

Vaping needs much tighter regulation as we approach Smokefree Aotearoa 2025: Two new studies

22 November 2021

Nick Wilson, Janet Hoek, Jennifer Summers, Driss Ait Ouakrim, Andrew Waa, Richard Edwards, Tony Blakely



Two recent studies provide new insights into the impact vaping may have on public health. The first estimates that use of modern vaping devices could be around a third as harmful to health as smoking. The second uses these findings to estimate the net health and cost impacts for NZ of vaping devices having become widely available. We draw on these findings to conclude that vaping needs much tighter regulation to maximise benefits and minimise harms.

Background

Tobacco smoking is a major health problem in Aotearoa New Zealand (NZ), with an estimated 4790 attributable deaths in 2019 (95% uncertainty interval [UI]: 4510 to 5100 deaths) [1]. The total health loss in 2019, including non-fatal illness, was estimated at 116,000 disability-adjusted life years (DALYs) lost (95%UI: 108,000 to 125,000) [1]. Furthermore, smoking causes health inequities, with poorer health for Māori relative to non-Māori [2] [3]. Exposure to second-hand smoke is estimated to cause an additional 347 attributable deaths per year in NZ and an additional 9022 lost DALYs per year [4].

Fortunately, the NZ Government's recent Discussion Document outlining proposals for an Action Plan to realise the Smokefree Aotearoa 2025 Goal, recognises the threat smoking poses to population health and health equity [5]. The Discussion Document outlines many important actions, including denicotinisation and greatly reduced availability of tobacco products. However, although the NZ Government has also passed vaping product legislation [6] [7], we argue the regulations are inadequate, given the findings of two new studies investigating potential risks posed by vaping.

New study on vaping harm relative to tobacco smoking

The first study (that some of us authored) [8], identified biomarkers (levels of toxicants in the blood/urine/exhaled breath) that have specific associations with different disease groupings e.g., volatile organic compound (VOCs) for chronic obstructive pulmonary disease (COPD), and tobacco-specific N'-nitrosamines (TSNAs) and polycyclic aromatic hydrocarbons (PAHs) for all cancers. We reviewed recent studies (from 1 January 2017 onwards) that compared levels of these biomarkers between people exclusively vaping and those exclusively smoking tobacco. We applied relative differences in these biomarkers (and hence risk of disease) to previously modelled estimates of smoking-related health loss in health-adjusted life-years (HALYs) [9].

We found that the disease-related biomarker levels in people who were exclusively vaping vs exclusively smoking were 28% for respiratory disease biomarkers (5 results, 3 studies); 42% for cancer biomarkers (5 results, 4 studies), and 35% for cardiovascular disease biomarkers (7 results, 4 studies).** When integrated with the HALY impacts by disease, we estimated the overall harm to health from vaping to be 33% that of smoking. Nevertheless, because this estimate is based on a relatively limited number of biomarker studies, and given potential biases in our method (detailed in our published paper [8]), we suggest viewing this figure as a likely upper level of risk posed by vaping. Further research, including additional biomarker studies and long-term epidemiological studies that include cohorts of exclusive vapers, is urgently needed to refine our estimates.

New study updating the health and cost impacts of vaping in NZ

The second study that some of us authored [10], used these estimates of vaping harm to update a previous NZ study modelling the health impacts of smoking and vaping [11], using an existing proportional multi-state life-table model of 16 tobacco-related diseases. This modelling estimated the net benefits (or harms) of allowing vaping in NZ compared to the counterfactual of NZ having never allowed sale of vaping products. This study captured the potential health gain due to vaping acting as a less harmful substitute for people who cannot or do not want to stop using nicotine and the potential harm from sustained exclusive vaping and that arising from youth uptake of vaping.

Our modelling results suggest that widespread access to vaping products in NZ (compared to vaping products kept out of NZ) is expected to result in a gain of 195,000 quality-adjusted life-years (QALYs – similar to the HALYs referred to above) over the remainder of the lifespan of the NZ population in the year 2011. However, there was also wide uncertainty in QALYs gained (95%UI = -8000 to 406 000) (with further details around all these estimates in the published work [10]). We also report a small (3.2%) probability of net health loss, where the simulation runs returned net negative changes in QALYs (e.g., due to potential increases in youth vaping uptake). Health system cost-savings from allowing wide availability of vaping products were expected to be NZ\$2.8 billion over the lifespan of the NZ population, but again with very wide uncertainty (95%UI: -0.3 to 6.2 billion [in 2011

NZ\$]).

In summary, the updated modelling estimating impacts of allowing vaping products in NZ, still suggests likely overall health and cost-saving benefits – but of lesser magnitude than previous work [11].

What might these findings mean for advancing smoking and vaping policies?

The enormous harm to population health and to health equity from smoking means the NZ Government must act decisively. Proposed measures that could profoundly reduce smoking prevalence include mandated denicotinisation of all supplied tobacco (as per a NZ modelling study [12] and previous blog [13]). Marked reductions in tobacco's availability are also crucial and have previously been modelled [14] [15] and discussed [16] [17]).

But given the potential benefits and harms of vaping, policy options should be pursued that maximise the benefits (supporting its use as a complete substitute among people who smoke) and minimise the harms (uptake among youth and other non-smokers). That is, we need policies that recognise different population groups face varying risks and benefits; current policy does not adequately reflect the nuances required, and therefore we suggest the following actions:

1. **Further restricting the sales of vaping products** to either pharmacies or R18 outlets only (e.g., specialist stores licensed to sell vaping products) to prevent illegal sales to youth and maximise the advice and support available to people who smoke to use vaping to quit smoking or switch completely to vaping. To ensure the “retail playing field” does not favour smoked tobacco products over vaping products, much stronger restrictions on availability should apply to tobacco products.
2. **Monitoring and surveillance of social media promotions that market vaping products to youth** by NZ-based vaping product suppliers. NZ studies show extensive youth-oriented marketing has continued after legislation restricting vape advertising came into effect [18]. Tobacco company documents also show that the industry view vape products as “additive” and likely to attract new users, which is the antithesis of the harm reduction arguments underpinning the NZ Government's policy [19]. Social media marketing requires much greater monitoring by NZ health authorities, with rigorous penalties applied to those breaching the law, including potential bans imposed on recidivist companies.
3. Ongoing NZ Government **funding of evaluation and research** of both the recently enacted regulations on vaping and any new ones (as suggested here).
4. **Government funding of additional research** into the relative harm of vaping vs smoking (biomarker studies and epidemiological studies). This could be supported by annual licensing fees on tobacco and vaping product retailers.

In summary, we present evidence from a new study that vaping could be a third as harmful to health as smoking. While access to vaping products is likely to reduce the overall health harm from smoking in NZ, the availability and marketing of vaping products need much stronger regulation to maximise benefits and minimise harms.

***Author details:** The authors are with the Department of Public Health, University of Otago Wellington, NZ; except for Prof Tony Blakely and Dr Ait Ouakrim who are with

Population Interventions, Centre for Epidemiology and Biostatistics, Melbourne School of Population and Global Health, University of Melbourne, Melbourne, Australia.

** Note that these percentages are for the biomarker level difference between people who were exclusively vaping or exclusively smoking. But there are various limitations with these comparisons – with the main one likely to be that the analysis excludes many more unmeasured toxicants in smoking than unmeasured toxicants from vaping (owing to these not having been studied or being difficult to measure). See the full article for further details on the study limitations [9].

References

1. GBD Tobacco Collaborators. Spatial, temporal, and demographic patterns in prevalence of smoking tobacco use and attributable disease burden in 204 countries and territories, 1990-2019: a systematic analysis from the Global Burden of Disease Study 2019. *Lancet*. 2021;(E-publication 31 May).
2. Blakely T, Disney G, Valeri L, Atkinson J, Teng A, Wilson N, et al. Socioeconomic and Tobacco Mediation of Ethnic Inequalities in Mortality over Time: Repeated Census-mortality Cohort Studies, 1981 to 2011. *Epidemiology*. 2018;29(4):506-516.
3. Teng A, Blakely T, Atkinson J, Kalediene R, Leinsalu M, Martikainen PT, et al. Changing social inequalities in smoking, obesity and cause-specific mortality: Cross-national comparisons using compass typology. *PLoS One*. 2020;15(7):e0232971.
4. Institute of Health Metrics and Evaluation. GHDx (Global Health Data Exchange); Results for New Zealand (on 24 May 2021). Seattle; Institute of Health Metrics and Evaluation. <http://ghdx.healthdata.org/gbd-results-tool>.
5. Ministry of Health. Proposals for a Smokefree Aotearoa 2025 Action Plan: Discussion document. Wellington: Ministry of Health 2021. https://www.health.govt.nz/system/files/documents/publications/proposals_for_a_smokefree_aotearoa_2025_action_plan-final.pdf
6. Edwards R, Hoek J, Waa A. E-cigarettes, vaping and a Smokefree Aotearoa: where to next? *N Z Med J*. 2020;133(1517):14-17.
7. Hoek J, Wilson N, Edwards R, Waa A. New e-liquid flavour restrictions: Potential impacts on young people and people who smoke. *Public Health Expert Blog* 2021;(10 August). <https://blogs.otago.ac.nz/pubhealthexpert/new-e-liquid-flavour-restrictions-potential-impacts-on-young-people-and-people-who-smoke/#more-15019>.
8. Wilson N, Summers JA, Ait Ouakrim D, Hoek J, Edwards R, Blakely T. Improving on estimates of the potential relative harm to health from using modern ENDS (vaping) compared to tobacco smoking. *BMC Public Health*. 2021;21(1):2038.
9. Blakely T, Cobiac LJ, Cleghorn CL, Pearson AL, van der Deen FS, Kvizhinadze G, et al. Health, health inequality, and cost impacts of annual increases in tobacco tax: Multistate life table modeling in New Zealand. *PLoS Med*. 2015;12(7):e1001856.
10. Summers JA, Ait Ouakrim D, Wilson N, Blakely T. Updated Health and Cost Impacts of Electronic Nicotine Delivery Systems, Using Recent Estimates of Relative Harm for Vaping Compared to Smoking. *Nicotine Tob Res*. 2021;ntab178, <https://doi.org/10.1093/ntr/ntab178>.
11. Petrović-van der Deen FS, Wilson N, Crothers A, Cleghorn CL, Gartner C, Blakely T. Potential country-level health and cost impacts of legalizing domestic sale of vaporized nicotine products. *Epidemiol*. 2019;30:396-404.
12. Wilson N, Hoek J, Nghiem N, Summers J, Grout L, Edwards R. Preliminary High-Level Modelling Estimates of Impacts of Denicotinisation on Smoking Prevalence in Aotearoa

New Zealand. medRxiv 2021.08.13.21262035; doi:

<https://doi.org/10.1101/2021.08.13.21262035>

13. Edwards R, Hoek J, Wilson N, Bullen C. Reducing nicotine in smoked tobacco products: A pivotal feature of the proposals for achieving Smokefree Aotearoa 2025. Public Health Expert 2021;(30 April).
<https://blogs.otago.ac.nz/pubhealthexpert/reducing-nicotine-in-smoked-tobacco-products-a-pivotal-feature-of-the-proposals-for-achieving-smokefree-aotearoa-2025/>.
14. van der Deen FS, Wilson N, Cleghorn CL, Kvizhinadze G, Cobiac LJ, Nghiem N, et al. Impact of five tobacco endgame strategies on future smoking prevalence, population health and health system costs: two modelling studies to inform the tobacco endgame. Tob Control. 2018;27(3):278-286.
15. Petrović-van der Deen FS, Blakely T, Kvizhinadze G, Cleghorn CL, Cobiac LJ, Wilson N. Restricting tobacco sales to only pharmacies combined with cessation advice: a modelling study of the future smoking prevalence, health and cost impacts. Tob Control. 2019;28(6):643-650.
16. Robertson L, Hoek J, Edwards R, Petrović-van der Deen F, Thomson G, Marsh L. Reducing tobacco retail availability: how could this be achieved and what evidence supports the NZ Government's proposals? Public Health Expert 2021;(6 May).
<https://blogs.otago.ac.nz/pubhealthexpert/reducing-tobacco-retail-availability-how-could-this-be-achieved-and-what-evidence-supports-the-nz-governments-proposals/>.
17. Edwards R, Marsh L, Robertson L, Petrović-van der Deen F, Wilson N, Hoek J. A Smokefree Aotearoa – could making tobacco products available only through community pharmacies help us get there? Public Health Expert 2021;(12 August).
<https://blogs.otago.ac.nz/pubhealthexpert/a-smokefree-aotearoa-could-making-tobacco-products-available-only-through-community-pharmacies-help-us-get-there/>.
18. Cochran C, Robertson L, Hoek J. Online marketing activity following New Zealand's vaping legislation. Tob Control. 2021.
19. Robertson L, Hoek J, Gilmore A, Edwards R, Waa A. Regulating vaping and new nicotine products: Are tobacco companies' goals aligned with public health objectives? Public Health Expert Blog 2020;(27 March).
<https://blogs.otago.ac.nz/pubhealthexpert/regulating-vaping-and-new-nicotine-products-are-tobacco-companies-goals-aligned-with-public-health-objectives/>.

Public Health Expert Briefing (ISSN 2816-1203)

Source URL:

<https://www.phcc.org.nz/briefing/vaping-needs-much-tighter-regulation-we-approach-smoke-free-aotearoa-2025-two-new-studies>