Electronic cigarettes: what can we learn from the UK experience?

Electronic cigarettes have the potential for substantial improvements in public health

Electronic cigarettes (e-cigarettes) have polarised the medical and public health communities in Australia and internationally. Some researchers describe them as the greatest opportunity to improve public health this century, with the potential to save millions of lives.[1] Other commentators are concerned that they could renormalise smoking by increasing the visibility of a behaviour that resembles smoking, act as a gateway to smoking for young people and deter quitting.[2]

E-cigarettes are battery-powered devices that heat liquid nicotine and other chemicals (e-liquid) into an aerosol for inhalation. E-cigarettes simulate smoking by delivering nicotine as well as addressing the behavioural, sensory and social aspects of the smoking ritual.

As there is no tobacco or combustion, e-cigarettes do not produce the tar or carbon monoxide which are responsible for most of the health effects of smoking. E-cigarettes do contain some toxicants, but at very low levels which are unlikely to pose significant health risks, and they are considered to be much safer than combustible cigarettes.[3]

Although the sale, possession and use of nicotine-containing e-cigarettes without a permit are illegal in Australia, the devices clearly have appeal to smokers and are increasingly popular. Current use of e-cigarettes increased from 0.6% to 6.6% in current and former smokers over a 3-year period from 2010 to 2013. The rate of responders reporting that they had "ever used e-cigarettes" in this population increased from 9.6% to 19.7% over the same period. In 2013, 42.5% of users reported that their current brand contained nicotine.[4]

The United Kingdom experience

The UK has a more liberal regulatory environment for e-cigarettes, allowing the sale and use of nicotine-containing devices by adults aged 18 years or more.[4] E-cigarettes are classified as consumer products and can be legally purchased online and from dedicated "vape" shops, pharmacies and other retail outlets. The most common reason for using e-cigarettes ("vaping") is to reduce the health risks of smoking by stopping or reducing smoking.[5]

E-cigarettes are currently used by 2.6 million "vapers" in the UK.[5] More than 1 million vapers are ex-smokers who have switched to vaping as a safer alternative to smoking and to avoid relapsing into smoking.[5] Long-term use of safer nicotine products has been supported as a harm-reduction strategy in the UK since a landmark report of the Royal College of Physicians which concluded that:

> smokers smoke predominantly for nicotine, that nicotine itself is not especially hazardous, and that if nicotine could be provided in a form that is acceptable and effective as a cigarette substitute, millions of lives could be saved.[6]

"The concerns that underlie the strict Australian approach to e-cigarettes … have not been supported by evidence from the UK"

The remaining 1.4 million e-cigarette users (about 54%) in the UK continue to smoke tobacco as well as vaping (dual use).[5] The net health implications of dual use are unclear but many dual users report reduced symptom severity,[7] and a recent study found that there was decreased toxicant exposure from dual use, compared with continuing only to smoke and not use e-cigarettes.[8] It has been proposed by some commentators that dual use may perpetuate smoking in some users who would otherwise have quit.[2] However, some dual users will go on to quit smoking, just as many smokers who use nicotine replacement therapy (NRT) while smoking progress to abstinence.[9]

E-cigarettes are now the most popular aid for quitting smoking in England, being used in 38% of quit attempts.[10] NRT is used in 23%, varenicline in 5%, and behavioural support in 3% of quit attempts.[10] A cross-sectional population study of nearly 6000 English smokers found that those who used e-cigarettes in their most recent quit attempt were 60% more likely (after correcting for confounding variables) to be abstinent 12 months later than those quitting unaided or using over-the-counter NRT products. Self-reported quit rates were 20% for e-cigarettes, 15.4% for unaided quitting and 10.1% for NRT.[11] It has been estimated that of 1 080 000 smokers who tried to quit using an e-cigarette in 2014 in England, 20 340 additional smokers were able to achieve long-term (1-year) abstinence because of the availability of e-cigarettes.[12]

A recent report from a trial conducted at a London smoking clinic suggested that adding e-cigarettes to standard behavioural support and other pharmacotherapies, such as NRT or varenicline, may further increase effectiveness,[13] and this approach is endorsed by the UK National Centre for Smoking Cessation and Training and the UK public health agency, Public Health England (PHE).[3]

A recent independent review of the evidence commissioned by PHE concluded that e-cigarettes are around 95% safer than smoking, and that their use could be encouraged for smokers who have failed to quit with

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other methods or as a harm-reduction strategy for smokers who are not willing or able to quit.[3] In the view of PHE, there are sufficient data to endorse the use of e-cigarettes while further research and monitoring continue.[3]

The PHE report has been criticised by some commentators who believe that the incomplete evidence does not yet allow such firm conclusions on efficacy and safety.[14] Concerns have also been expressed about the potential for renormalising community smoking and the gateway effect for young people.[14] Others have observed that the strong views on both sides of the debate are driven by ideology and predetermined opinions, particularly about acceptance of the harm-reduction model.

In the UK, there is no evidence that e-cigarettes are renormalising smoking. As e-cigarettes have become popular, quit attempts have increased and smoking prevalence has continued to fall.[5,15]

There is also no evidence so far of a gateway effect; ie, non-smokers taking up e-cigarettes and then progressing to smoking.[3] Although some children and young people experiment with e-cigarettes, their regular use in this population is rare and is confined almost entirely to current or previous tobacco smokers.[16] In adults aged 16 years and over who have not smoked previously, only 0.2% use e-cigarettes regularly, and there are no recorded instances of daily vaping.[5,15]

The UK data contrast with the findings of a cross-sectional Polish study that reported a significant rise in smoking and e-cigarette use by 15–19-year-old students between 2010–2011 and 2013–2014.[17] Smoking rates and e-cigarette use increased from 23.9% to 38% and 5.5% to 21.9% respectively during these periods. The rate of dual use in 2013–2014 was also high, at 72.4% of e-cigarette users.

Implications for Australia

Based on the UK experience, e-cigarettes may be another useful tool for helping Australian smokers who are unwilling or unable to quit using the currently available treatments.

The real-world effectiveness of e-cigarettes for smoking cessation in the English study is promising, and is consistent with the results of clinical trials.[18,19] However, the quality of the evidence overall from trials is low because of the small number of studies available, and the outcomes need to be interpreted cautiously.

As with NRT, the best quitting results are likely when e-cigarettes are used with behavioural support. E-cigarettes can also be used in conjunction with other approved pharmacotherapies, such as varenicline or nicotine patches for improved outcomes.[13]

The UK data also suggest a valuable role for e-cigarettes in harm reduction for Australian smokers who are not willing or able to give up nicotine or the smoking ritual. If a large number of smokers switched to long-term use of e-cigarettes, this would have an immediate and substantial positive impact on public health.[6]

There has been no indication so far in the UK of some of the potential, negative unintended consequences of widespread e-cigarette use. There is no evidence of a gateway effect or of renormalisation of smoking behaviour. On the contrary; e-cigarettes may be acting as a gateway out of smoking, but it is early in the cycle of e-cigarette uptake, and their impact on smoking behaviour will need careful monitoring in the future.

It has become apparent from the UK experience that some vapers will continue to smoke and vape in the long term, typically with reduced smoke intake, but even reduced smoking poses some dangers and dual users should be encouraged and helped to stop smoking as soon as possible.

Careful, proportionate deregulation of e-cigarettes could give Australian smokers access to the benefits of vaping while minimising potential harm to public health. Appropriate regulations could include banning vaping in smoke-free areas; bans on sales of e-cigarettes to minors; and restricted advertising, improved quality control, child-resistant e-liquid containers and labelling requirements for e-cigarettes.[20]

Conclusion

The UK experience with e-cigarettes has so far been positive. E-cigarettes are helping some smokers to quit or reduce their tobacco intake. Others are able to substantially reduce harm with the switch to a safer nicotine delivery device. The concerns that underlie the strict Australian approach to e-cigarettes — ie, that they could renormalise smoking, act as a gateway to smoking for children, and reduce quitting rates — have not been supported by evidence from the UK.

Regulation of e-cigarettes in Australia should be liberalised to allow smokers the opportunity to benefit from their use. The popularity and widespread uptake of e-cigarettes creates the potential for large-scale improvements in public health in Australia and for faster progress towards the endgame, the ultimate demise of combustible tobacco.

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