

UK report underscores potential of e-cigarettes to reduce smoking harms

Most of the harm from smoking could be prevented if a way could be found to provide the nicotine smokers crave without the harmful constituents of tobacco smoke.¹ E-cigarettes have the potential to reduce smoking harms, but their population health impact depends on their uptake among smokers, the extent to which they completely displace smoking, and, crucially, their health effects compared with smoking. These factors must be weighed against any adverse impacts, such as uptake of e-cigarettes among nicotine-naive young people and their absolute health risks compared with using no nicotine products. A report commissioned by the UK Office for Health Improvement and Disparities, *Nicotine Vaping in England: an Evidence Update Including Health Risks and Perceptions, 2022* by Ann McNeill and colleagues,² provides the most rigorous and comprehensive review on this topic to date. This report's findings provide reassurance to smokers, health services, and policy makers.

The report focuses predominantly on a large systematic review of the potential health risks of vaping. Studies of many types, ranging from in-vitro analyses to randomised controlled trials, most with small sample sizes, compared a range of biomarkers of exposure to nicotine and potential toxicants. They showed that people who vape are able to derive similar levels of nicotine as smokers but have substantially lower exposure to volatile organic compounds, tobacco-specific nitrosamines, and other toxicants,² which are implicated in the onset of smoking-related diseases (eg, cancer, respiratory conditions, and cardiovascular disease).³ Although evidence on biomarkers of potential harm (eg, those that cause oxidative stress and inflammation) was limited, McNeill and colleagues concluded there was no evidence to cause concern.² The report concludes that vaping poses a small fraction of the health risks of smoking. By implication, encouraging smokers to switch completely to vaping is likely to be an effective way to reduce the harms of smoking and improve population health.

However, the report acknowledges that, although less harmful than smoking, vaping has some risks compared with not using any nicotine product. Studies that compared biomarkers of toxicant exposure between vapers and people who neither smoke nor vape indicated that although their exposure to many toxicants was similar, exposure to some harmful substances (eg, acrylonitrile, a possible carcinogen³) was higher among vapers.² As such, people who have never smoked should be discouraged from taking up vaping (or smoking) to avoid unnecessary health risks.

The *Nicotine Vaping in England* report suggests that health risks of vaping are often overstated, resulting in inaccurate risk perceptions that could deter people who use the most harmful product (cigarettes) from switching to less harmful product (e-cigarettes). According to representative surveys of young people (11–18 years) and adults (≥18 years) in England in 2021, 55·3% of young people and 65·9% of adult smokers and vapers in England mistakenly think that vaping is as harmful or more harmful than smoking.² Such inaccurate perceptions have probably been fuelled by misrepresentative news coverage of e-cigarette harms, such as that of the US outbreak of vaping-associated lung injury in 2019, which was caused by inhaling vitamin E acetate, an additive in cannabis vaping devices, rather than standard nicotine e-cigarettes.⁴ In an effort to uphold the precautionary principle, the health community may have inadvertently aided the promotion of misinformation.⁵

Concerns about vaping harms also extend to policy. Although some governments, such as the UK Government, encourage smokers to switch to e-cigarettes,⁶ other governments, such as the Government of India, have prohibited the sale and use of e-cigarettes.⁷ The latter approach overlooks the potential for e-cigarettes to improve population health in the context of continued

availability and use of cigarettes and other forms of smoked tobacco, which pose far greater danger to health.²

The report used representative surveys to provide an update on vaping prevalence in England over time. These showed the proportion of adults (≥ 18 years) who vape has increased by around a percentage point each year; the prevalence of vaping among the adults surveyed was 6.3% in 2020, 7.1% in 2021, and 8.3% in 2022.² Over the same period, there has been a sharper rise in the proportion of young people (11–18 years) who vape: 8.6% of young people in England vaped in 2022, compared with 4.0% in 2021 and 4.8% in 2020.² This rise has coincided with a substantial increase in the proportion of young vapers who use disposable e-cigarettes, from 7.8% in 2021 to 52.8% in 2022.² Most major tobacco companies now include e-cigarettes in their product range. Such industry involvement is a cause for concern. E-cigarette companies use social media for advertising and product promotion;⁸ stronger regulation of this activity is needed to deter youth uptake of vaping.⁹ Although vaping is uncommon among never-smoking young people and adults in England (<2%),² some countries, such as the USA,¹⁰ have seen a rise in prevalence among adolescents who have never smoked. It is important to monitor the impact of the rising popularity of newer disposable devices on vaping and smoking prevalence among youth and young adults,¹¹ and consider how these products can be better regulated to make them less appealing to non-smokers.

The report does not address the evidence for the effectiveness of e-cigarettes in helping smokers to quit. In England, e-cigarettes are the most popular quitting aid, used in one in every three quit attempts.¹² The prevalence of e-cigarette use in quit attempts is generally lower in other countries with less supportive harm-reduction policies.¹³ The 2021 update of the living Cochrane review on e-cigarettes for smoking cessation¹⁴ concluded with moderate certainty that nicotine-containing e-cigarettes, used daily, are more effective than nicotine replacement therapy. This conclusion is supported by observational data that show strong associations between use of e-cigarettes and success in quitting at the individual and population level.^{15, 16} The *Nicotine Vaping in England* report concludes that the Cochrane findings on effectiveness and their own findings on health risks suggest that smokers should be encouraged to use e-cigarettes for stopping smoking, or as alternative nicotine delivery devices to reduce the harms of smoking.²

From a clinical perspective, health providers should provide patients who smoke with information about the risks of vaping relative to continuing to smoke and how e-cigarettes can help them stop smoking. Public messaging should also convey the same messages. However, young people who have never smoked should be discouraged from starting to vape. This information needs to be communicated through evidence-based approaches that are non-punitive, foster informed discussion about substance use (eg, the role of industry in creating and driving demand for new nicotine products), and draw on an understanding of adolescent development in home, school, and community settings.¹⁷ Together with strengthened enforcement of restrictions on sales and advertising, sponsorship, and other marketing techniques, such approaches are more likely to be effective than simply telling young people to “say no” to vaping.

This report advances the debate on e-cigarettes and their role in smoking cessation and in harm reduction. The main conclusion of the report—that although vaping poses only a fraction of the risks of smoking it is not risk-free, particularly for people who have never smoked—underlines the need for policy makers to strike the right balance for unique country contexts. Therein lies the challenge: at a global level, countries with weak tobacco control policies and poor regulation of legal and illegal markets of e-cigarettes and tobacco typically view and treat e-cigarettes as an additional burden to tobacco.¹⁸ However, other countries aspire to maximise the benefits of vaping while reducing unintended harms and in so doing have an opportunity to harness the potential of e-cigarettes in accelerating progress towards a smoke-free future.

Sarah Jackson, Chris Bullen

s.e.jackson@ucl.ac.uk

Department of Behavioural Science and Health, University College London, London WC1E 6BT, UK (SJ); School of Population Health, The University of Auckland, Auckland, New Zealand (CB)

SJ receives salary support from Cancer Research UK and is a board member for the London Smoking Cessation Transformation Programme (a regional tobacco control programme). CB has received honoraria from the University of Malaya and AUT University for examining students and reviewing postgraduate courses; grants from the New Zealand Ministry of Health paid to his institution for research on the illicit trade in tobacco and New Zealand Smoking Cessation Guidelines; grants from the Health Research Council of New Zealand as a co-investigator on project grants for tobacco cessation research; is a subrecipient of a US National Institutes of Health grant from Wake Forest University, USA, for New Zealand-based surveys on low nicotine tobacco policy; is a member of the International Scientific Committee of the RESPIRE Study (University of Edinburgh), the Scientific Assessing Committee of the Cancer Society of New Zealand, and the Public Health Advisory Committee of the Health Research Council of New Zealand; and is the President, Oceania SRNT Chapter and President-Elect SRNT for the Society for Research on Nicotine and Tobacco.

- 1 Russell MA. Low-tar medium-nicotine cigarettes: a new approach to safer smoking. *Br Med J* 1976; **1**: 1430–3. DOI: 10.1136/bmj.1.6023.1430.
- 2 McNeill A, Simonavicius E, Brose LS, *et al.* *Nicotine vaping in England: an evidence update including health risks and perceptions, September 2022. A report commissioned by the Office for Health Improvement and Disparities.* London: Office for Health Improvement and Disparities, 2022 <https://www.gov.uk/government/publications/nicotine-vaping-in-england-2022-evidence-update> (accessed Oct 3, 2022).
- 3 Fowles J, Dybing E. Application of toxicological risk assessment principles to the chemical constituents of cigarette smoke. *Tob Control* 2003; **12**: 424–30. DOI: 10.1136/tc.12.4.424.
- 4 Tattan-Birch H, Brown J, Shahab L, Jackson SE. Association of the US Outbreak of Vaping-Associated Lung Injury With Perceived Harm of e-Cigarettes Compared With Cigarettes. *JAMA Netw Open* 2020; **3**: e206981. DOI: 10.1001/jamanetworkopen.2020.6981.
- 5 Ferrey A, Fletcher B, Coker T, *et al.* *E-cigarettes and primary care: A cross-sectional survey of nurses and GPs across the UK.* London, UK: Cancer Research UK, 2019 https://www.cancerresearchuk.org/sites/default/files/cancer-stats/full_report/full_report_0.pdf (accessed Oct 7, 2022).
- 6 Department of Health. *Towards a Smokefree Generation: A Tobacco Control Plan for England.* London: Department of Health, 2017 https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/630217/Towards_a_Smoke_free_Generation_-_A_Tobacco_Control_Plan_for_England_2017-2022__2_.pdf (accessed Oct 7, 2022).
- 7 Chakma JK, Kumar H, Bhargava S, Khanna T. The e-cigarettes ban in India: an important public health decision. *Lancet Public Health* 2020; **5**: e426. DOI: 10.1016/S2468-2667(20)30063-3

- 8 Collins L, Glasser AM, Abudayyeh H, Pearson JL, Villanti AC. E-Cigarette Marketing and Communication: How E-Cigarette Companies Market E-Cigarettes and the Public Engages with E-cigarette Information. *Nicotine Tob Res* 2019; **21**: 14–24. DOI: 10.1093/ntr/ntx284.
- 9 Vogel EA, Ramo DE, Rubinstein ML, *et al.* Effects of Social Media on Adolescents' Willingness and Intention to Use E-Cigarettes: An Experimental Investigation. *Nicotine Tob Res* 2021; **23**: 694–701.
- 10 Tam J, Brouwer AF. Comparison of e-cigarette use prevalence and frequency by smoking status among youth in the United States, 2014–19. *Addiction* 2021; **116**: 2486–97. DOI: 10.1111/add.15439
- 11 Tattan-Birch H, Jackson SE, Kock L, Dockrell M, Brown J. Rapid growth in disposable e-cigarette vaping among young adults in Great Britain from 2021 to 2022: a repeat cross-sectional survey. *Addiction* early view. DOI:10.1111/add.16044. DOI:10.1111/add.16044.
- 12 West R, Kock L, Kale D, Brown J. Monthly trends on smoking in England from the Smoking Toolkit Study. 2022. <https://smokinginengland.info/graphs/monthly-tracking-kpi> (accessed Oct 7, 2022).
- 13 Gravely S, Cummings KM, Hammond D, *et al.* Self-Reported Quit Aids and Assistance Used By Smokers At Their Most Recent Quit Attempt: Findings from the 2020 International Tobacco Control Four Country Smoking and Vaping Survey. *Nicotine Tob Res* 2021; **23**: 1699–707. DOI: 10.1093/ntr/ntab068.
- 14 Hartmann-Boyce J, McRobbie H, Butler AR, *et al.* Electronic cigarettes for smoking cessation. *Cochrane Database Syst Rev* 2021. DOI:10.1002/14651858.CD010216.pub6. DOI: 10.1002/14651858.CD010216.pub6.
- 15 Jackson SE, Kotz D, West R, Brown J. Moderators of real-world effectiveness of smoking cessation aids: a population study. *Addiction* 2019. DOI: 10.1111/add.12429.
- 16 Beard E, West R, Michie S, Brown J. Association between electronic cigarette use and changes in quit attempts, success of quit attempts, use of smoking cessation pharmacotherapy, and use of stop smoking services in England: time series analysis of population trends. *BMJ* 2016; **354**: i4645. DOI: 10.1136/bmj.i4645.
- 17 Griffin KW, Botvin GJ. Evidence-Based Interventions for Preventing Substance Use Disorders in Adolescents. *Child Adolesc Psychiatr Clin N Am* 2010; **19**: 505–26. DOI: 10.1016/j.chc.2010.03.005.
- 18 Gravely S, Fong GT, Cummings KM, *et al.* Awareness, trial, and current use of electronic cigarettes in 10 countries: Findings from the ITC project. *Int J Environ Res Public Health* 2014; **11**: 11691–704. DOI: 10.3390/ijerph111111691.