

# Excise, electronic cigarettes and nicotine reduction to reduce smoking prevalence in New Zealand by 2025

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**W**e investigate the possibility of achieving the Māori Affairs Select Committee's aspirational goal of only 5% of adults smoking by 2025,<sup>1</sup> by increasing excise tax, making electronic cigarettes legal to sell, and reducing cigarette nicotine content. Our results show this is feasible.

Consumption and census data show similar rates of decline. Nicotine e-cigarettes (ECs) do not contain tobacco, cause few deaths, are not taxed, but currently cannot be purchased legally in New Zealand. Many 'vape' these devices without no proven extra harm.<sup>2</sup> In 2014, a total of 1% of New Zealand adults used e-cigarettes daily.<sup>3</sup> ECs, if approved for sale as a medicine, can be sold under the Medicines Act. Otherwise, ECs could only be sold if the Smoke-free Environments Act was revised. In 2015, tank e-cigarettes cost \$3 per week, while the price of a packet of 20 cigarettes (\$20) is rising each year due to excise.

From 2006–2009, tobacco consumption failed to fall below 2006 figures, as the translated smoking prevalence graph shows in Figure 1. From 2010 to 2014 the excise rose 10% per year and cigarette consumption per adult decreased by a mean 6.3% per year<sup>4</sup> (for 2010–2013 and M. Laugesen, personal communication, 2015). The decreases in future prevalence after 2016 are estimated proportionally as 9.45%, 11.1% and 12.6% if excise rose annually by 15%, 17.5% or 20%. These new plots are depicted in Figure 1, numbering each plot from the top down.

*Plot 1.* Shows the legislated scenario for 2010–2016, during which time tobacco excise increased 10% per year. We would

expect the percentage of smokers to decrease by a mean 6.3% per year through to 2016, and then decrease by 2.16% per year (based on the years 2003–2009, when real excise was not increased any more). In this scenario, 10.2% of adults would smoke in 2025.

*Plot 2.* Excise tax is extended at the current 10% increase per year from 2017 to 2025. If Parliament approved this, we would expect prevalence to decline by 6.3% per year. This would result in 6.9% of adults smoking in 2025, well above the goal of 5%.

*Plot 3.* Excise is increased to 15% commencing 1 January 2017. The percentage smoking each year declines by 9.45% and lowers adult smoking to 5.1% in 2025.

*Plot 4.* This shows the effect of increasing price by 17.5% annually from 2016, composed of 10% excise increase combined with a 7.5% effect from reducing nicotine content per year. This would mean reducing nicotine below New Zealand's average nicotine content in 2011 (8.1 mg for factory-made and 10.9 mg for roll-your-own cigarettes)<sup>5</sup> to the lowest possible level of 2 mg nicotine per cigarette (a non-addictive level). In our recent New Zealand trial, comparing ordinary full-priced cigarettes versus nicotine-free non-addictive cigarettes at no cost, consumption was halved.<sup>6</sup> Increases in cost and decreases in nicotine content have been shown to have similar effects on consumption, suggesting that the key factor is the unit price of nicotine.<sup>7</sup> By 2025 4.1% of adults still smoke.

*Plot 5.* If excise is raised 20% per year, smoking prevalence falls 12.6% annually and 3.7% smoke in 2025.

*Plot 6.* Excise is increased to 15% beginning 1 January 2017. In 2014 in the US, 5.7% of ex-smokers reported daily e-cigarette use, while 85% of vapers among ex-smokers had stopped smoking within the past five years, suggesting but not proving that ECs had helped them stop smoking.<sup>8</sup> In the UK in 2014, 4.7% of ex-smokers reported regular e-cigarette use.<sup>9</sup> On this basis we deducted an average  $(5.7+4.7)/2 \times 85\% = 4.4\%$  from New Zealand's consumption from 2016 to 2025; 3.0% of adults would smoke in 2025.

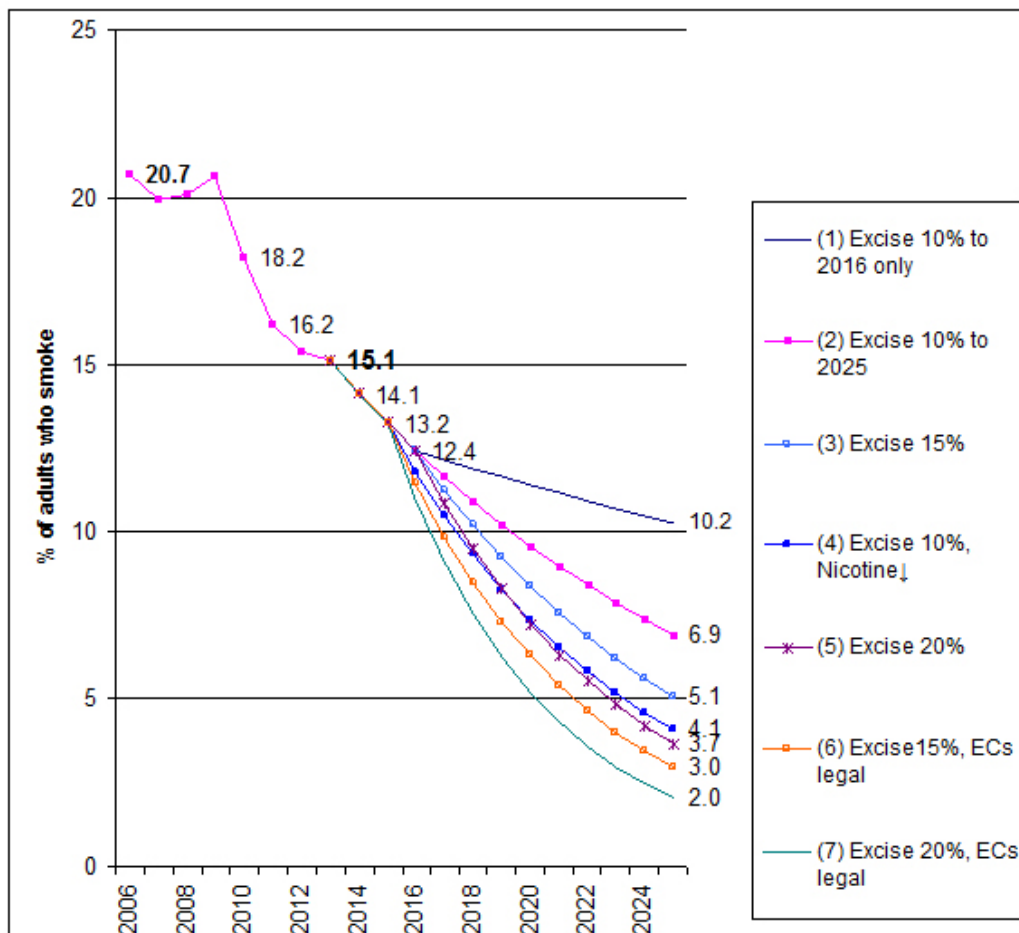
*Plot 7.* With prevalence decreasing 12.6% per year as in Plot 5, and with ECs legal as in Plot 6, 2% would smoke in 2025.

from 2017 to 2025 are required to reduce smoking rates to under 5%. Reduced increases will not achieve this goal. Excise, combined with legalised nicotine e-cigarettes or reduced nicotine cigarettes, will also reduce smoking below 5% in 2025. For groups with traditionally high smoking prevalence, further government action may be needed to make e-cigarettes low cost. Kozlowski,<sup>10</sup> writing in the US where support has been strongest for reduced nicotine cigarettes, asks why wait—when the excise measures to reduce the harms of smoking can become available as soon as government decides. We estimate that as current rates of excise continue, cigarettes in 2025 will retail at over \$40 per packet of 20s. Once the 2025 goal is attained legislation may be needed to phase out the import and sale of tobacco products altogether.

## Discussion

The bottom four scenarios in Figure 1 achieve the desired 5% or less smoking by 2025. Excise increases of 20% per year

**Figure 1:** Estimated proportion of adults who smoke, by prevention group, 2006–2025.



Smoking prevalence is shown in 2006 and 2013 by Census, and for the years between it is estimated from tobacco products consumption per adult.<sup>4</sup>

**Competing interests:**

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**REFERENCES:**

1. Inquiry into the tobacco industry in Aotearoa and the consequences of tobacco use for Māori. Report of the Māori Health Committee, 49th Parliament (Hon Tau Henare, chairperson) November 2010. Presented to the House of Representatives.
2. Bullen C, Howe C, Laugesen M, et al. Electronic cigarettes for smoking cessation: a randomised controlled trial. *Lancet* 2013; 382: 1629–37. [http://dx.doi.org/10.1016/S0140-6736\(13\)61842-5](http://dx.doi.org/10.1016/S0140-6736(13)61842-5). Published on-line 8 Sept 2013.
3. Li J., Bullen C, Newcombe R, Walker N, Walton D. The use and acceptability of electronic cigarettes among New Zealand smokers. *NZ Med J* 31 May 2013;126 No 1375. <http://journal.nzma.org.nz/journal/126-1375/5675/>
4. Laugesen M. Analysis of Manufacturers Returns to the Ministry of Health, 2013. [www.health.govt.nz/system/families/documents/pages/2013cvreport-for-2014-formatted-26-aug14.doc](http://www.health.govt.nz/system/families/documents/pages/2013cvreport-for-2014-formatted-26-aug14.doc)
5. Laugesen M. Modelling a two-tier tobacco excise policy to reduce smoking by focussing on the addictive component (nicotine) more than the tobacco weight. *NZ Med J* 2012 14 Dec;125 (1367):35-48.
6. Natalie Walker, Trish Fraser, Colin Howe et al. Abrupt nicotine reduction as an endgame policy: a randomised trial. *Tob Control* First on line. 2014 Nov 14, pii: tobaccocontrol-2014-051801.
7. Tracy T. Smith, Alan F. Sveda, Dorothy K. Hatsukami, et al. Nicotine reduction as an increase in the unit price of cigarettes: A behavioral economics approach. *Prev Med.* 2014 Jul 13. pii: S0091-7435(14)00246-1. doi: 10.1016/j.ypmed.2014.07.005.
8. Rodu B. 30 million US adults have used e-cigarettes, unpublicised CDC data reveals. *Tobacco Truth.* 14 July 2015. (based on the 2014 United States National Health Interview Survey, released June 29). <http://rodutobaccotruth.blogspot.co.nz/2015/07/30-million-have-used.e.html>
9. ASH fact sheet on electronic cigarettes. ASH UK, 2014. [www.ash.org.uk](http://www.ash.org.uk)
10. Kozłowski LT. Prospects for a nicotine-reduction strategy in the cigarette endgame: alternative tobacco harm reduction scenarios. *Int J Drug Policy.* 2015 Feb 23; pii: 20955-3959(15)00043-2. doi: 10.1016/j.drugpo.2015.02.001 <http://dx.doi.org/10.1016/j.drugpo.2015.02.001> First published 23 Feb. 2015.