Facts About Vapes (e-cigarettes) 2: Health Outcomes and Other Risks

What are the risks of vaping?

Vaping may be less harmful than smoking cigarettes, but it is not harm free. The liquids used in vapes contain a range of toxic chemicals. It is difficult to know how harmful vaping might be in the long term because:

- vapes have not been around long enough for all the effects to show;
- not enough research looking at health effects has been completed;
- people who vape are usually former smokers or dual users, so it can be difficult to separate the effects of vapes from cigarette use.

What toxic chemicals are in vapes?

An Australian Government Report (2019)[1] identified 243 different chemicals that were used as ingredients in vape liquids. The majority of these (235) were flavouring chemicals. They also identified 27 chemicals produced as part of the vaping process and 106 contaminants. Many of these chemicals can be harmful to human health. Others have unknown effects. A total of 38 chemicals identified in this report are classified as poisons including:

- formaldehyde;
- acetone;
- arsenic;
- heavy metals (e.g. cadmium, copper, lead).

Three of the chemicals classified as poisons were found to be at toxic levels:

- ethylene glycol (used in anti-freeze);
- propylene oxide (used in the manufacture of some plastics);
- acrolein (used in the manufacture of some plastics).

A 2021 study from Curtin University[2] identified a number of chemicals in vapes that are known carcinogens (cancer-causing chemicals). A number of vapes tested also included nicotine, even though this was not a declared ingredient. You can find out more about this study, the range of chemicals they found and the health risks by listening to this short podcast[3].

What do we know about the health outcomes of vaping?

The best evidence we have of the health effects of vaping comes from a review of the evidence produced by the Australian National University (ANU) in 2023[4]. They rated the strength of the evidence for a range of health outcomes as shown in Figure 1[5]. The authors noted that there is still not much evidence about the health effects of vaping. This means we can only say there is not enough (insufficient) evidence to draw clear conclusions about whether or not vaping causes certain health problems. This is not the same as saying vaping does not cause these health effects – we just don't have enough evidence one way or the other.

Conclusive Evidence	· Poisoning and immediate inhalation toxicity (including seizures) particularly in children and adolescents · Injuries and burns caused by malfunctioning devices · E-cigarette or vaping product use-associated lung injury (EVALI) especially if e-liquids contain tetrahydrocannabinol (THC)	
Substantial Evidence	· Vapes containing nicotine cause dependence or addiction in people who do not smoke	
Moderate Evidence	· Headache · Dizziness · Cough · Throat irritation	· Nausea · Increased heart rate · Increased blood pressure · Stiffening of the arteries
Insufficient Evidence	· Respiratory health · Cardiovascular disease · Cancer · Mental health · Development in children and adolescents · Reproductive health · Sleep	· Wound healing · Neurological conditions (other than seizure) · Endocrine conditions · Eye health · Nose health · Allergy · Blood diseases

Strength of evidence

Figure 1: Health Effects of Vaping

What are the risks to passive bystanders?

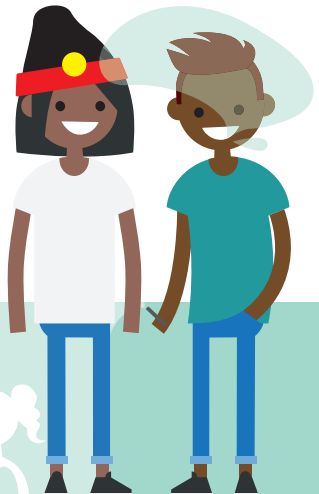
ANU's recent review found conclusive evidence that vaping indoors increases toxins in the air, but limited evidence of increased concentrations of nicotine in the air or on surfaces. Although the aerosol produced by vapes is probably less harmful to bystanders than cigarette smoke, it is unlikely to be completely harm free. For example, there is some evidence that exposure to this aerosol can irritate the nose, throat and lungs of bystanders.

What are the other health risks of vapes?

As well as the direct health impacts of vaping, there is substantial evidence that vapes are a cause of fires and environmental waste both of which impact on human health. The environmental waste[6] produced by vapes includes:

- non-biodegradable plastics;
- electronic waste;
- hazardous chemical waste.

A further risk to the health of young people comes from the strong evidence that vaping leads to smoking. Learn more about young people and vaping in the third factsheet in this series: Vaping in Australia.



1 https://www.industrialchemicals.gov.au/sites/default/files/2020-08/Non-nicotine%20liquids%20for%20e-cigarette%20devices%20in%20Australia%20chemistry%20and%20health%20concerns%20%5BPDF%201.21%20MB%5D.pdf
2 https://onlinelibrary.wiley.com/doi/epdf/10.5694/mja2.51280
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