

Electronic cigarettes – where are we headed?

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Electronic cigarettes (e-cigs), electronic nicotine delivery systems, vape pen, whichever name you choose to refer to them, their use is becoming as common a sight as someone smoking a cigarette. In fact, e-cig use among United States teenagers surpassed cigarette use in 2014 for the first time (1).

So what does this new phenomena hold for smoking and the use of nicotine in the present and future? The complexity and duality of these products and their use probably means they represent both a promise and threat to society and our health. The promise comes from the potential for harm reduction and in what they may offer as a smoking cessation aid. The threat comes in the form of what has been termed the 'renormalization' of smoking behaviour, possibly setting back the significant gains made in 'denormalizing' smoking for decades (2). For example, in Manitoba, the introduction of the Non-Smokers Health Protection Act (3), which made it illegal to display, advertise and promote tobacco products in retail shops and placed restrictions on the use of tobacco in indoor public places, effectively denormalized the use of tobacco products.

Who is using e-cigs? The most recent (2013) data from Statistics Canada indicate that 9% of all Canadians ≥ 15 years of age (approximately 2.5 million) reported having ever tried an e-cig and 2% had used an e-cig in the past 30 days (4). Youth and young adults 15 to 24 years of age are the most likely to try e-cigs. Approximately 20% of 15- to 24-year-olds have ever tried an e-cig compared with 12.5% of 25- to 34-year-olds, and just 3.7% of those ≥ 45 years of age (5). A similar trend exists for those using e-cigs in the past 30 days; however, the figures are significantly lower (3.9% and 1.0%) for 25- to 34-year-olds, and those ≥ 45 years of age, respectively.

While these figures may not appear to be large, it is becoming clear that use is increasing and that youth are a significant driver of demand for e-cigs. According to the Centres for Disease Control and Prevention (Georgia, USA), e-cig use among middle and high school students has tripled from 2013 to 2014 (6). To those involved in tobacco control and even to the casual observer, this increased use and the associated marketing and promotion is not overly surprising in the context of historical and current promotion of tobacco products, in which branding and lifestyle approaches target youth culture. One needs only to explore 'Youtube' or 'Google' to see first-hand the proliferation of 'vape trick' videos and Hollywood stars promoting the use of e-cigs. Even the design of so-called 'third-generation' vaping devices, with their slick metallic look and customizable components, are meant to appeal to youth in addition to the thousands of flavours available such as 'whipped cream' and 'Swedish gummy flavour'. The lack of any controls or regulation of this massive marketing and promotion effort has undoubtedly influenced public attitudes and behaviours toward e-cigs, legitimizing them before any real assessment of their safety and efficacy as a cessation aid. The fact that Health Canada has not authorized any e-cig containing nicotine for sale or distribution in Canada and recommends they not be used because their safety and efficacy has not been properly studied, has not slowed down the supply and use in the least.

In response to the alarming proliferation of e-cigs, governments are taking various forms of action: federally, the Minister of Health asked the Standing Committee on Health (HESA) to prepare a report on

e-cigs; at the provincial level, legislation to regulate e-cigs has been introduced (Nova Scotia, New Brunswick, Ontario, Quebec, British Columbia, Prince Edward Island, Manitoba); and, in the case of Nova Scotia, the restrictions started on May 31, 2015, which was 'World No Tobacco Day'.

The key recommendations of the HESA report include financially supporting research investigating the health effects of e-cigs, developing a new legislative framework and consulting with the public, provinces and stakeholders with respect to regulating e-cigs and related devices. It is especially encouraging that the recommendations to develop a new legislative framework includes establishing maximum levels of nicotine, safety standards for all components of e-cigs and disclosure of ingredients, including requiring packaging to be child-resistant, labelled with clear and accurate nicotine concentrations and contain appropriate health warnings. These recommendations represent an appropriate division of responsibility vis-a-vis provincial/federal jurisdiction, in which initial legislation treats e-cigs like tobacco products and prohibits sales to minors, prohibits their use in enclosed public places and indoor workplaces, and places restrictions on display, advertising and promotion. The federal government has yet to respond to the HESA report; however, many hope that their response will include a commitment to develop the recommended legislative framework. In the meantime, provinces, including Manitoba, are acting in an attempt to introduce controls where none have existed, with the intention of preventing youth uptake and protecting the public from the exhaled vapour of e-cigs, which, early evidence shows, contains at least a few carcinogenic compounds such as formaldehyde, tobacco-specific nitrosamines, and metals including nickel, cadmium and lead (7), raising serious public health concerns and stressing the urgent need for the federal government to fund a research agenda.

One of the more fascinating aspects to the e-cig phenomena has been the polarization of opinion among tobacco control experts globally on whether e-cigs are a positive or negative development with regard to smoking. A number of health practitioners advocate for actively encouraging the uptake of e-cigs as an essential harm reduction strategy, far more preferable than continued use of tobacco in terms of the disease and death it causes. Many others advocate for far greater control and raise alarms of e-cigs 'renormalizing' smoking behaviour and hooking new generations on nicotine. The reality is that in these early days, more speculation than evidence is the basis for these polarized positions; there is no preponderance of evidence, no conclusive studies and no hard data that support either side (8-10). At this point in time, it appears there are a few, but limited, conclusions that can be drawn:

- e-cigs contain nicotine, a highly addictive substance that causes damage to human health;
- e-cigs are less harmful than cigarettes;
- the potential benefit of e-cigs will be measured by how they affect cigarette use;
- many smokers are using e-cigs to quit smoking;
- the effectiveness of e-cigs as cessation aids is yet to be determined; and
- many youth are trying e-cigs.

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Beyond these basic conclusions, only greater and more in-depth research will reveal the true impact of e-cigs and enable better informed policy decisions and public communications that set the record straight on what role e-cigs may play in cessation.

Interesting social policy questions emerge with regard to e-cigs that regulators will have to grapple with, and that should inform public debate on the evolving role of e-cigs. For example:

- If we accept they are here to stay as a consumer product, and appropriate regulation is put in place, will the public tolerate e-cigs as a cleaner drug delivery device?
- Given emerging trends, such as widespread and legal use of medical marijuana (now in all its forms), will e-cigs and the next generation of similar devices be viewed as the most acceptable form of nicotine intake and, possibly, signal the demise of tobacco products?
- Given the cost and stigma associated with 'denormalized' tobacco products, are we already in the early stages of a natural progression from nicotine via tobacco to nicotine via clean delivery devices?
- What new and perhaps unique threats to human health does long term use of e-cigs represent and are we generally prepared to accept the 'lesser of two evils'?
- What is the level of risk if e-cigs gain acceptance as a smoking cessation aid and regulation does not prohibit their use, and these 'drug delivery devices' become a common means of consuming drugs far more harmful than nicotine and marijuana?

Given the many unknowns, it would appear that e-cigs have the potential for both a positive and negative outcome, with so much depending on how quickly we can gain greater understanding and insight. In the meantime, 18% of the Canadian population still smoke cigarettes (11), resulting in a significant burden on the health care system and, more importantly, a great deal of suffering and loss. We need to do all we can now to eliminate this tragic legacy.

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REFERENCES

1. E-cigarette use triples among middle and high school students in just one year. <www.cdc.gov/media/releases/2015/p0416-e-cigarette-use.html> (Accessed May 18, 2015).
2. Fairchild AL, Bayer R, Colgrove J. (2014) The Renormalization of Smoking? E-Cigarettes and the tobacco "endgame". *N Engl J Med* 2014;370:293-5.
3. The Non-Smokers Health Protection Act. <<https://web2.gov.mb.ca/laws/statutes/ccsm/n092e.php>> (Accessed September 15, 2015).
4. Canadian Tobacco, Alcohol and Drugs Survey (CTADS) <<http://healthy Canadians.gc.ca/science-research-sciences-recherches/donnees/ctads-ectad/summary-sommaire-2013-eng.php>> (Accessed August 13, 2015).
5. Tobacco Use in Canada: Patterns and Trends <www.tobaccoreport.ca/2015/TobaccoUseinCanada_2015_EcigaretteSupplement.pdf> (Accessed May 18, 2015).
6. Tobacco Use Among Middle and High School Students — United States, 2011–2014. <www.cdc.gov/mmwr/preview/mmwrhtml/mm6414a3.htm> (Accessed September 15, 2015).
7. Goniewicz ML, Knysak J, Gawron M. Levels of selected carcinogens and toxicants in vapour from electronic cigarettes. *Tobacco Control*. 2014. <<http://tobaccocontrol.bmj.com/lookup/lookupui/lookupkey/lookupkeycode/lookupkeycode/content/23/2/133.full.pdf+html>> (Accessed September 20, 2015).
8. Bullen C, Howe C, Laugesen M, et al. Electronic cigarettes for smoking cessation: A randomised controlled trial. *Lancet* 2013;382:1629-37.
9. McRobbie H, Bullen C, Hartmann-Boyce J, Hajek P. Electronic cigarettes for smoking cessation and reduction. *Cochrane Database Syst Rev* 2014;12:CD010216.
10. McNeill A, Brose LS, Calder R, Hitchman SC, Hajek P, McRobbie H. E-cigarettes: An evidence update A report commissioned by Public Health England." Public Health England. <www.gov.uk/government/uploads/system/uploads/attachment_data/file/454516/E-cigarettes_an_evidence_update_A_report_commissioned_by_Public_Health_England.pdf> (Accessed August 22, 2015).
11. Statistics Canada. Canadian Community Health Survey. <www.statcan.gc.ca/pub/82-625-x/2015001/article/14190-eng.htm> (Accessed August 13, 2015).