An electronic cigarette (e-cigarette) is a battery-operated device that emits doses of vapourised nicotine, or non-nicotine solutions, for the user to inhale. Also known as e-cigs, electronic nicotine delivery systems, vapouriser cigarettes, and vape pens, personal vapourisers are often marketed as a way to stop or cut down on smoking.

Many health professionals are very cautious about the benefits of e-cigarettes in smoking cessation. According to the Australian Medical Association (AMA):

The evidence on e-cigarettes, and their role in cessation and the risk they pose to young people, is not conclusive. For this reason, the Australian Medical Association (AMA) supports a precautionary approach. We recognise that, where there is potential to do harm, caution must be exercised.

This view is shared by a range of health and medical organisations: Cancer Council Australia, Cancer Australia, the Heart Foundation and the Thoracic Society of Australia and New Zealand, to name a few.  

However, in its Report on the Inquiry into the Use and Marketing of Electronic Cigarettes and Personal Vaporisers in Australia, the House of Representatives Standing Committee on Health concludes that:

Considering the potential to reduce the devastating burden of tobacco related disease in people with SMI [severe mental illness], we believe there is strong justification for amending the laws of Australia and New Zealand to allow improved access to low concentrations of nicotine for use in e-cigarettes.

While nicotine-free e-cigarettes and refill liquids are readily accessible, nicotine liquid is not available for purchase except illegally through an unregulated black market. The current laws which restrict access to much less harmful options such as nicotine-containing e-cigarettes, while the most harmful nicotine product (tobacco cigarettes) remains widely accessible, are unscientific and raise serious ethical concerns.

We have therefore formed the conclusion that nicotine e-cigarettes should be available as a consumer good to Australians, subject to regulations which will limit their appeal to non-smokers and young people. 2

**e-Cigarettes and young people**

While e-cigarettes may help existing smokers to give up smoking, there is concern that young people are starting to ‘vape’ for its own sake, and not to replace tobacco use. In December 2016, the U.S. Surgeon General issued a report 3 that made a number of conclusions and findings about the use of e-cigarettes among youth. These included that the flavours in e-cigarettes are one of the main reasons young people use them, that e-cigarette aerosol is not safe – mainly because it is not regulated – and that e-cigarette use is strongly associated with the use of other tobacco products among youth and young adults.

A *Medical Journal of Australia* article 4 also raised concerns that e-cigarettes may act as a gateway to tobacco smoking. The authors argued that any move to regulate e-cigarettes in Australia must take this risk into account.

Other research links the use of e-cigarettes in young people to tobacco use, with a

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Scottish study of 2017 concluding that young never smokers are more likely to experiment with cigarettes if they have tried an e-cigarette. Causality cannot be inferred but continued close monitoring of e-cigarette use in young people is warranted.

**Regulation of the e-cigarette industry**

Given the rapid growth of the e-cigarette industry, the increase in the unregulated manufacturing of e-liquids in China and their questionable impact on health, there has been mounting pressure to regulate them in line with traditional tobacco products. Regulations need to balance the risks of e-cigarettes with their potential benefits – and achieve key aims of reducing smoking and continuing to avoid uptake of e-cigarettes by non-smokers. This requires keeping them under regular review and evaluating their impact. Suggested regulations include:

- Restrictions on their sale to minors.
- A ban on vaping in public places.
- Testing and labelling requirements.
- Restrictions on advertisements and online selling.
- Regulation and standardisation of flavourings, which are not identified on labels, and can be a combination of volatile and potentially toxic chemicals.

**Evaluation of e-cigarettes**

E-cigarettes haven’t been thoroughly evaluated in scientific studies and there is currently not enough existing data on their safety, how the health effects compare to traditional cigarettes and if they are helpful for people trying to quit smoking. One problem in evaluating e-cigarettes is that they can vary greatly in their design, nicotine concentration (ranging from none to relatively high levels), flavourings, and other compounds emitted. Currently, it is assumed that the levels of potentially toxic chemicals emitted are lower than those from tobacco cigarettes, but this is not clear, as there is so much variability and the extent of risk reduction is presently unknown.

Generally, most research so far suggests that e-cigarettes are less harmful than cigarettes when people who regularly smoke switch to them as a complete replacement. Some tobacco researchers and organisations, including Public Health England and the Royal Australian and New Zealand College of Psychiatrists have advocated for the use of e-cigarettes to assist quitting. The U.S. Centers for Disease Control and Prevention (CDC) conclude that e-cigarettes can benefit adult smokers who are not pregnant, as long as they completely replace any other nicotine or tobacco products. However, besides pregnant women, the CDC add that vaping is not suitable for young people or those who have never smoked before.

Concerns remain regarding the robustness of evidence for the efficacy of e-cigarettes as a cessation aid, product safety, tobacco industry action in the area, and the potential for e-cigarette experimentation in youth to increase the risk of subsequent smoking and nicotine dependence. Nevertheless, the reduced exposure to toxicants of well-regulated e-cigarettes used by established adult smokers as a complete substitution for cigarettes is likely to be less damaging to the smoker than conventional cigarettes or other combusted tobacco products.

According to CSIRO researchers, when e-cigarettes are used by smokers instead of conventional cigarettes there is evidence for improvement in individual health. However, use of e-cigarettes may also introduce independent health risks, and ‘dual use’ (using both e-cigarettes and conventional cigarettes) is popular.

There is some evidence that e-cigarettes may damage a person’s health. Existing evidence shows that e-cigarette aerosol is not merely water vapour as is often claimed in the marketing of these products. The US National Institute on Drug Abuse refers to a number of studies and concludes that:

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e-Cigarette use exposes the lungs to a variety of chemicals, including those added to e-liquids, and other chemicals produced during the heating/vaporizing process. A study of some e-cigarette products found the vapor contains known carcinogens and toxic chemicals, as well as potentially toxic metal nanoparticles from the device itself. The study showed that the e-liquids of certain cig-a-like brands contain high levels of nickel and chromium, which may come from the nichrome heating coils of the vaporizing device. Cig-a-likes may also contain low levels of cadmium, a toxic metal also found in cigarette smoke that can cause breathing problems and disease. More research is needed on the health consequences of repeated exposure to these chemicals.10

Another area for concern is the presence of the chemical diacetyl used in many electronic cigarette flavours. This chemical can lead to bronchiolitis obliterans or ‘popcorn lung’, and some companies which previously used it to flavour microwave popcorn have stopped using it altogether. According to the American Lung Association, using electronic cigarettes or vaping, particularly the flavoured varieties, can cause this condition. 11

What we need to know about e-cigarettes

As e-cigarettes are a relatively new product, there is very limited evidence available for their long-term use. For policy makers this poses a potential dilemma as making regulatory changes to legalise nicotine e-cigarettes may come with significant risks. Conversely, not making e-cigarettes available deprives smokers of a potentially useful tool to help them quit. There are a number of questions that have not been fully answered yet including:

- What are the longer-term success rates of people who use e-cigarettes for quitting compared with other stop smoking treatments?
- Does the uptake of e-cigarettes after quitting prevent relapse back to smoking?
- We need more data examining the number and quantities of some metals in e-cigarette aerosol – is it even greater than that in traditional cigarettes, and / or above accepted health-based limits?
- Although some manufacturers have claimed their flavourings are generally recognised as safe for food additives (i.e., to be used in preparing foods for eating), we need to know about the long-term health effects of inhaling these substances into the lungs (for example, the chemical causing ‘popcorn lung’ described above).
- We also need more information about the risk to others from second-hand exposure.

In summary, a recent literature review update published by the CSIRO concludes that, based on the current evidence it is not possible to determine whether e-cigarettes have a positive or a negative effect on health in countries where they are permitted.12

e-Cigarettes, smoking cessation and mental illness

It is consistently reported in the United States, the United Kingdom, and Australia, that smoking is two to three times more prevalent among people with mental illness, when compared with the general population. Smoking prevalence is particularly high (almost fivefold greater) among those with schizophrenia, bipolar disorder, post-traumatic stress disorder (PTSD), and alcohol/illicit drug use disorders. Smoking prevalence increases with a greater number of mental disorders, ranging from 18% for people with no mental illness to 61% for people diagnosed with 3 or more mental disorders.13

As far as people diagnosed with schizophrenia (the group with the highest smoking rates in this cohort) are concerned, an international team of scientists found that hypofrontality, decreased activity in the brain’s prefrontal cortex leading to cognitive issues like troubles

with memory and decision-making, may explain why so many in this group are heavy smokers. The research showed that a genetic mutation, previously linked to a greater risk of schizophrenia, is also linked to the decreased function in the frontal lobe. They claim that nicotine reverses this problem because the addictive chemical acts on receptors in regions of the brain key to healthy cognitive function. Many commentators believe that these findings will ultimately lead to non-addictive, nicotine-based therapies for patients with schizophrenia.14

An article in the Australian & New Zealand Journal of Psychiatry states that patients who are not able or willing to quit smoking using conventional methods or who express interest in using e-cigarettes should be provided appropriate counselling and information about the risks and benefits of switching to e-cigarettes and supported in their efforts to do so. New approaches are urgently needed to address the persistently high smoking rates in this priority population. Tobacco harm reduction by switching to e-cigarettes has the potential to substantially reduce the health, financial and social equity gap experienced by this disadvantaged group.15 16

Although, according to many sources, the use of e-cigarettes is considered effective in helping people with severe mental illness to quit smoking, it is important to keep in mind that:

- Smoking interacts with both psychiatric and non-psychiatric medications commonly used by people with mental illness.
- Smoking can change the way the body absorbs/responds to medication, which can cause side effects if someone starts, quits, or changes their smoking habits and some people may need dose adjustment when quitting or reducing smoking or when resuming smoking following abstinence.