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What Works

Tobacco Harm Reduction and Vaping



Brigid Clancy, Associate
Linda Jenner, Associate
Professor Nicole Lee, CEO

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360edge.

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hello@360edge.com.au
360edge.com.au
1300 988 184

About 360Edge

We are a leading Australian health consultancy, specialising in the alcohol and other drug, mental health and allied sectors. We provide a full suite of advisory services to help health organisations accelerate change. We work with leading international organisations, governments and not for profit agencies across Australia and internationally.

Our vision is for a community that provides the best public health policy and practice responses. Our mission is to ensure governments and services have the tools they need to respond effectively and efficiently to people who use the health system.

We strongly believe in social justice and human rights and are driven to make a positive impact in the world and strongly. It drives all of our work. We believe that everyone has the right to the opportunities and privileges that society has to offer. We strive to reduce harms and improve lives for everyone in society.

Our values of excellence, transparency and integrity are at the core of everything we do. We live these values within the team and with our customers and collaborators.

Our team of experienced 'pracademics' take a 360 approach to viewing situations from multiple perspectives. We collaboratively and holistically work with our clients at every stage, wherever they are in the cycle of change, to achieve their goals.

In the spirit of reconciliation, we acknowledge the traditional custodians of country throughout Australia and their connection to land, sea and community. We pay our deep respects to elders past, present and future, and to all Aboriginal and Torres Strait Islander peoples today.



Contents

About 360Edge	1
Why is talking about vaping important?	3
How did we get here?.....	2
A history of tobacco in Australia	2
Australia's tobacco policy	2
Tobacco use today	2
Approaches to reducing tobacco use	2
Nicotine replacement therapy	2
Non-nicotine pharmacotherapy	2
Non-pharmacological approaches.....	2
Nicotine vaping.....	1
What is vaping?.....	1
Vaping laws in Australia	2
Risks and harms from vaping	2
How do the harms compare with tobacco?	3
Can vaping help people stop smoking?.....	4
What about young people?	4
Should there be a ban on flavoured products?	5
What have other countries done?	5
Where should Australia go from here?	6
Reassessing our current policy	6
Rethinking regulation	7
The evidence sources	8

Why is talking about vaping important?

Vaping has become a topical issue in Australia and internationally in recent years. There has been passionate discourse about whether vaping is something that should be banned or encouraged.

As ABC reporter Tom Lowrey put it¹ “Depending on who you listen to, it’s either a public health solution, or a public health crisis”.

There are some who worry about the potential harms (known and unknown) associated with vaping, and who want to see greater restrictions on the availability of vaping products for fear of more non smokers and young people taking up vaping.

While on the other side of the debate, there are those who think vaping is a useful harm reduction tool that should be widely

available to reduce the use of tobacco for the public good.

Both sides want to see a reduction in the current harms our society is facing from tobacco and vaping products but have very different views about how this should be achieved.

So, what works when it comes to vaping? How dangerous is it? What reforms should we consider?

In this edition of What Works, we look at the history of tobacco use, currently available tools to quit, how we came to have nicotine vapes, the current questions and controversies surrounding vaping, and a potential path forward to manage vaping in Australia.

How did we get here?

A history of tobacco in Australia

Tobacco is made from the dried leaves of the tobacco plant. Nicotine is the active ingredient responsible for its dependence forming properties. Tobacco is most commonly smoked in a cigarette, which can be bought premade or roll your own and can also be smoked in a cigar or pipe, snorted or chewed.

Tobacco has been smoked in Australia since the early 1700s when it was introduced by Indonesian fishermen to northern First Nations communities.² It was also widespread among British colonists who arrived in 1788.^{3, 4} By the 1800s, tobacco became an essential commodity in the British settlements, with one record indicating that 80-90% of male labourers were smokers.⁵



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From 1901, the Australian Government supported the tobacco industry through preferential tariffs.⁶ During that time, many tobacco companies promoted their products by advertising that they were not only used but also recommended by doctors.

By the end of the Second World War, nearly three quarters of Australian men and more than one quarter of Australian women were smokers.⁷

From the 1950s, research began to report on a range of harmful health effects that were being linked to smoking, including lung cancer and coronary thrombosis.⁸ Later, the detrimental effects of exposure to second hand smoke, such as heart and lung disease, were identified.

Many tobacco companies promoted their products by advertising that they were used and recommended by doctors.

Australia's tobacco policy

In 1973, Australia responded to the mounting evidence of harms associated with smoking by mandating health warnings on all cigarette packs.⁹

Since then, a number of strong public health measures have been put in place to reduce tobacco smoking in Australia, designed to reduce the social appeal of smoking, reduce exposure to second hand smoke and encourage people to quit smoking entirely.¹⁰ The Tobacco Advertising Prohibition Act 1992 banned any advertising in Australia that might encourage or persuade people to use tobacco products.

Similarly, the Tobacco Plain Packaging Act 2011 intends to reduce the visual appeal of tobacco products by mandating retail packaging to be in a drab colour and to not display logos, brand images or promotional text.¹⁰

In an effort to make smoking less affordable, the price of tobacco products in Australia has risen considerably since the 1990s through increases in taxes and excise.⁹ A single cigarette was about 19 cents in 1990, compared to about \$1.40+ in 2023.¹¹ A pack a day smoker may now need to spend around \$1,000 per month on cigarettes.

From 1986, smoking started to be banned in workplaces and public spaces⁹ and today those laws extend to banning smoking in enclosed public places such as restaurants, public transport, schools, public buildings and near children's play equipment.¹⁰ It is also illegal to smoke in a car with a minor inside.

Tobacco use today

As a result of consistent public policy and better education, we have seen a significant fall in the number of people who use tobacco in Australia from 24% of the population in 1991, to only 11% in 2019.¹² Nearly two thirds of Australians in 2019 had never smoked.¹²

While rates of disease associated with tobacco have decreased, tobacco is the cause of nearly 10% of the total burden of disease and injury in Australia, making it the leading cause of preventable morbidity and mortality in Australia.^{13, 14} Thirteen percent of all deaths in Australia in 2018 were attributed to tobacco.¹³

Tobacco is still the leading cause of preventable death and disease in Australia.

In 2019, over 60% of Australians supported government policies to reduce tobacco related harm.¹⁵ However, 7 out of 9 policies received less support than they did in the 2016 survey, largely the policies concerning increasing taxes on tobacco products and making it harder to buy tobacco in shops. This could be related to the decrease in the number of people who perceive tobacco to be the drug that causes the most deaths, which dropped from 40% in 2007 to 18.7% in 2019.¹⁵

Thirty percent of Australian smokers surveyed in 2019 said they had no intention to quit.¹⁵ The main reasons were that they enjoyed smoking, it relaxed them, they were addicted to nicotine or had tried to quit before but it didn't work.¹⁵

Approaches to reducing tobacco use

Quitting smoking can be exceptionally difficult. While attempting to quit, smokers can experience numerous uncomfortable effects that for some people are perceived as intolerable. It can be so difficult that quitting smoking has been referred to as “killing your best friend” and “the most difficult thing a person can do”.^{16, 17} Because of this, quitting ‘cold turkey’ is not an option for many people and support is needed.

In Australia, there are multiple tools available to help people quit smoking such as nicotine replacement therapy and counselling which are summarised in this section. These tools have also been used to help people reduce the number of cigarettes they smoke. Realistically, not everyone who smokes will want to quit entirely and not everyone who attempts to quit will be successful.

Instead of taking a hard-line approach that cessation is the only option to improve people’s health, a harm reduction approach helps people who are unwilling or unable to quit, to reduce the harms they experience from continuing to smoke. Reducing harm benefits individual smokers, those around them, the health care system and the community as a whole.

Here we explore the tobacco cessation and harm reduction approaches currently available in Australia.

Nicotine replacement therapy

Nicotine replacement therapy was introduced in 1978 in Switzerland as a chewing gum formulation and evolved to the more widely known nicotine patch in the USA

in 1992.¹⁸ It works by providing the individual with steady doses of nicotine to combat tobacco cravings. Nicotine replacement therapy products don’t contain the toxic chemicals found in tobacco smoke and can help a person relieve their nicotine cravings without being exposed to the same level of harm as tobacco use.

The nicotine replacement therapy market has grown over the last 45 years and has developed fast acting products in many different forms. These include: ^{19, 20}

- Nicotine inhalator
- Nicotine lozenges
- Nicotine nasal spray
- Fast dissolving oral nicotine strips
- Nicotine mouth spray

Most forms of nicotine replacement therapy are available for purchase without a doctor’s prescription. Certain nicotine replacement therapy products (patches, gum and lozenges) are also available at discounted rates through the Australian Pharmaceutical Benefits Scheme (PBS). Some national and state wide organisations such as Quitline (QLD) can also provide free of charge nicotine replacement therapy products (ie. patches) if an individual expresses their interest to attempt quitting or reducing their smoking behaviours as part of a three-month quit program.

Nicotine replacement therapy is an effective way for many people to achieve long term smoking cessation.²¹ Nicotine replacement therapy also significantly increases the likelihood of people who are unmotivated to quit, to reduce the number of cigarettes they smoke.²²

For some people, a combination nicotine replacement therapy approach is more helpful.²³⁻²⁵ This is where a person uses both a long acting nicotine replacement therapy product (ie. a patch) in conjunction with a short acting nicotine replacement therapy product (ie. gum, spray or inhalator).

The aim is for the long acting form to provide constant, low dosages of nicotine to 'dull' overall cravings and prevent a state of nicotine withdrawal. The short acting form is used to address cravings that may become intolerable or 'bubble up' throughout the day.

Non-nicotine pharmacotherapy

Non-nicotine medications are also available as a first line treatment to aid people in quitting smoking. Bupropion and varenicline are the two available in Australia. They are both only available via a doctor's prescription in Australia, so they are not as accessible for smokers as nicotine replacement therapies.

Bupropion was originally developed as an antidepressant, but after users reported a decreased urge to smoke additional research was conducted which demonstrated it was a useful smoking cessation tool.²⁶ It became available in Australia in 2000 and was listed on the PBS in 2001.

There is high quality evidence that bupropion aids people in long term smoking cessation.²⁷ However, the exact mechanism by which it works to aid smoking cessation is still unknown. The more common side effects can include sleeping difficulties, dry mouth, headache, dizziness and nausea.^{28,29}

Varenicline, commonly known as Champix®, was introduced in Australia in 2008 on the PBS. It is a nicotinic receptor partial agonist. This means it binds to particular receptors in the brain that help to maintain moderate levels of dopamine, which in turn helps to reduce withdrawal symptoms and cravings. It also blocks nicotine from binding to some receptors, which is theorised to make cigarette smoking less satisfying and make it easier to quit.²⁹⁻³¹

Research supports the efficacy of varenicline.^{27,32,33} It is generally considered

to be more effective than bupropion. After nicotine replacement therapy, varenicline is the second most used smoking cessation medication across a number of countries, including Australia.²⁶

Both of these medications are not considered suitable for children under 18 years of age.²⁶

Non-pharmacological approaches

Counselling and brief interventions are two commonly recommended approaches. In fact, there is high quality evidence available that individually delivered smoking cessation counselling is effective for assisting smokers to quit.³⁴ Generally, more intensive counselling is considered to be more effective than brief counselling interventions by a small margin.³⁴

As well as face to face counselling, phone services are available such as Quitline.³⁵ A Cochrane review found moderate evidence that telephone counselling services are effective at helping people to quit smoking.³⁶ This is true whether the person seeks out the Quitline or if it is a proactive service that reaches out to people first.

Online options like the My QuitBuddy app³⁷ are also available. This has the potential to address some of the difficulties and barriers in providing smoking cessation support to some harder to reach groups.³⁸

The Royal Australian College of General Practitioners strongly recommend that behavioural support be offered alongside pharmacotherapy or nicotine replacement therapy.²⁵

Other alternative methods that some people claim aids in smoking cessation include hypnotherapy and acupuncture. However, there is no clear evidence to show that these assist in reducing harm from tobacco use or quitting smoking.

Additionally, lower nicotine or lower tar cigarettes are on the market, as are different filter products. There is no evidence that these products will aid people in quitting smoking or reduce the risk of smoking related diseases.

Nicotine vaping

What is vaping?

Vaping refers to the inhalation of nicotine or other substances produced by an electronic device.

Nicotine vaping products include e-cigarettes, e-hookahs, vape pens, nicotine vaporisers and electronic nicotine delivery systems.

The first patent granted for an electronic cigarette was first granted in 1930.³⁹ In the 1960s, the first nicotine vaping product prototype and associated patent came about,⁴⁰ but it was another 40 years until pharmacist Hon Lik created an electronic cigarette in 2003 with the hope of avoiding the fate of his father, a heavy smoker who died of lung cancer.⁴¹

Nicotine vaping products work by heating an element housed within a battery powered or disposable device. Once heated, the element vaporizes a solution (e-liquid or 'vape juice'), mainly consisting of nicotine, glycerol, propylene glycol, distilled water and flavourings.⁴²

The heating process generates an aerosol (vapour) that is inhaled. This process is commonly known as 'vaping'. Despite its appearance, the vapour is not smoke as nothing is actually burned. The exhaled vapour contains particles of chemicals produced by the vape device.

Over time, nicotine vaping products on the market have changed in design. Four generations of nicotine vaping products are generally recognised:⁴³

1. Cig-a-likes – Designed to mimic the appearance and feel of traditional cigarettes, these early devices provide the least control over heating and have lower efficiency of nicotine delivery.



Flickr: Vaper City under Creative Commons 2.0

Disposable and refillable devices are available.

2. Vape pens – These devices often resemble pens and include a manual button that users can press to regulate the length and frequency of puffs. They have a larger variable voltage compared to the previous generation.
3. Tanks or mods – This is where devices began to move away from resembling combustible cigarettes and began coming in various sizes and shapes (an example is shown in the image above). The e-liquid tanks are designed to be refillable and to hold greater amounts than previous generations. Devices are also more modifiable and allow control over voltage and wattage, which gives the user more control over different aspects of the user experience such as nicotine dosage.
4. Pods, pod mods and disposables – Small devices in a variety of shapes, sizes and colours, sometimes resembling items like lighters or USB drives. These can be fully disposable devices designed for single use or designed with a pod cartridge system that can be replaced when empty.

Vaping laws in Australia

The regulation of nicotine vaping products varies significantly from country to country, and in Australia between States and Territories.

In 2009, Australia banned the use and sale of nicotine vaping products that contain nicotine without a prescription from a doctor.

In 2021, it also became illegal for Australians to import nicotine vaping products from overseas websites without a doctor's prescription and an individual importation permit. The quantity of nicotine vaping products able to be purchased is also restricted and the prescription is valid for three months.

Vaping devices and mixtures without nicotine are legal in most states although people must be over 18 years of age to purchase them.⁴⁴

Risks and harms from vaping

One major concern with vaping is its potential for harm. High quality research into the use of nicotine vaping products has begun relatively recently and an accurate assessment of the long term health effects is yet to be described. However, existing studies provide a useful starting point.

Unregulated market

Because no vaping products can be legally made in Australia and imported products are not currently tested for safety and quality they are more dangerous than if they were properly regulated. Like illicit drugs, there is no way for users to determine consistently what they are inhaling.

There is estimated to be over 15,000 vape flavours identified for sale online. The 2019 National Industrial Chemicals Notification and Assessment Scheme (NICNAS)⁴⁵ identified 243 unique chemicals in nicotine vaping product liquids or emissions. Most of these were flavourings. Thirty-eight of the chemicals listed in that report are regarded as poisons on the Australian Poisons Standard.

The dose of nicotine delivered by vaping is highly variable, often due to the device being used rather than the e-liquid concentration.⁴⁶ Lower powered devices require e-liquids with higher nicotine concentrations than that of high powered devices to deliver the same dose of nicotine.^{47,48}

In Australia, because of the lack of regulation, vaping products purchased via the black market don't always list if they contain nicotine, nor provide an accurate nicotine concentration level on the product label.

Dependence

Nicotine vaping products may have a higher dependence potential than other nicotine replacement therapies due to the nicotine delivery speed and method used.^{49, 50} Inhaled nicotine, via a nicotine vaping product or cigarette, leads to peak blood nicotine levels within seconds and reaches the brain in less than 20 seconds.⁵⁰ In comparison, nicotine replacement therapy can take between ten minutes and nine hours to reach peak blood nicotine levels^{26,51} and 15-20 minutes until the effects of nicotine are felt.⁵²

Health effects

It is difficult to determine the true harms associated with nicotine as most populations studied have been tobacco users and tobacco is filled with other chemicals that are responsible for significant harms.⁵³

Nicotine poisoning can occur through the ingestion of nicotine e-liquid. This is a rare occurrence. Four deaths in children from nicotine poisoning have been reported globally in the last 15 years, including one death in Australia.⁵⁴

It is also possible for acute nicotine toxicity to occur through inhalation if there is a high nicotine concentration in the liquid and vapour. This can cause nausea, throat irritation and in severe cases seizure.⁵⁵

There is a limited amount of evidence from animal studies that chronic use of high doses of nicotine has harmful effects on the adolescent brain.⁵⁶ However, the animal

studies tend to administer nicotine in doses that do not reflect teen use patterns.^{15, 57, 58}

One meta-analysis of 14 studies found that the most common adverse effects of using nicotine vaping products were mouth or throat irritation, anxiety, depressed mood, nausea and insomnia.⁵⁹

Findings regarding the risk of cardiovascular problems from nicotine vaping products are mixed.^{43, 60-62} Nicotine may lead to an increased heart rate and increased blood pressure.⁶³

The long-term effect of nicotine vaping product use on cancer risk are unknown. Small amounts of potentially carcinogenic materials have been detected in some devices.^{64, 65}

It is unknown as yet whether nicotine vaping products use in pregnancy safe but the negative effects of nicotine that also apply to tobacco smoking including preterm delivery, still birth, neonatal apnoea and sudden infant death syndrome, probably also apply to nicotine vaping products, so pregnant women should avoid using tobacco and vaping products entirely ⁶⁶.

Popcorn lung and other lung problems

Like cigarettes, the liquids used in many vaping devices contain a range of other chemicals. One in particular is diacetyl, which is used to produce a buttery flavour. Diacetyl is associated with the development of bronchiolitis obliterans, a severe lung disease also known as ‘popcorn lung’ as it was first reported among workers in popcorn factories who were exposed to airborne diacetyl.

However, there have been no recorded cases of popcorn lung among people who use nicotine based vaping products. A prospective observational study of 9 daily vape users who had never smoked tobacco compared to 12 people who had never smoked either tobacco cigarettes or nicotine based vapes found no difference between the two groups on any health outcomes including lung changes after 3.5 years.⁶⁷

Most of the cases of vaping associated lung injury (also known as EVALI) occurred in the United States.⁶⁸ These cases have been

strongly linked to the additive vitamin E acetate that is found in many vaping devices used to administer tetrahydrocannabinol or THC.^{68, 69} Vaping liquids used for THC are often oil based, unlike most nicotine vaping liquids. Many of these devices and e-liquids have been procured via an unregulated or black market.^{69, 70}

A number of other chemicals used in vaping products have been associated with other lung problems, and most vaping with or without nicotine is likely to have some level of harm for people who are non-smokers. As it stands, there is insufficient evidence that vaping in non-smokers leads to acute reductions in lung function and respiratory measures.⁴³

Without further research into the constituent-dependent toxicity of vaping products (i.e. how different combinations of additives can result in differing levels of toxicity due to the chemical reactions), it will be difficult to determine how different vaping products may affect the lungs.⁷¹

How do the harms compare with tobacco?

Under typical conditions of use, nicotine vaping products are estimated to be significantly less harmful than tobacco.⁷²⁻⁷⁴

Some of these estimates are as low as 5% or less of the harms associated with cigarettes.⁷²⁻⁷⁴ Even if the true risk of harm was double, or even triple these estimates, this would still be significantly less harmful than tobacco use and would continue to be viable harm reduction tool.

Nicotine vaping products are estimated to have <1% of the cancer risk of cigarettes.⁷⁵ Cancer causing properties of tobacco cigarettes are from the chemical additives in smoking and chewing tobacco. These chemicals are absent or at barely detectable levels in nicotine vaping products and pose little cancer risk to people who use them.

Switching to vaping from cigarette smoking has been associated with improved health outcomes. This includes an improvement in vascular health⁷⁶ and in chronic obstructive pulmonary disease scores and symptoms.⁷⁷

Second hand vaping is much less harmful than second hand smoking. The aerosol cloud that is inhaled dissipates within seconds.⁷⁸ This is much faster than smoke from conventional cigarettes, where the particle concentration increases with consecutive puffs and won't return to background levels for 30-45 minutes.⁷⁸

Can vaping help people stop smoking?

There is currently high certainty evidence that nicotine vaping products increase quit rates compared to other nicotine replacement therapy products such as patches and gum.

This evidence comes from a November 2022 Cochrane review⁷⁹ that examined and combined findings from 78 studies representing over 22,000 participants. This review also found moderate certainty evidence that nicotine vaping products are more effective at helping people to quit smoking than non-nicotine vapes.

The findings also suggested that nicotine vaping products are likely to be more beneficial for quitting smoking than usual care or no treatment.

To quote the review:⁷⁹ “For every 100 people using nicotine e-cigarettes to stop smoking, 9 to 14 might successfully stop, compared with only 6 of 100 people using nicotine-replacement therapy, 7 of 100 using e-cigarettes without nicotine, or 4 of 100 people having no support or behavioural support only.”

Vaping is such a growing area of research that this review was conducted in both 2021⁸⁰ and 2022⁷⁹, and in that time found increased evidence for the efficacy for nicotine vaping products as a smoking cessation tool. This goes partially to explain why reports conducted in early 2022 or prior did not concur with these results given they did not have the same access to published evidence.⁴³

Other systematic reviews published in 2022 have found similar results, with nicotine vaping products being more effective for

smoking cessation than other types of nicotine replacement therapy.^{81, 82}

Vaping has also been found to be significantly more effective at helping people reduce the number of cigarettes they smoke.⁸¹ This contributes to reducing the harm that smokers are exposed to.

A large percentage of the population who continue to smoke may need additional support to quit, may have struggled to quit many times without success or are otherwise vulnerable to cigarette smoking. For example, people living with mental illness are more likely to smoke tobacco, to smoke more heavily and to have more unsuccessful quit attempts than the general population.⁸³ Older⁸⁴ and more socially disadvantaged⁸⁵ Australians are also more likely to be smoking today.

Nicotine vaping products have been associated with higher tobacco quit rates in these populations⁸⁶ and are generally well accepted. The Royal Australian College of Psychiatrists supports the legalisation, regulation and use of nicotine vaping products as a tobacco harm reduction tool.⁸⁷

What about young people?

There is concern about the use of vaping products by teens, particularly that it will attract young people to start smoking via vaping. Data show that the majority of Australian teens have never smoked or vaped.^{15, 57}

The most recent National Drug Strategy Household Survey¹⁵ in 2019 found that less than 2% of teens reported that they had vaped in the past year, which had approximately doubled since 2016. This was still lower than the rates of teen smoking (3.2%) and teen alcohol use (32%).

The Generation Vape study in NSW, published in 2022, identified higher numbers of teenagers vaping.⁵⁷ The online survey of 721 teenagers aged between 14 and 17 years found that nearly a third of the sample had used a vape at some time (68% had never vaped). Of those who had ever vaped, 53% reported use of a vape that they knew contained nicotine. There was wide variability in frequency of vaping among the

young people, with only 5% of those who had ever vaped using the device 100 or more times.

The Generation Vape study⁵⁷ also reported that more than 90% of teens were able to access vaping products without difficulty. Of those who purchased their last vape themselves, nearly a third had bought it from a retailer, like a petrol station, tobacconist, convenience store or vape shop. This highlights the need for improvements in regulation to reduce the extensive black market and to restrict underage access to vaping products.

Tobacco continues to be the most dangerous form of youth exposure to nicotine. Vaping products have significant potential as an accessible tool to combat the largest preventable cause of morbidity and mortality in Australia, tobacco,¹³ as demonstrated in other countries which have taken a less restrictive, more harm reduction approach to these sale and use of these products.

The largest proportion of the reduction in smoking we have seen in Australia to date comes from young people not taking up smoking in the first place. This means that we can continue to improve knowledge, skills and confidence among young people to not take up vaping, as well as allowing access to smokers who have difficulty quitting.

The evidence indicates that youth vaping, as with other drugs, is typically experimental, transient, and infrequent.^{15, 57, 58} The minority of young people who use vaping products more regularly are usually already smoking or already at risk of smoking.^{15, 57, 58}

There is some evidence to suggest that young people who vape and have never smoked are at increased risk of initiating smoking in future.^{43, 88} Other studies have found the relationship to be more complex and possibly bi-directional.^{89, 90}

The use of vaping products by young people who have never smoked should be actively discouraged and age restrictions should apply and be enforced.

Should there be a ban on flavoured products?

Some bodies have called for a ban on flavoured nicotine vaping products. The primary argument used for this is to reduce the appeal of vaping for adolescents.

However, adults also prefer non tobacco flavours.^{14, 91} Sweet vape flavours are associated with more successful quit efforts by smokers than those using tobacco or menthol flavours.⁹² Adults who use sweet flavours to quit smoking are also no more likely to continue vaping than people who use tobacco flavoured vaping products.⁹²

There is also the risk that by banning flavours, it will only increase the black market for nicotine vaping products or possibly result in increased at home mixing of flavours which could result in additional unwanted effects.¹⁴ The presence of an extensive black market increases accessibility for young people in this unregulated market.

Evidence suggests that flavours are not the main reason young people take up vaping, so they are unlikely to reduce the likelihood of youth vaping.¹⁵ Furthermore, some studies have shown that bans on flavours may increase youth tobacco smoking.^{93, 94}

From a harm reduction perspective, rather than limiting or banning flavours, limiting the retail sale of flavoured NVPs to adult only outlets is likely to be a more effective solution to restrict access to young people and reduce likelihood of uptake.⁹⁵

What have other countries done?

Regulation varies substantially between countries. Some countries allow vapes to be legally sold in stores without a prescription but impose strict quality controls and do not allow the sale of products to people under the age of 18 (21 years in the US). Similar to the regulation of cigarettes and alcohol.

The UK⁷³ has introduced minimum standards on manufacturing and restrictions on purchasing age and where people can vape.

Aotearoa New Zealand⁹⁶ introduced a unique plan to reduce smoking rates by imposing a lifetime ban on buying cigarettes. Currently, anyone born after 1 January 2009 will never be able to buy cigarettes. At the same time, they are increasing access to vaping products under strict regulations on manufacture, purchase and use.

As of late last year, all states in the USA⁹⁷ require sellers to have a retail licence and sales to under 21s are prohibited. There are also restrictions on where people can vape.

A recent study⁹⁸ modelled the impact of increasing access to vaping products in Australia. It found that there is likely to be significant public health gains achieved by relaxing the current restrictive nicotine vaping policies and increasing access to nicotine vaping products for adult smokers.

The US and UK have shown significant decreases in cigarette use in their general populations.⁹⁹ There is no evidence that e-cigarette use resulted in increased cigarette smoking in these countries. Various approaches to vaping products product regulation are summarised in Table 1.

Table 1. Comparison of approaches to nicotine vaping products product regulation in selected countries

	Australia	New Zealand	England	USA	International summary
Sale	A prescription is required to purchase at a pharmacy or import for personal use. It is illegal for other Australian retailers to sell nicotine vaping products, though it is legal for non-nicotine products to be sold and imported (with exceptions in Western Australia).	Permitted for sale in general retail stores (eg. supermarkets, newsagents) and specialist vape retailers who have separate application products to be able to sell a wider range of vaping products.	Nicotine vaping products are permitted for sale in general retail outlets.	All states require sellers to have a retail licence. Additional sale requirements vary per state. For example, online sales are prohibited in Arkansas.	Sale of all types of cigarettes banned in 30 countries. Jamaica, Japan and Switzerland ban nicotine vaping products but not non-nicotine cigarettes. 79 countries allow e-cigarettes to be sold with full or partial regulations in place. 84 countries do not regulate e-cigarettes at all.
Age restrictions	The sale of vaping products to children under the age of 18 is prohibited in all states and territories. Vaping products may be sold by pharmacies to smokers over 18 on prescription only.	Prohibits the direct or indirect sale and supply of vaping products to people under the age of 18.	Prohibits sale of vaping products to people under the age of 18. It is up to whoever owns individual spaces to determine if and where they allow vaping.	Prohibits the sale of vapes to people under the age of 21 in all states.	69 countries have an age restriction on the sale of nicotine vaping products of between 18 and 21 years.
E-liquid regulation	Nicotine concentration is limited to 100mg/mL. There are no volume limitations. Personal importation is limited	20mg/ml for freebase nicotine and 50mg/mL for nicotine salt products.	Upper limit of 20mg/mL. Tank capacity should not exceed 2ml and e-liquid refill bottles are restricted to no	E-liquid concentration restrictions vary state to state.	36 countries regulate the volume and concentration of nicotine e-liquid.

	Australia	New Zealand	England	USA	International summary
	to three months' supply at a time.		more than 10ml per bottle.		33 countries enforce quality and safety regulations for e-liquids.
Flavours	If a nicotine vaping product flavour contains an ingredient deemed to be a significant health risk, it is prohibited. Non-nicotine vaping products are not regulated.	Approved specialists vape retailers are permitted to sell any flavour of vaping substances. Other retailers are prohibited from selling vaping products that contain noticeable smell or taste/flavour that is not tobacco menthol or mint. Use of colourings is strictly prohibited.	There are not bans on flavours. Colourings are banned.	Different states have different restrictions regarding flavour. Some allow all flavours, while others have restricted all fruity and sweet flavours. These restrictions may only apply to in-store sales, such as California.	Three countries (Finland, Hungary and Montenegro) ban all flavours other than tobacco. Six countries have bans on select flavours.
Use in public places	Most states and territories ban the use of any vaping products in smoke free places.	Vapefree laws follow smokefree laws.	There are no legal restrictions on vaping in public areas as vaping products are not included in smokefree legislation. Individual businesses such as pubs and bus and train companies will apply their smokefree rules to vaping products.	These restrictions vary state to state.	30 countries that permit the use of nicotine vaping products ban their use in public places, public transport and workplaces. 45 countries have partial bans.

	Australia	New Zealand	England	USA	International summary
Advertising	Restrictions vary for each state and territory.	Advertisement is prohibited if it encourages use, promotes the sale of, notifies the availability of products or promotes smoking or vaping behaviour.	Ads for nicotine vaping products that are not licensed as medicines are prohibited on on-demand television, in newspapers and magazines, on the internet, in emails and in text messages. However, advertising for these products is permitted on outdoor posters and on the sides of buses not travelling outside of the UK, on leaflets, in direct hard copy mail and in the cinema, granted that they are socially responsible, not targeted at children and don't make unauthorised health or safety claims.	All vaping products are required by law to have FDA authorisation to be marketed legally.	22 countries have banned the advertising, promotion and sponsorship of nicotine vaping products. 53 countries have partial regulations.
Labelling and packaging	Australia requires nicotine vaping products sold in pharmacies to include: An ingredient	Requires health warnings to be displayed in English and te reo Māori.	Safety mechanisms for e-liquid containers, cartridges and tanks must be child	In most states there are restrictions on the packaging of vaping products that are similar for other	32 countries have child safety packaging regulations.

	Australia	New Zealand	England	USA	International summary
	list, labelled nicotine concentration (mg/mL), warning statements and child-resistant packaging. Products acquired through personal importation do not have these requirements. There is no packaging regulation for non-nicotine vaping products.	Safety messages are also to be displayed, including what to do in the case of accidental poisoning.	resistant and tamper evident. Health warnings on packaging. Full ingredient list including nicotine content information.	poisons including child resistant packaging. Labelling varies from state to state; many states require health warnings such as labelling the product as addictive.	40 countries require the display of health warnings on the packaging. The only country that requires plain packaging for all e-liquids is Israel.

Where should Australia go from here?

In 2021 Australia made it illegal to possess and use nicotine without a prescription. We are the only country in the world to take this path. With more than 90% of people who vape using black market products,¹⁰⁰ it is clear that the current approach isn't working. Vaping products are accessible, less costly and less time consuming than waiting to see a GP to obtain a prescription.

Some people view the solution to the problems lies in tightening current regulations and increasing enforcement. But we know from past experience that prohibition does not significantly reduce or eliminate long term black market operations for any illegal drugs.¹⁰¹

Law enforcement and border control efforts have minimal long term impact on the supply of drugs in the community. In fact, when substances are banned, suppliers find more creative ways to hide and sell their products, which leaves the buyer at a higher risk of buying unsafe, unregulated products of unknown quality and potency.^{101, 102}

Others view the situation quite differently, and have called for the production and sale of vaping products to be brought into line with a public health orientated harm reduction approach, which is consistent with Australia's national drug policy.^{103, 104}

Reassessing our current policy

Australia would benefit from rethinking its current policies on nicotine vaping products by taking a harm reduction approach, carefully regulating vaping products rather than banning them and providing education and support to people trying to quit.

Australia is the only country that requires a prescription as the only legal way to access vaping products.

People who are opposed to changing Australian policy to allow the sales of nicotine vaping products without a prescription generally do so because of an absence of firm research that proves its safety. The approach comes from a desire to hold off making any 'rash' decisions without the evidence to support it.

Both sides of the policy divide want the same thing – to reduce harm. A failure to act on the information we have available to us now and waiting until there is 'perfect' research on vaping, will lead to an increase in potential harm that could otherwise be avoided. Everything we currently know from the evidence indicates that nicotine vaping products can be a useful tool in reducing harms from tobacco use, and are significantly less harmful than smoking.

Rates of vaping are rising and the black market already supplies more than 90% of Australians who vape.¹⁰⁰ Continuing with the current policy, or cracking down further on the availability of vapes, is unlikely to improve this situation.

Despite heavy restrictions and penalties for other illicit drugs, there is consistently a proportion of the population who continue to access and use them. When substances are banned, suppliers find more creative ways to hide and sell their products, leaving the buyer at risk of receiving unregulated, unsafe products of often unknown quality and potency.^{101, 102}

Instead, the evidence suggests that the government should shift its focus and

funding to ensuring regulated access to nicotine vaping products for adult smokers as a harm reduction tool, support regulatory controls in the community, regulate and approve products checked for quality and safety and improve public education.

Recent research that has modelled the impact of increasing access to nicotine vaping products in Australia found that there is likely to be significant public health gains achieved by relaxing the current restrictive policy and increasing access to vaping products for adult smokers.⁹⁸

Rethinking regulation

Right now, vaping is more harmful than it needs to be because it is poorly regulated.

The Australian National University 2022 report into vaping⁴³ found that nicotine vaping product risks increase with: higher nicotine concentrations in e-liquids; greater e-liquid volumes; “at home” e-liquid preparation; adulteration of e-liquids; inadequate labelling; lack of child-resistant packaging; longer durations of use; potential for multiple prescriptions; personal importation; flavourings and other factors increasing attractiveness to children and youth; and factors increasing the likelihood of use of nicotine vaping products in youth and non-smokers, including advertising and promotion, lack of enforcement of regulations and high concentration nicotine salt products.

All of these are risks that can be mitigated with appropriate regulation.

There needs to be a greater investment into studying ingredients used in nicotine vaping products. In line with this, there should be an assessment of nicotine vaping products available for sale against a product standard designed to ensure maximised quality and safety. Ingredients that do not increase the

efficacy or function of the vape as a harm reduction tool should not be included.

If nicotine vaping products become available for sale without a prescription, nicotine concentration restrictions should also be revisited.

Regulations on vaping devices available for sale also need to be put in place to minimise risk of burns and other adverse events that can result from device misuse or malfunction. This extends to the requirement for appropriate child safety mechanisms.

E-liquids and vaping products must be required to be clearly labelled regarding the presence of and concentration of nicotine. Companies with false or misleading representations of their products should face heavy penalties.

Regulations on vaping products should not be more restrictive than those for more harmful smoking products such as cigarettes, tobacco and cigars.¹⁰⁵

Within these proposed reforms, there is also a need to restrict access to children. This can be achieved by the same methods currently used for tobacco and alcohol. This includes prohibiting the sale of, provision to, and use of vaping products in people under the age of 18. This can be enforced via random checks and heavy fines to retail outlets that do not comply.

Making products less appealing to children through strict advertising and packaging rules is also required. Labels and flavour names should not be made appealing to children.

Given it is the additional ingredients, rather than the nicotine, that pose the greatest risk of unknown harm in vaping, the above regulations should extend to all vaping products.

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