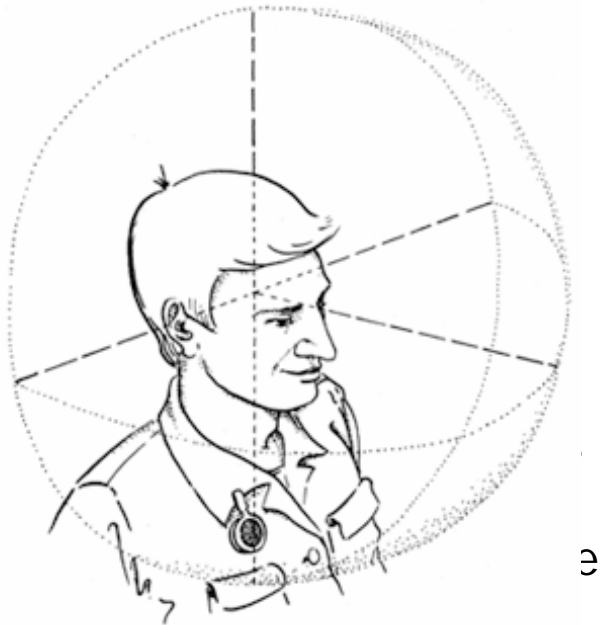
- ⌘ **no likelihood** of injury or illness
- ⌘ **likelihood** of injury or illness
- ⌘ risk **uncertain**
 - ☒ more information about the substance needed
 - ☒ more detailed examination of the work needed
 - ☒ Often expertise required to gather or interpret information

Monitoring and health surveillance

Atmospheric monitoring

- ⌘ taking measurements to estimate the level of airborne contaminants in the air inhaled by employees
- ⌘ results compared to exposure standards
- ⌘ must be carried out in certain circumstances

- ⌘ The breathing zone - a sphere extending in front of a person, with the mid-point of an imaginary line between the mouth and nose as the center



Health surveillance

- ⌘ assessing whether a person's health is being affected by exposure
- ⌘ includes "biological monitoring" – testing blood, urine or exhaled air to see how much of a substance has actually entered a person's body
- ⌘ must be carried out in certain circumstances

Blood tests



eye checks



Evaluating the risk (2)



For **new substances** being introduced to the workplace:

- ⌘ risk must be assessed before the substance is first used
- ⌘ the task or process should be designed to eliminate or minimise risk from the outset.

Outcomes:

- ⌘ injury or illness **unlikely**, or
- ⌘ injury or illness **likely**, or
- ⌘ risk **uncertain** - get further info/assistance

NB: Implement safety measures and repeat the assessment once the substance is in use

Record keeping & review



- ⌘ outcomes of risk assessments must be documented
- ⌘ records must be kept while the assessment is still relevant
- ⌘ records must be accessible to employees

Assessments must be reviewed and revised:

- ⌘ at least every five years
- ⌘ when circumstances change

Topic 5. Controlling risk



Risk must be eliminated or if not practicable, reduced to as low as “practicable”

- ⌘ What does “practicable” mean?
- ⌘ Developing control (safety) measures
- ⌘ The hierarchy of control
- ⌘ Making sure safety measures work as intended

“Practicable”



- ⌘ **severity of the hazard or risk**
severe hazards and risks treated urgently
- ⌘ **the state of knowledge**
staying up to date on the hazard, risk and controls
- ⌘ **suitability and availability of ways to reduce risk**
relating to the workplace, the task, the employees involved
- ⌘ **cost**
of effective controls, (of ineffective controls that fail)

Controlling risk



For substances **currently in use**:

⌘ risk control involves changing equipment or processes if a risk exists

For **new substances**:

⌘ risk control (or safety) measures should be put in place before the substance is introduced to the workplace

Consider safety measures when planning a new workplace or modifying an existing workplace

The hierarchy of control



Level 1. Elimination

Level 2. “Safe place” options

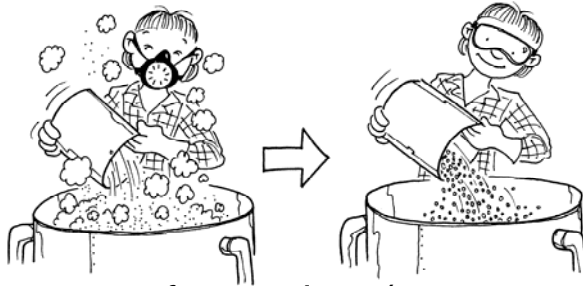
- Substitution
- Isolation
- Engineering controls

Level 3. “Safe person” options

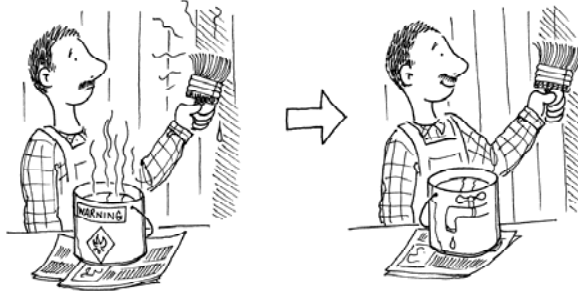
- Administrative controls/
safe work practices
- Personal protective
equipment

Level 2. “Safe place” options

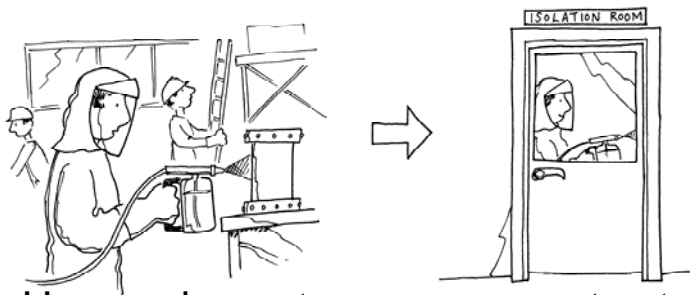
Substitution – use a safer form of the product (eg. pellets instead of powders)



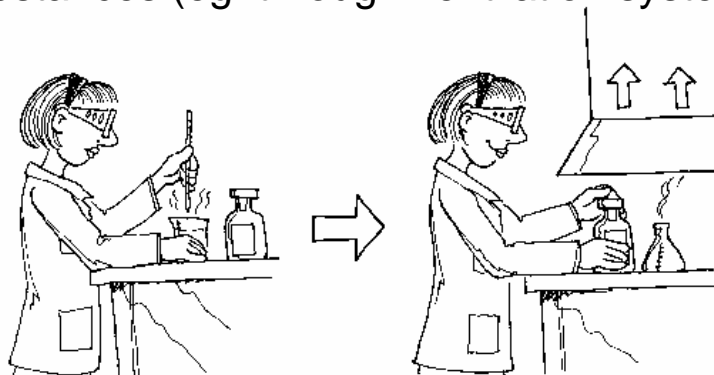
Substitution – use a safer product (eg. use water based paint rather than oil based paint)



Isolation – Separate people from a process by distance or barriers



Engineering – Use equipment or processes, to stop or remove unwanted substances (eg. through ventilation systems)

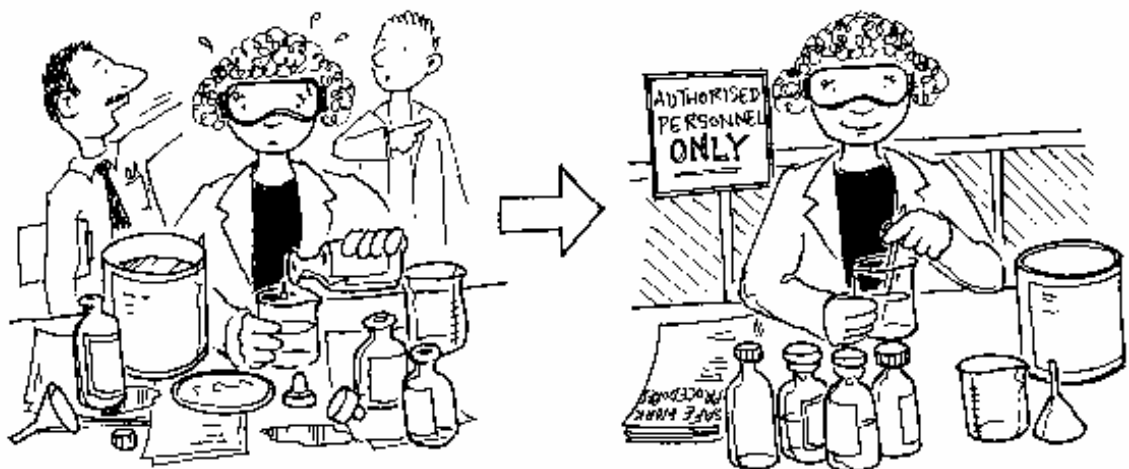


Administration controls

⌘ Are safe work practices which help to reduce employee exposure to hazardous substances. For example:

- Restricting access to certain areas at certain times
- Good housekeeping, including regular cleaning of work areas
- Changing purchasing procedures so substances are supplied in ready-to-use containers and decanting is not required

Administrative controls

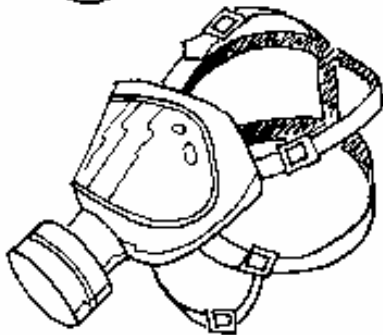
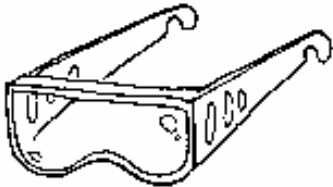


Personal protective equipment (PPE)

Only used:

- ⌘ if you can't reduce the risk enough by other means
- ⌘ or as a temporary measure

TYPES OF PPE





PPE should:

- ⌘ meet the relevant Australian standard
- ⌘ be appropriate to its application
- ⌘ be issued to an individual, not shared
- ⌘ be properly, stored, cleaned and maintained

Making sure safety measures work as intended



- ⌘ Safety measures maintained and reviewed as part of normal workplace routine
- ⌘ Air monitoring or sometimes health surveillance might be used to monitor effectiveness *NB: they are not control measures*
- ⌘ Health surveillance and air monitoring should not be used instead of safety measures

Topic 6. Maintaining a safe workplace



Planned processes and procedures to support the systematic approach to hazardous substances

General

- roles, responsibilities and accountability established
- mechanisms for consultation and joint problem-solving
- injuries, ill-health and incidents recorded, investigated and analysed
- mechanisms for ensuring that employees receive appropriate induction and training

Supporting the systematic approach



Hazard identification

- tendering and purchasing procedures adjusted to consider health & safety
- inspection procedures - labels, MSDSs
- maintenance of the Hazardous Substances Register

Risk assessment

- risk assessment procedures
- policies and procedures for atmospheric monitoring and/or health surveillance
- procedures to ensure the required records are kept
- protocols for updating risk assessments
- mechanisms to consider risks from hazardous substances when designing or purchasing new equipment or processes


Supporting the systematic approach

Risk control

- regular inspections to ensure substances are being used and stored as required by the risk assessment, whether control measures are in place and working adequately
- procedures for maintenance and checking the effectiveness of controls
- procedures for staying up to date with current knowledge and information
- procedures for emergencies and adequate first aid facilities

Anything else?

Occupational Health and Safety (Hazardous Substances) Regulations 1999



- ⌘ Manufacturers or importers must classify substances and provide information (MSDS and labels)
- ⌘ Suppliers must provide MSDSs and ensure containers are labelled
- ⌘ Employers must identify hazards, assess and control risks to health
- ⌘ Additional duties apply to scheduled carcinogens.
- ⌘ The *Occupational Health and Safety Act 1985* applies if the Regulations do not.