

Fact sheet

Formaldehyde: health effects

Formaldehyde is a naturally occurring substance which can also result from man made sources. While formaldehyde is a relatively common chemical, it is quickly broken down in the environment and the body.

The effects on human health depend on the concentration of formaldehyde and the extent of exposure.

What is formaldehyde?

Formaldehyde is a colourless, highly flammable, pungent smelling gas that enters the environment from man-made sources (e.g., manufacturing industries) and natural sources including bush fires. It is even produced in very small, non-harmful amounts by our bodies.

What happens to formaldehyde in the environment?

Formaldehyde does not persist for long in the environment. When it is present in air, most of it degrades to molecular hydrogen and carbon monoxide. When formaldehyde is present in water, it is rapidly hydrated to form glycol. Formaldehyde is not commonly found in soil although it has been measured in soils around manufacturing plants where phenol/formaldehyde resins are used.

How might I be exposed to formaldehyde?

Food & water

Formaldehyde occurs naturally in a variety of foods (e.g., some fruits, fish, processed foods and alcoholic beverages). The Australian Drinking Water Guidelines set a health-based limit for formaldehyde of 0.5 mg/L for potable (drinking) water.

Consumer products

Formaldehyde and its derivatives are present in a wide range of consumer products where it is used as a preservative to protect from spoilage due to microbial (bacteria and mould) contamination (e.g., in household cleaning agents, dishwashing liquids, fabric softeners, shoe care products, car shampoos and waxes, carpet cleaning products, disinfectants and glues).

Formaldehyde is also present in smoke resulting from the combustion of tobacco products and wood fires.

Cosmetics

Formaldehyde has been used in the cosmetic industry as a preservative (e.g., hair products, lotions, makeup and mouth washes), in nail treatments as a hardener for fingernails, and as a manufacturing equipment sanitiser. Formaldehyde is also an ingredient in hand cream, bath products, mascara and eye makeup, cuticle softeners, nail creams, vaginal deodorants and shaving cream. When you use nail polishes or nail hardeners, formaldehyde is released into the air.

Clothing and fabrics

Formaldehyde-releasing chemicals are used as flame-retardants and to provide crease resistance in textiles and as a binder in textile printing. Durable-press or permanent-press resins containing formaldehyde have been used in cotton and cotton-polyester fabrics since the mid 1920s to minimise wrinkles during wear and laundering. Manchester and clothing that contains formaldehyde can give off moderate amounts of formaldehyde into the air which can be more noticeable when the packaging is initially removed from new items. Formaldehyde may also be breathed in when wearing new clothes that release the gas.

Indoor air

Formaldehyde released from building materials has long been recognised as a significant cause of elevated formaldehyde levels that are frequently measured indoors. Pressed wood products (e.g., particleboard, medium density fibreboard



and hardwood plywood) are considered to be the major sources of formaldehyde in homes. Formaldehyde released from carpets, carpet backings, vinyl floors, wall coverings and some insulation products has also been reported with higher exposures being more likely in newly built or furnished homes.

Formaldehyde is also produced when using open fireplaces and un-flued gas or kerosene heaters.

Workers exposed to formaldehyde (e.g., clothing or furniture manufacturers and laboratory workers) will be exposed to higher levels of formaldehyde than the general population.

Outdoor air

The largest man-made source of formaldehyde in the environment is the combustion of fuel and therefore it is found in the air we breathe every day that is polluted by motor vehicle exhausts. Although formaldehyde is not present in petrol, it is produced by incomplete combustion which occurs in internal combustion engines. The amount of formaldehyde generated depends on the composition of the fuel, the type of engine, the emission control applied, and the age and state of repair of the vehicle.

Formaldehyde is produced from many industrial activities and will be present in the air due to emissions from various industrial sites.

How can formaldehyde affect my health?

Formaldehyde is water soluble and rapidly metabolised in the body when you breathe, drink or eat it. Very small amounts may also be absorbed through your skin. Health effects caused by exposure primarily involve the body organs that first come into contact with formaldehyde e.g. eyes, lungs, mouth, and skin.

The major toxic effects caused by acute formaldehyde exposure by inhalation are eye, nose and throat irritation and effects

on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains and bronchitis. In the case of respiratory symptoms move to fresh air and seek medical advice through the Poisons Information Centre (13 11 26) or if severe symptoms present call the Emergency helpline (000 or 112 from mobile phones).

Formaldehyde, at levels commonly present in consumer goods, can be irritating to the eyes, nose, throat and the lungs. These sensory irritations are commonly described as itchy, sore or burning sensations. At concentrations higher than those associated with sensory irritation, formaldehyde may contribute to small, reversible effects on lung function. Some people are more sensitive (i.e. hypersensitive) to formaldehyde effects than others. For the general population, skin exposure to formaldehyde solutions with concentrations of around 1-2% is likely to irritate skin. However, hypersensitive people can develop contact dermatitis after exposure to concentrations of formaldehyde as low as 0.003%.

There is no evidence to suggest that formaldehyde causes birth defects in humans or that formaldehyde absorbed by the mother can be transferred to the baby across the placenta or in breast milk.

Studies in workers exposed to formaldehyde in the air found more cancer cases than expected. Based on human and animal studies, international authorities have determined there is enough evidence to suggest that in high enough doses and with long periods of exposure (e.g., many years) formaldehyde is carcinogenic (i.e. cancer-causing) in humans.

As exposures can occur from many sources in our everyday life, every effort should be made where possible to minimise any unnecessary exposure to formaldehyde for you and your family to reduce risk of health effects and sensitisation (i.e. becoming hypersensitive).



How can I reduce my risk of exposure to formaldehyde at home?

- Adequate ventilation is particularly important when using formaldehyde-containing products e.g. nail polish and after installing new furniture or carpet. Levels of formaldehyde in the air are usually higher indoors than outdoors; therefore fresh air can lower formaldehyde levels in the home.
- Avoid or minimise exposure to cigarette smoke especially by not smoking indoors.
- Avoid using un-flued gas or kerosene heaters indoors.
- Minimise the number of formaldehyde-containing consumer and cosmetic products used in the home to reduce dermal exposure and formaldehyde release indoors. This can be difficult as formaldehyde is not required to be listed as an ingredient on some household chemicals. Hypersensitive people should contact product manufacturers to find out if formaldehyde is an ingredient before choosing to use specific products.
- Washing new clothes prior to wearing and washing or airing new toys and other consumer products before use, particularly if an odour is detected, can lower exposure to formaldehyde.

Where can I get more information?

Formaldehyde

<http://www.who.int/ipcs/publications/cicad/en/cicad40.pdf>

For more information

**Scientific Services
Public Health
SA Health**

**PO Box 6, Rundle Mall
Adelaide SA 5000
Telephone: 08 8226 7100
www.health.sa.gov.au**

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