

COMMENTARY

Could vaping help lower smoking rates in Australia?

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Abstract

In this brief article, we review the evidence on whether easier access to vaping could help lower smoking rates in Australia. To make a convincing case for vaping the following conditions need to be met: that vaping assists in smoking cessation; that the prevalence of vaping is high enough to produce measurable effects at a population level; and that the decline in smoking prevalence is slower in countries where vaping is less common. The evidence suggests that these criteria are satisfied. [Mendelsohn C, Hall W, Borland R. Could vaping help lower smoking rates in Australia? *Drug Alcohol Rev* 2020]

Key words: electronic cigarette, smoking, addiction, tobacco harm reduction, nicotine.

Vaping is widely used globally, either as a smoking cessation aid or an alternative to smoking. However, the sale and use of nicotine for vaping is effectively banned in Australia. In this brief article, we review the evidence on whether easier access to vaping could help lower smoking rates in Australia.

To make a convincing case for vaping the following conditions need to be met: that vaping assists in smoking cessation; that the prevalence of vaping is high enough to produce measurable effects at a population level; and that the decline in smoking prevalence is slower in countries where vaping is less common. The evidence suggests that these criteria are satisfied.

Can Vaping Facilitate Cessation?

Randomised controlled trials

Well-designed randomised controlled trials (RCT) can demonstrate whether interventions are effective by randomising patients to treatment or a control condition. Random assignment makes it more likely that the two groups of patients do not differ in any way that will affect treatment outcomes and allows us to attribute any differences in outcome to the treatment.

Early evidence from a small number of RCTs using vaping devices (e-cigarettes) with low nicotine delivery suggested that vaping was more effective than placebo vaping, but not more effective than other forms of nicotine replacement therapy (NRT) [1]. This may have been because of a lack of studies or the relative ineffectiveness of the early vaping devices. Two recent high-quality, pragmatic trials have now shown that vaping can be more effective than conventional NRT.

In one trial of 886 smokers by Hajek *et al.*, run within the National Health Service stop-smoking service, those randomised to vaping with a modern device and quitting support were nearly twice as likely to quit as smokers who were given NRT [2]. Both groups were offered behavioural support. Biochemically validated abstinence rates at 12 months were 18% for the vaping group and 9.9% for NRT users (risk ratio 1.83; 95% confidence interval [CI], 1.30 to 2.58; $P < 0.001$). Ninety percent of subjects in the NRT arm used a combination of products, typically a nicotine patch and a nicotine gum or lozenge, which is currently established as the most effective cessation pharmacotherapy [3]. The effect from vaping appears to be at least in part due to sustained use, with 80% of those who quit in the

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vaping arm still using their vaping device after 12 months (compared with 9% in the NRT arm).

The second trial by Walker *et al.* in New Zealand randomised 1124 smokers to nicotine patch-only ($n = 125$), nicotine patch plus nicotine vaping ($n = 500$) and nicotine patch plus nicotine-free vaping ($n = 499$). All subjects were offered behavioural support [4]. Those randomised to combined patch and nicotine vaping had triple the biochemically validated continuous abstinence rates of the patch-only group at 6 months (7% vs. 2%). The quit rate for the patch and nicotine-free vaping group was 4%. However, only around 40% of this community-based sample provided a biochemical sample, meaning this is a very conservative estimate of effect size. A more realistic estimate used by the authors, which extrapolated adjustment for biochemical verification gave success rates of 17% versus 10%, showing a larger benefit for the active nicotine vaping condition.

Neither study found any evidence of higher rates of treatment-related adverse effects in the vaping groups.

Together these studies show that nicotine vaping improves cessation over NRT when used alone [2] or with patches [4]. The magnitude of the benefit is that between seven and eight extra quitters will result per 100 who use vaping to try to quit.

Other evidence of likely effectiveness

Observational studies such as cohort studies can help assess whether the effects found in RCTs are observed in the real world. Care is needed to control for potential biases such as including users who are not trying to quit, not differentiating between occasional or regular vaping, recruiting smokers who have already failed to quit smoking at baseline and failing to control for other confounders.

Unfortunately, many published studies are too flawed in one of these ways to provide unbiased information on the effectiveness of vaping for quitting. However, comprehensive analyses of the more robust observational studies by Glasser *et al.* and Villanti *et al.* found that vaping facilitates quit attempts and increases cessation [5,6].

Population studies in the USA and the UK have found also that smokers who use vaping to quit have *significantly higher quit rates* than those who do not [7–10]. Quit attempts and quit rates have been increasing since vaping became popular.

An English study of 19 000 smokers compared the real-world effectiveness of quitting aids used in the most recent quit attempt in the last 12 months [10]. Those who used vaping devices had significantly higher quit rates than those who bought NRT over-the-counter and those who used no treatment.

A US study of a nationally representative sample of nearly 23 000 smokers also found that those who used a vaping device were 73% more likely to quit than non-users (8.2% vs. 4.8%) and were also more likely to make a quit attempt [7]. Similar results were found in a study of 60 000 25–45-year-olds in the USA: smokers who were vaping were 65% more likely to have quit smoking in the last 12 months than smokers who were not [8].

Daily vaping is more effective than less frequent use. In large studies in the USA, daily vapers were 3–8 times more likely to quit than smokers who did not vape [11,12].

Other studies have shown that modern devices are more effective for cessation than earlier ‘cigalike’ models [11,13] although not all studies have found clear effects [14].

Overall the observational evidence indicates that daily vaping with higher nicotine delivery models can increase quit rates.

Is There Enough Vaping to Influence Population Smoking Rates?

The population health impact of vaping is determined by its uptake as well as its effectiveness. In countries where smokers can readily access them, vaping devices have been used by a large enough proportion of smokers to affect the population prevalence of cigarette smoking. Vaping devices are now the most popular quitting aid in the UK [15], the USA [16] and the European Union [17].

In England in 2019, vaping devices were used in 31.9% of quit attempts, followed by NRT over-the-counter (13.7%), varenicline (4.4%) and prescribed NRT (4%) [15]. In France since 2010, 27% of smokers who tried to quit used vaping compared to 18% who used NRT [18].

The number of adults vaping continues to grow rapidly and was estimated to be at least 40 million globally in 2018 by market research group Euromonitor [19]. Current adult vaping rates range from 2% to 6% of the adult population in countries where vaping is legal and readily available (Figure 1).

Decline in Smoking Rates

It is not possible to conclusively prove that changes in population smoking can be attributed to any one intervention. Nonetheless, it is noteworthy that the decline in smoking in both the USA and UK has accelerated over the period that vaping has become widespread and population quit rates have increased [7,30]. These changes do not appear to be explained by other factors

Current adult vaping

(2016-19)

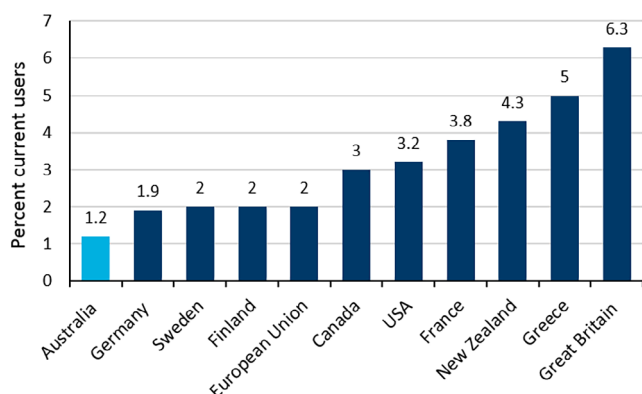


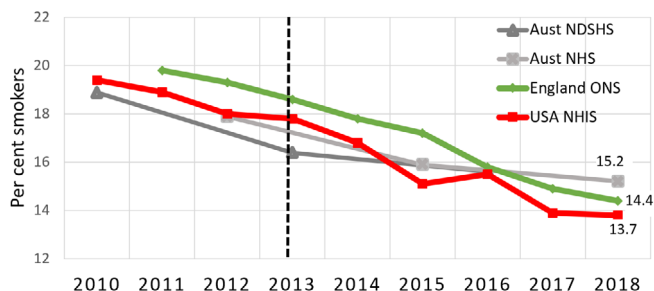
Figure 1. Adult vaping prevalence in selected western countries. Australia [20], Germany [21], Sweden [22], Finland [23], European Union [24], Canada [25], United States [26], France [27], New Zealand [28], Greece [29] and Great Britain [30].

such as tax rises and public health marketing campaigns [7].

Given that vaping is widely used and can be effective, it is more likely than not to be contributing to this rapid decline in smoking. We can also be confident that increased vaping it is not significantly inhibiting progress towards a smoke-free society (Figure 2).

By contrast, Australia has a low current vaping rate of 1.2% [20] and the decline in smoking prevalence appears to have slowed since 2013 according to two national surveys [20,35]. This is despite Australia having among the highest priced cigarettes in the world, the introduction of plain packaging and very rigorous tobacco control laws. The comparison between countries increases the likelihood that the differences observed are at least in part due to a positive effect of vaping on reducing smoking prevalence.

England, US, Australia ≥18y Cigarette smoking rates 2010-2018



Data. Australia: NDSHS [31]; NHS [32] | England: Office of National Statistics [33] | US: NHIS [34]

Figure 2. Adult cigarette smoking prevalence in UK, USA and Australia [33]. NDSHS, National Drug Strategy Household Survey [31]; NHIS, National Health Interview Survey [34]; NHS, National Health Service [32].

Conclusion

Vaping appears to be lowering smoking rates in countries that allow its use. Vaping nicotine increases success rates for smoking cessation as demonstrated in RCTs and confirmed in population-based studies. The population impact of vaping is amplified because of its popularity with smokers. Vaping has had a wide uptake in communities where it is allowed and has reached more smokers than quitting aids such as NRT.

There is evidence that vaping has increased quit attempts and reduced national smoking rates in the UK and USA, where the decline in prevalence of smoking has accelerated. This contrasts with countries such as Australia with restrictive vaping policies where such declines in prevalence are not being observed.

Taken together this evidence provides compelling support for the proposition that vaping is an effective smoking cessation aid that is contributing to a lower smoking prevalence in countries where its use is not actively discouraged.

These positive effects have largely been achieved without official government support or endorsement in most countries. A greater impact would be expected if public health officials encouraged smokers to try vaping where conventional cessation strategies have failed.

Vaping has the potential to help rejuvenate smoking cessation in Australia and improve public health if smokers are allowed easier and legal access to appropriately regulated products. This can and should be done in ways that minimise uptake by non-smokers and young people e.g. by limiting sales to licensed vaping shops, pharmacies and adult stores, and restricting advertising to adult smokers such as at the point of sale.

Conflict of Interest

No funding was provided for the preparation of this manuscript. CM received funding from Pfizer Australia, Johnson & Johnson Pacific and Perrigo Australia for teaching, consulting and conference expenses. CM has never received payments from electronic cigarette or tobacco companies. He is a Board Member of the Australian Tobacco Harm Reduction Association, a health promotion charity which has received unconditional funding for establishment costs from small Australian vape businesses. Vape industry funding has not been accepted since March 2019. WH and RB have no conflicts of interest to declare.

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