

# Modelling the number of quitters needed to achieve New Zealand's Smokefree 2025 goal for Māori and non-Māori

Nick Wilson, Frederieke Sanne Petrović-van der Deen, Richard Edwards, Andrew Waa, Tony Blakely

## ABSTRACT

**AIM:** To estimate the numbers of people required to quit smoking in New Zealand to achieve the Smokefree 2025 goal and to compare these with current levels of quitting.

**METHODS:** We used the established BODE<sup>3</sup> tobacco forecasting model to project smoking prevalence separately for Māori and non-Māori to 2025 under a business-as-usual (BAU) scenario. We then determined by what factor current annual cessation rates would have to increase to achieve an adult smoking prevalence of under 5% by the year 2025, while annual smoking uptake rates continued to follow BAU patterns. Comparisons were also made in terms of estimated current long-term quitters arising from official reports of smoking cessation service use (Quitline and face-to-face support services).

**RESULTS:** To achieve a below 5% smoking prevalence by 2025, there would need to be additional averages of 8,400 Māori long-term quitters per year (5.2 times the BAU level on average) and 8,800 extra non-Māori quitters per year during 2018 to 2025 (1.9 times the BAU level on average). We estimated that the Quitline and funded face-to-face smoking cessation services are generating 2,000 Māori and 6,100 non-Māori long-term quitters per year. But this represents only 19% of Māori and only 34% of the non-Māori quitters required.

**CONCLUSIONS:** This modelling work suggests that to achieve the Smokefree 2025 goal, there would need to be very major increases in quit rates. To achieve this goal the New Zealand Government will need to massively increase investment in established interventions (smoking cessation support, mass media) while continuing with substantial tobacco tax increases, or else add substantive new strategies into the intervention mix.

Projections of future smoking prevalence suggest that a continuation of current policies and services will be insufficient to achieve the New Zealand Government's Smokefree 2025 goal (generally considered to be <5% adult daily smoking prevalence).<sup>1-3</sup> In particular, this modelling work has suggested that the under 5% target would be missed for non-Māori and by a very wide margin for Māori, a particular concern given the importance of addressing ethnic inequalities in health in this country.<sup>4</sup>

Despite the urgent need for more progress, no New Zealand Government has published a plan setting out how the Smokefree 2025

goal will be achieved (although in 2018 the goal of developing an action plan was announced by the Associate Minister of Health<sup>5</sup>). Furthermore, current tobacco control funding by central government is mainly allocated to the provision of individual-level smoking cessation services (eg, the Quitline) and pharmacotherapy (largely funded by Pharmac). Given this background, we aimed to inform planning to achieve the Smokefree 2025 goal by estimating the numbers of people required to quit smoking to achieve the goal and to compare these with current levels of quitting.

## Methods

We used the established BODE<sup>3</sup> tobacco forecasting model<sup>1–3,6,7</sup> to project smoking prevalence separately for Māori and non-Māori to 2025 under a business-as-usual (BAU) scenario. This BAU scenario assumed a continuation of current annual trends in smoking uptake and cessation rates (established between the 2006 and 2013 Censuses) with the added impact of the scheduled 10% annual tobacco tax increases until the last one in January 2020 (for details see van der Deen et al<sup>3</sup>). We projected the total daily smoker population each year, as well as the net number of successful quitters. The latter was the difference in the total of daily smokers between the current and the previous year, after excluding reductions due to daily smokers who had died during the year and additional young people estimated to have been prevented from taking up smoking compared to the previous year.

We then determined by what factor current annual cessation rates would have to increase to achieve adult smoking prevalence of under 5% by the year 2025, while annual smoking uptake rates continued to follow BAU patterns (ie, remained unchanged). In this way it was possible to estimate the additional number of successful quitters needed among Māori and non-Māori smoker populations each year to achieve the Smokefree 2025 goal.

Finally, we estimated the number of long-term quitters generated by the Quitline and Ministry of Health-funded face-to-face smoking cessation services. We used data provided by the Ministry for the last three quarterly reporting periods of 2017 and the first quarter of 2018.<sup>8</sup> For estimating the long-term quit rate for these service users, we used the estimate of 13.4% from a published New Zealand study of the Quitline<sup>9</sup> (which considered data from four published trials involving this Quitline<sup>10–13</sup>). Of note however, is that we had to apply this 13.4% figure (derived from studies of the telephone-delivered part of the Quitline Service) to all Quitline Service users (including those using the text-messaging

service and email conversation service) and to face-to-face cessation services. This was owing to a lack of data on quit success rates for these other types of service delivery.

## Results

Under the BAU trends in smoking cessation and uptake, the projected smoking prevalences in 2025 were 17.4% for Māori and 7.2% for non-Māori (see Table 1 and Table 2 respectively). Under these projections, there will still be around nearly 90,000 Māori smokers and 220,000 non-Māori smokers in the year 2025, around 64,000 and 67,000 more respectively than would be still smoking if a prevalence of 4.99% for both population groups was achieved.

From 2018–2025, an average of around 2,000 Māori and 9,200 non-Māori smokers were estimated to quit successfully under BAU conditions each year (see Tables), with greater numbers quitting in the earlier years. To achieve a below 5% smoking prevalence by 2025, there will need to be additional averages of an extra 8,400 Māori long-term quitters per year (5.2 times the BAU level) and 8,800 extra non-Māori quitters per year (1.9 times the BAU level on average). However, assuming a constant rate of quitting over time (as seems most sensible, and is embedded in our forecasting model), these numbers are much higher in the early years. For example, around 20,200 Māori and 14,800 non-Māori additional quitters would be required in 2018, and an average of around 15,000 Māori and 12,400 non-Māori additional quitters from 2018–2020 for this initial period (see Tables).

We estimated that the Quitline and funded face-to-face smoking cessation services are currently generating around 8,100 long-term quitters per year (6,000 and 2,100 respectively), including 2,000 Māori and 6,100 non-Māori quitters. This represents around 29% of the around 28,000 required quitters per year during the 2018–2025 period overall, only 19% for Māori and 34% for non-Māori. Figures 1 and 2 show these number of quitters relative to the total number of quitters required to achieve the Smokefree goal by the year 2025.

## Discussion

This analysis suggests that there will have to be a very substantial increase in numbers of smokers enrolling with, and quitting through, the Quitline and face-to-face smoking cessation services to achieve the numbers of quitters to be on track to achieve the Smokefree 2025 goal. In particular, the increase required in service provision and supported quitting through the services for Māori to achieve the goal (over five times the BAU level) seems unrealistic.

It is possible that our results have overestimated the difficulty of achieving the Smokefree 2025 goal. For example, increasing use of e-cigarettes<sup>14</sup> and new types of non-combusted nicotine-delivery

products appearing on the market (eg, 'JUUL'<sup>15</sup>) may possibly result in increased quit rates of tobacco cigarettes. We also did not take into account the likely beneficial impact of plain (standardised) packaging introduced in New Zealand in 2018. Conversely, we may have slightly overestimated the beneficial impact of tobacco tax increases due to tobacco industry strategies such as increasing the number of budget brands available and not fully passing through the tax into higher prices for these products.<sup>16</sup> Furthermore, we may have underestimated smoker numbers and the numbers of quitters required because we used census estimates for smoking prevalence in our model. Smoking prevalence estimates from the census tend to be lower

**Table 1:** Projected smoking prevalence and number of Māori smokers by year into the future under business-as-usual (BAU) annual trends in smoking uptake and cessation rates and under increased cessation rates that would be needed to achieve <5% adult daily smoking prevalence by 2025.

Year	Projected adult smoking prevalence (crude) assuming BAU (includes current plans of tobacco tax increases until 2020)*	Projected number of smokers assuming BAU	Projected number of successful quitters each year under BAU (difference in the number of smokers each year minus smokers who died and averted initiators)**	Projected smoking prevalence under sufficiently high cessation rates to achieve <5% smoking prevalence by 2025 (ie, baseline cessation rates were increased to achieve the target)	Hypothetical total smoker population on track to reach the <5% target	Number of smokers that would need to quit successfully each year to achieve <5% smoking prevalence by 2025*	Additional number of successful quitters (relative to BAU) needed each year to achieve <5% smoking prevalence by 2025
2018	24.0%	108,000	2,740	19.6%	87,600	22,900	20,200
2019	22.7%	104,000	2,760	15.3%	69,800	17,200	14,400
2020	21.5%	101,000	2,900	12.1%	56,400	13,100	10,200
2021	20.6%	98,000	1,440***	9.8%	47,000	9,190	7,750
2022	19.7%	96,000	1,430	8.1%	39,500	7,060	5,620
2023	18.9%	94,000	1,620	6.8%	33,700	5,610	3,990
2024	18.1%	92,000	1,580	5.8%	29,300	4,340	2,760
2025	17.4%	90,000	1,480	4.99% (on target)	25,900	3,320	1,850

\*For long-term projections under BAU (out to the year 2060), see Figure 1 in the previous publication using the same model: van der Deen et al 2016<sup>3</sup>.

\*\*This column represents the projected number of successful quitters between this and the previous year under baseline trends in smoking uptake and cessation, and excludes those who died or were prevented from taking up smoking (as a result of existing tobacco control strategies—including tobacco tax increases through to January 2020). It is as such, not the exact difference between the number of smokers in this and the previous year in the column on the left.

\*\*\*This lower number of quitters in this year is due to the end of the current series of annual tobacco tax increases (see *Methods*).

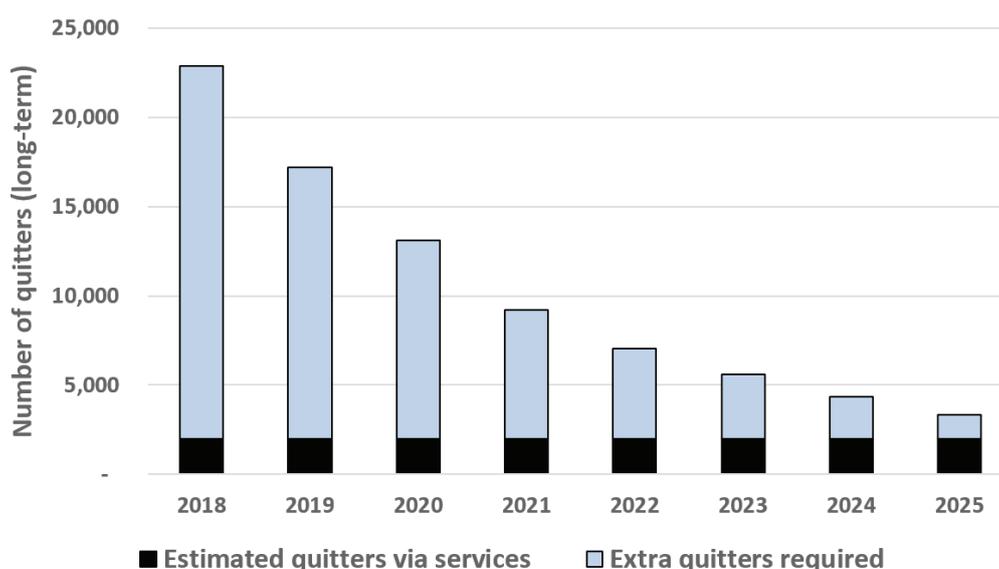
All values are rounded to three meaningful digits.

**Table 2:** Projected smoking prevalence and number of non-Māori smokers by year into the future under business-as-usual (BAU) annual trends in smoking uptake and cessation rates and under increased cessation rates that would be needed to achieve <5% adult daily smoking prevalence by 2025.

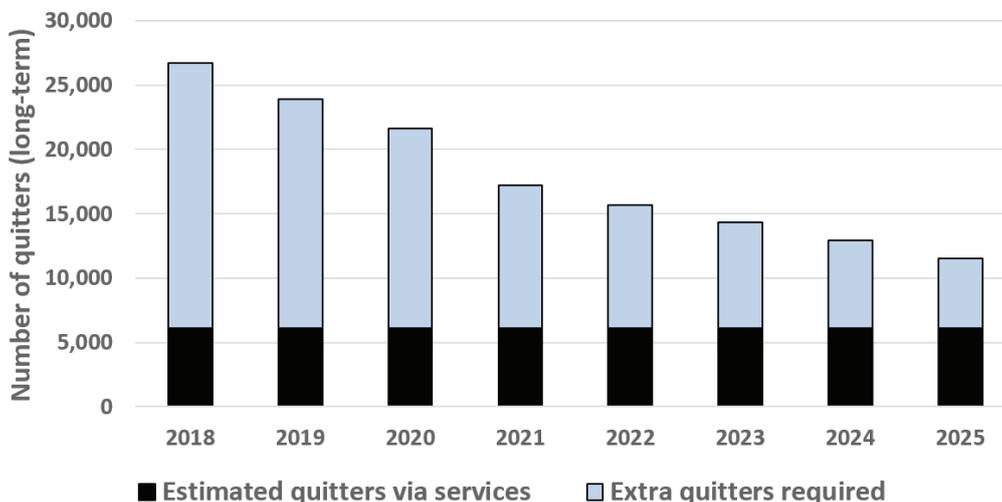
Year	Projected adult smoking prevalence (crude) assuming BAU (includes current plans of tobacco tax increases until 2020)*	Projected number of smokers assuming BAU	Projected number of successful quitters each year under BAU (difference in the number of smokers each year minus smokers who died and averted initiators)*	Projected smoking prevalence under sufficiently high cessation rates to achieve <5% smoking prevalence by 2025 (ie, baseline cessation rates were increased to achieve the target)	Hypothetical total smoker population on track to reach the <5% target	Number of smokers that would need to quit successfully each year to achieve <5% smoking prevalence by 2025*	Additional number of successful quitters (relative to BAU) needed each year to achieve <5% smoking prevalence by 2025
2018	9.9%	295,000	11,900	9.4%	280,000	26,700	14,800
2019	9.4%	281,000	11,600	8.5%	254,000	23,900	12,300
2020	8.9%	268,000	11,300	7.7%	231,000	21,600	10,300
2021	8.5%	257,000	8,250	7.0%	212,000	17,200	8,990
2022	8.2%	247,000	8,100	6.4%	195,000	15,700	7,610
2023	7.8%	238,000	7,940	5.9%	179,000	14,300	6,380
2024	7.5%	229,000	7,600	5.4%	166,000	12,900	5,310
2025	7.2%	220,000	7,160	<b>4.99% (on target)</b>	153,000	11,500	4,380

\*See the footnotes for Table 1.

**Figure 1:** Projected annual number of Māori quitters required to achieve <5% adult daily smoking prevalence by 2025, including the estimated number of quitters achieved via current Ministry of Health funded smoking cessation services.



**Figure 2:** Projected annual number of non-Māori quitters required to achieve <5% adult daily smoking prevalence by 2025, including the estimated number of quitters achieved via current Ministry of Health funded smoking cessation services.



than the estimates in the New Zealand Health Survey (especially for Māori), as we have detailed elsewhere,<sup>17</sup> albeit somewhat less different for the most recent New Zealand Health Survey data.<sup>18</sup> Our estimates of long-term quit rates achieved by the Quitline may also be overestimated, given our assumption that the 13.4% quit rate from users of the telephone-delivered approach of Quitline Service also applied to those using the text-messaging service, the email conversation service and face-to-face smoking cessation services.

Despite these limitations, it is unlikely that they would substantially change the key finding of this current work, which is that an unrealistically large increase in the usage of cessation services on its own would be required to meet the Smokefree 2025 goal. We note that others have also described the role of assisted quitting through health service provision as modest (in terms of achieving population smoking prevalence reductions).<sup>19</sup> For example, unassisted quitting dominates in Australia with 54% to 69% of ex-smokers having quit unassisted according to a recent systematic review of Australian studies.<sup>20</sup>

So if the Government is to achieve its Smokefree 2025 goal we see two main options for moving forward as detailed below.

- 1. Greatly enhanced investment in established tobacco control measures:** This option would involve massively increased investment in cessation services (eg, the Quitline) and associated mass media campaigns, and other approaches to increase the uptake. Together this package has been shown to be very cost-effective, as per our modelling work on the New Zealand Quitline.<sup>9</sup> New Zealand appears to have under-invested in mass media campaigns historically,<sup>21,22</sup> even though some of these campaigns have shown to assist with advancing tobacco control for Māori (eg, the successful “Its About Whanau” campaign<sup>23,24</sup>). Continuing to raise tobacco taxes<sup>6,25–27</sup> would need to be part of this mix, albeit with using some of the tax revenue to assist smokers with quitting. Furthermore, to reduce the risk of financial hardship for smokers who can’t readily quit, some of the tobacco tax revenue could be used to support smokers quitting with, or shifting to longer-term use of e-cigarettes, which are much cheaper than tobacco and are probably less harmful to health.<sup>28</sup>

2. **Adding substantive novel interventions into the tobacco control intervention mix:** To maximise confidence in achieving the goal, the Government could consider adding to the established intervention mix in the above Option One, one or more novel endgame strategies. These include: a sinking lid on tobacco supply,<sup>26,29</sup> substantial tobacco retail outlet reduction,<sup>7,26,30</sup> adopting a “tobacco-free generation” policy<sup>26</sup> or restricting the sale of tobacco to very-low-nicotine content tobacco products. The latter approach is being explored by the US Food and Drug Administration (FDA).<sup>31</sup> All except the sinking lid option are included in a comprehensive action plan prepared by New Zealand health sector groups.<sup>22</sup> Including any of these substantive interventions would require law changes—which we recognise has political risks. However,

relative to the above Option One, these substantive novel strategies are likely to greatly increase the health gain achieved<sup>26</sup> and achieve much larger cost-savings from reduced disease treatment costs (as per modelling work which considered 16 tobacco-related diseases<sup>26</sup>).

## Conclusions

This modelling work suggests that to achieve a below 5% smoking prevalence by 2025 for both non-Māori and Māori, there will need to be very major increases in quit rates (ie, 1.9 and 5.2 times the projected BAU levels respectively). To achieve this goal the New Zealand Government will need to massively increase investment in established interventions (smoking cessation support, mass media) while continuing with substantial tobacco tax increases, or else add substantive new strategies into the intervention mix.

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### Competing interests:

Nil.

### Author information:

Nick Wilson, Department of Public Health, University of Otago, Wellington;  
 Frederieke Sanne Petrović-van der Deen, Department of Public Health, University of Otago, Wellington; Richard Edwards, Department of Public Health, University of Otago, Wellington;  
 Andrew Waa, Department of Public Health, University of Otago, Wellington;  
 Tony Blakely, Department of Public Health, University of Otago, Wellington.

### Corresponding author:

Professor Nick Wilson, Department of Public Health, University of Otago, Mein St, Newtown, Wellington.

[nick.wilson@otago.ac.nz](mailto:nick.wilson@otago.ac.nz)

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