

The rise of e-cigarettes: implications for health promotion

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Introduction

In January 1964 the Smoking and Health Report of the Advisory Committee to the Surgeon General of the Public Health Service of the United States was released, identifying the adverse health effects of tobacco smoke.¹ Since then the World Health Organization (WHO) has attributed almost 6 million deaths per year to tobacco smoking, including those caused by second-hand smoke.² For over four decades the health promotion and public health community have worked tirelessly to reduce smoking and curb the adverse health outcomes through actions such as smoke-free policies, tobacco taxes, advertising bans, social marketing campaigns, plain packaging and provision of cessation services, with adult daily smoking rates in Australia reducing from 35% in 1983 to 13% in 2013.³ However, the situation has now changed with the emergence of e-cigarettes (ECs), and the debate is on as to whether this new nicotine delivery device has the potential to exacerbate nicotine addictions, or play a part in harm reduction and smoking cessation.

EC products

ECs in their current form were invented in 2003 and entered the United States (US) market in 2007;⁴ since then, they have experienced rapid growth. ECs are nicotine delivery devices that use batteries to heat up liquid (EC-juice), typically containing propylene glycol and nicotine.⁵ By inhaling, the user activates the circuit within the device that heats the liquid and turns it into a vapour that they breathe in. The EC delivery devices can have the appearance of a fountain pen, lipstick or even a USB stick, making them much like a fashion accessory – novel and attractive to purchasers. The EC-juice or liquid that is used in the delivery device comes in 7700 different flavours, including chocolate, Gummy Bears and cola, which may appeal particularly to the young.⁶ The EC-juice in vials varies in the content of non-controlled nicotine concentrations, in a range of solution volumes and different carrier compounds (usually propylene glycol).⁷ This often results in the nicotine levels in the EC vapour not correlating with the nicotine concentration listed on the vial packaging,⁸ raising issues around product safety and potential toxicity.

EC use

EC use is growing exponentially worldwide. In the US and United Kingdom (UK), between 2010 and 2012 the use of ECs doubled from 3.3% to 6.2% (US) and 2.7% to 6.7% (UK),⁹ while the percentage of Australians who had tried ECs increased from 2% in 2010 to 16.8% in 2013.¹⁰ The National Drug Strategy Household Survey (2013)³ showed that almost 1 in 7 smokers aged 14 or older have used ECs in the last 12 months, with those aged 18–24 more likely users (27%) than older smokers aged 60–69 (7.2%). Australian data on daily EC use is not available but is urgently needed to better understand the issue.

Some data suggests that ‘never smokers’ are less likely than ‘former or current smokers’ to have tried ECs. Between 2011 and 2012, ‘ever users’ of ECs among US high school students more than doubled and in 2012, one in five middle-school children who identified as ‘ever users’ of ECs reported never smoking regular cigarettes.¹¹ Beyond this, a recent study in Ireland showed that 5% of smokers began using ECs before switching to regular cigarettes.¹² Critics have suggested that most of the research undertaken to date is cross-sectional and this methodology may not yet have captured the trajectory of uptake of new EC users.⁸

Safety of ECs

Although ECs do not deliver tar or carbon monoxide,¹³ they do expose users and those nearby to particulate matter, organic compounds and solvents.¹⁴ Many of these chemical substances and particulates are toxic and carcinogenic, and cause respiratory and heart distress.¹⁵ In addition, ECs have similar effects as regular cigarettes on the cotinine levels of passive and active smokers.¹⁶

However, as ECs have only been available for a relatively short time, data relating to their long-term health effects are small. A recent systematic review reported that common carcinogens are lower in ECs compared with tobacco products (e.g. nitrosamines). However, the researchers concluded that because of inconsistencies in evidence and lack of long-term results, the safety of ECs cannot be determined at this point in time.¹⁷ Cheng¹⁵ concluded from his systematic review of chemical compositions of EC-juice that the level

and type of exposure to users and other people in proximity are difficult to establish. This is a result of the range of components in the juices and the differences in delivery performance of EC devices. Although ECs appear to deliver lower levels of some chemicals compared with regular cigarettes, there is no evidence that they are a healthier alternative.¹⁸ Drummond warned that the perception of ECs as a harm-reduction tool without adequate evidence can be likened to the promotion by tobacco companies of 'light' cigarettes, which were proven not to be safer.¹⁸

Smoking cessation or marketing tool

The evidence around ECs' role in smoking cessation is inconclusive, with experts stating 'the goal of ECs makers is not cessation of tobacco use but "dual use"'.¹⁹ The Cochrane review²⁰ examining ECs as a cessation tool showed that they may have similar efficacy to nicotine patches. However, the findings were inconclusive because of the small amount of evidence available (i.e. only two randomised controlled trials and 11 observational studies).

Promotion of ECs

ECs have increased in popularity and have been promoted enthusiastically as a smoking cessation aid and healthy alternative to regular cigarettes, even though these claims are unsubstantiated.²¹ Major tobacco companies are purchasing or developing EC products,⁷ and using websites and Twitter to reach large audiences at a relatively cheap price.²² At the 2014 Electronic Cigarette Education Summit, a Wells Fargo Securities Senior Analyst projected that EC consumption could surpass regular cigarettes in 10 years.²³

Grana and colleagues⁷ reviewed 59 websites that sold ECs and found claims such as: ECs are a healthier product than regular cigarettes (95% of websites); they are cheaper and cleaner than regular cigarettes (93%); they can be smoked anywhere (88%); they can be used to get around smoke-free policies (71%); they create no side-stream smoke, just water vapour (76%); and they could act as a worthwhile cessation aid (64%). These marketing messages are repeated via social media such as Facebook and Twitter, where EC companies have a strong presence. Social media are especially valuable in helping EC companies reach new markets as Twitter users are mainly from younger age groups.²⁴ In addition, some ECs are promoted as a lifestyle choice, associated with stylish accessories and celebrities. They have essentially been promoted by Katherine Heigl on the David Letterman Show, Johnny Depp's character in *The Tourist* and in UK television serials such as *EastEnders*.²⁵

Regulation of sales of ECs

Many countries – including Australia, Canada, Mexico and Brazil – have banned over-the-counter sales of ECs. As a consequence, ECs are sold largely via the internet, making their sales difficult to regulate but still accessible, particularly to the young, as this is their preferred purchasing medium.²⁶ In early 2014, there was an estimated 466 brands of ECs available online, with up to 50% of sales occurring via the internet.⁶ The exact amount of sales of ECs is difficult to

determine, although two US companies reported selling 735 000 ECs in a year.¹³

Australian laws covering ECs are complex, vary between states and are difficult to enforce.¹⁰ Currently, tobacco control laws do not apply to ECs; rather, poisons control legislation in all Australian jurisdictions prevents the sale, possession or use of non-therapeutic nicotine without a licence. A few states (e.g. Western Australia, South Australia and Queensland) have also banned delivery devices that do not contain nicotine but resemble tobacco products because these may be particularly attractive to children.²⁷

Restricting use of ECs

The WHO has called for greater restrictions on the use, sale and promotion of ECs as there is limited evidence on their safety and their role to help smokers to quit.²⁸ The Cancer Council, Australia and National Heart Foundation support a ban on the sale of nicotine delivery devices.²⁹ A recent position statement by the National Health and Medical Research Council (NHMRC) reported there is insufficient evidence that ECs are a safe alternative to tobacco and supports research to assess their health impact,³⁰ and the Australian Medical Association is concerned about the increasing use of ECs, calling for tougher regulations.³¹

Several cities in the US have moved to address the use of ECs. The city of Boston has applied workplace EC bans, with New York and Los Angeles ready to introduce legislation that will prohibit their use in public places.¹⁹ In Australia, the University of South Australia led the charge announcing on 31 May 2014³² that they would ban the use of ECs on campus. This has been followed by the Australian National University whose ban on ECs became effective on 31 May 2015.³³ Queensland is the first Australian state to subject ECs to the same laws as regular cigarettes with amendments to the Tobacco Control Act taking effect in January 2015.³⁴

Implications for health promotion

The health promotion community has limited data on which to base their position on ECs; hence, there is no firm consensus. Some health professionals see ECs as a safe form of nicotine delivery in comparison to regular tobacco, as well as a tobacco-cessation device and harm-reduction strategy, even though they have not been adequately tested, standardised or regulated.³⁵ Others see it as a coercive entry point or 'gateway' for the young to a life of smoking and ill health, and an ideal opportunity for the re-normalising and re-glamourising of societal smoking.³⁶ However, we should remember that nicotine replacement and cessation programs played only a minor role in the decline in regular smoking prevalence. The main influences were due to a comprehensive health promotion approach that restricted access and opportunities to smoke.

It appears that we will have to remain wary of the tobacco industry as their recent actions mirror a history of opportunism.¹ This was illustrated in New South Wales recently, where the state government delayed laws to restrict minors from obtaining ECs after Members of

Parliament were approached by lobbyists representing multinational tobacco companies.³⁷ A healthy scepticism towards the tobacco industry's engagement in policy development related to ECs is crucial.

From the limited evidence available to date on ECs, it is apparent that a cautious approach is warranted with a case that supports strict regulation until rigorous research is conducted. The same rigour that is applied to new therapeutic products needs to be applied to ECs. Randomised controlled trials are needed to compare ECs to other nicotine-replacement therapies and research studies should be designed to assess long-term health outcomes of EC use.

Legislation should be considered that restricts EC sales to persons over 18 years of age who are attempting to reduce or quit smoking. This could be an interim measure based on the assumption that research may eventually indicate relative safety as well as effectiveness of ECs as a cessation agent. Legislation should also consider: standardising EC products; requiring all EC brands to list their juice ingredients and nicotine contents; restricting the flavours to make them less appealing to children; making juice containers childproof; non-glamorised generic packaging; careful controls on the marketing of ECs; restricting sales avenues; banning of online sales/purchases; and banning of unsubstantiated claims regarding quitting and health benefits.

In conclusion, there are still too many unknowns about the likely consequences of EC use to allow uncontrolled availability and we therefore need to consider the 'precautionary principle' when dealing with this issue. Short-term research should be able to identify the relative safety of the product and its benefits as a cessation agent; however, long-term research may be necessary to identify its potential impact on smoking behaviours of children, youth and adults, including rates of uptake. As ECs are a smoking-related product with close connections to the tobacco industry, 'caution is the better part of valour'! We do not want decades of health promotion practice and public health policy that has successfully reduced smoking prevalence to be undone.

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