

Difference between perceived and actual daily smoking prevalence among New Zealand adults

Results from a nationally representative survey

Individuals' social norms, beliefs and attitudes towards a behaviour predict their intentions and behaviours (Ajzen, 1991; Bandura, 1986; DiClemente et al., 2013; Fishbein & Ajzen, 1975). Social norms are commonly classified into two types: descriptive (estimated prevalence) and injunctive (perceived acceptability) (Hamilton et al., 2007; Lapinski & Rimal, 2005).

Both descriptive and injunctive norms are influencers of smoking behaviour among adolescents and adults (van den Putte et al., 2005; Wium et al., 2006). Several studies have shown that the perceived smoking prevalence rate is a strong predictor of actual smoking behaviour (both initiation and continuation) among young people (Agaku et al., 2019; Cerrada et al., 2016; Davis et al., 2010; Elsey et al., 2015). There is, however, a shortage of literature on perceived daily smoking prevalence

among New Zealand adults aged 15 years or over, and how this relates to smoking behaviour. Given that perceived smoking norms can predict actual smoking behaviour, overestimation of smoking prevalence may be an important risk factor for both initiation and continuation of smoking behaviour among adults.

The current study examines the difference between perceived daily smoking prevalence and actual self-reported daily smoking prevalence using a nationally representative sample of New Zealanders aged 15 years and over (the Health and Lifestyles Survey, HLS).

Perceived daily smoking prevalence was assessed using the HLS question "Out of 100 adults in New Zealand, how many do you think smoke cigarettes or tobacco? By this we mean they smoke cigarettes or tobacco at least once a day." Those who

Key points:

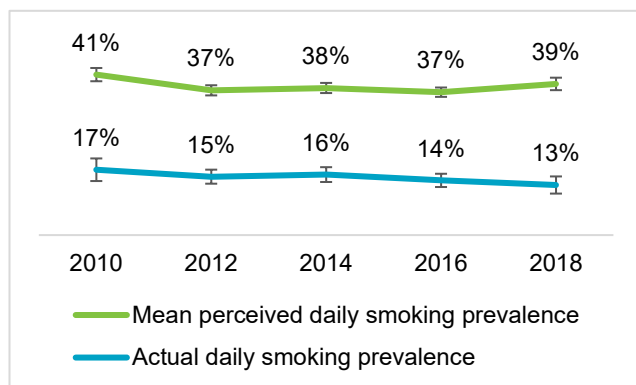
- In 2018, around 4 in 5 (79%) adults overestimated daily smoking prevalence in New Zealand.
- More than half (59%) had grossly overestimated (double or more than the actual prevalence) daily smoking prevalence.
- The proportion of respondents overestimating daily smoking prevalence increased significantly between 2010 and 2018.
- Māori, Pacific peoples, respondents aged 15 to 24-years-old and those living in highly deprived communities were more likely to overestimate the daily smoking prevalence.
- The evidence of population-level overestimation of smoking prevalence provides support for further denormalisation strategies in tobacco control.

overestimated the actual population-level daily smoking rate by more than 5% were classified as ‘overestimating’. For more details, see the methodology section.

On average, people estimated the daily smoking prevalence at 39%

In 2018, the mean perceived daily smoking prevalence was 39%, a decrease from the 2010 estimate of 41%. The actual daily smoking prevalence in 2018 was 13%, significantly decreased from 17% in 2010 (see Figure 1).

Figure 1: Mean perceived daily smoking prevalence versus actual daily smoking prevalence, 2010-2018



Note. The mean perceived smoking prevalence is the average of discrete responses (to the question on perceived smoking prevalence) provided by all respondents.

The 2018 mean perceived daily smoking prevalence was higher for Māori (50%) and Pacific peoples (56%) than non-Māori non-Pacific (36%) (see Figure 2 on Page 3).

Around 4 in 5 adults overestimated the daily smoking prevalence

In 2018, 79% of HLS respondents overestimated the daily smoking prevalence in New Zealand, 5% underestimated the daily smoking prevalence, and 12% estimated about right (see Table 1 on Page 4).

Those who were more likely to overestimate daily smoking prevalence in New Zealand were:

- 15 to 24-year-olds (2.7 times), compared to those aged 65 years or older
- Māori (1.8 times) and Pacific peoples (2.9 times), compared to non-Māori non-Pacific
- those living in highly deprived communities (1.8 times), compared to people living in less deprived communities.

Moreover, 64% of Māori and 84% of Pacific peoples had overestimated the daily smoking prevalence based on prevalence among their respective subsamples.

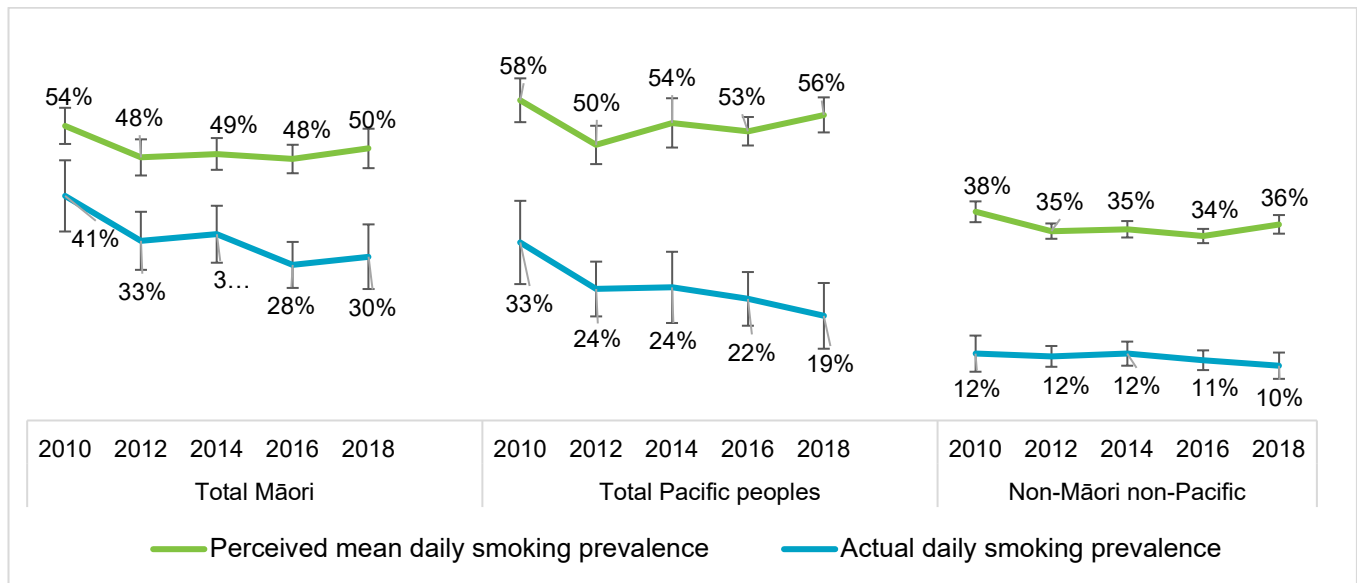
Whether respondents smoked or not made no difference - both daily smokers and never/non-daily smokers overestimated the smoking prevalence, with no significant difference between them.

More than half of adult respondents grossly overestimated the daily smoking prevalence

In 2018, 59% of the sample had grossly overestimated (double or more than the actual prevalence) the daily smoking prevalence in New Zealand. Those who were more likely to grossly overestimate were:

- 15 to 24-year-olds (2 times), compared to those aged 65 years or older
- Māori (2 times) and Pacific peoples (3.5 times), compared to non-Māori non-Pacific
- those living in moderately (1.6 times) and highly deprived communities (2.7 times), compared to people living in less deprived communities.

Figure 2: Trends in the mean perceived daily smoking prevalence and the actual daily smoking prevalence by ethnicity, 2010-2018



Note. The mean perceived smoking prevalence among Māori is the average of responses (to the question on perceived smoking prevalence among general population) provided by Māori and likewise for Pacific peoples and non-Māori non-Pacific.

Discussion

The current study found that there is significant misperception between self-reported actual and perceived smoking prevalence, both overall and among Māori, Pacific peoples, 15-24 year-olds and those living in highly deprived communities.

Social norms associated with smoking can influence attitudes and behaviour related to smoking at an individual level and changes at an individual level can contribute to a shift in societal norms associated with smoking. Descriptive norms play a bigger role in influencing people's own decisions, whereas injunctive norms play a bigger role in influencing people's recommendations to others. The current study found that descriptive social norms associated with smoking behaviour are unequally distributed by age, ethnicity and socio-economic position. These perceived smoking norms could also have contributed to disparities related to smoking behaviour. Findings from the current study could inform behaviour change by denormalising smoking behaviour and reducing its acceptability.

Similar to youth and young adults, normative levels of daily smoking were overestimated by the majority (79%) of respondents of New Zealanders aged 15 years and over (Cerrada et al., 2016; Davis et al., 2010). Such misperceptions are also very common for other risk behaviours such as alcohol and drug use and dietary behaviours (Arbour-Nicitopoulos et al., 2010; Kypri & Langley, 2003; Lally et al., 2011; Page & Scanlan, 1999; Perkins et al., 2010).

Despite the significant decline in actual smoking prevalence in New Zealand, there remains a very large gap between perceived and actual smoking rates. The 4% decrease in the actual daily smoking prevalence during this period (17% in 2010 to 13% in 2018) may not be big enough to be widely seen by the general population (Ministry of Health, 2019). This may be a reason for substantial overestimation during this period despite the significant overall decline in smoking rates. The overestimation of smoking prevalence may also be due to the increased visibility of smokers outside building entrances, footpaths and other outdoor areas; an unintended consequence of the Smoke-free

Environments Act 1990 that banned smoking inside buildings and workplaces (Ministry of Health, 2005).

There are many factors that may influence perceived smoking norms. Some of the factors strongly related to overestimation are: local tobacco regulations, family members' smoking status, close friends' smoking status, smoking in homes, workplaces and schools, and exposure to smoking on television and in movies (Davis et al., 2010; Hamilton et al., 2007; Reid et al., 2007).

Given that significant overestimation of smoking prevalence rates is widespread, public health campaigns could include messages that provide accurate smoking prevalence rates. Messaging that overtly focuses on group-specific smoking prevalence might reinforce already high smoking rates among them. Such messaging should therefore focus on general population smoking prevalence. Such messages could reverse the perception that smoking is normal and socially acceptable, and ultimately contribute to a reduction in smoking uptake and prevalence.

Table 1: Overestimation of daily smoking prevalence by demographic variables and smoking status-weighted percentage, unadjusted and adjusted relative risk

	<i>n</i>	% (95%CI)	Unadjusted RR (95%CI)	Adjusted RR (95%CI)	Adjustment variables
Total	2,175	79.0 (76.6-81.3)	-	-	-
Gender					
Female	1,334	78.4 (75.5-81.4)	1.1 (0.8-1.5)	1.1 (0.8-1.6)	Age, prioritised ethnicity and deprivation status
Male	841	79.6 (76.0-83.1)	1 (Reference group)	1 (Reference group)	
Age					
15-24 years	229	91.2 (86.5-96.0)	3.5 (1.7-6.9)***	2.7 (1.3-5.6)**	Gender, prioritised ethnicity and deprivation status
25-34 years	424	83.1 (77.5-88.6)	1.6 (1.0-2.6)*	1.3 (0.8-2.1)	
35-44 years	373	76.0 (69.7-82.3)	1.0 (0.6-1.5)	0.9 (0.5-1.4)	
44-55 years	337	77.9 (72.7-83.1)	1.2 (0.8-1.9)	1.1 (0.7-1.7)	
55-64 years	336	74.5 (68.6-80.4)	1.0 (0.6-1.6)	0.9 (0.6-1.5)	
65+ years	476	71.0 (66.6-75.4)	1 (Reference group)	1 (Reference group)	
Ethnicity					
Total Māori	493	88.6 (85.2-92.0)	2.2 (1.5-3.4)***	1.8 (1.2-2.8)**	Gender, age and deprivation status
Total Pacific peoples	438	88.6 (85.2-92.0)	3.9 (2.4-6.4)***	2.9 (1.7-5.0)***	
Non-Māori non-Pacific	1,279	76.8 (74.0-79.6)	1 (Reference group)	1 (Reference group)	
Deprivation status					
Low (score 1-3)	442	74.0 (69.0-79.1)	1 (Reference group)	1 (Reference group)	Gender, age and prioritised ethnicity
Moderate (score 4-7)	757	79.4 (75.7-83.2)	1.6 (1.0-2.3)*	1.4 (1.0-2.1)	
High (score 8-10)	971	84.7 (80.9-88.4)	2.4 (1.5-3.7)***	1.8 (1.1-3.0)*	
Smoking status					
Daily smokers	368	83.7 (76.7-90.6)	1.3 (0.7-2.5)	1.0 (0.5-2.1)	Gender, age, prioritised ethnicity and deprivation status
Non-daily and ex-smokers	891	78.2 (74.8-81.6)	0.9 (0.6-1.1)	1.0 (0.7-1.4)	
Never smokers	893	78.3 (74.5-82.1)	1 (Reference group)	1 (Reference group)	

Statistically significant results at $p < .05$ are in bold. * $p < .05$; ** $p < .01$; *** $p < .001$

Note. Those who overestimated the population-level daily smoking rate by more than 5% were classified as 'overestimating' RR = risk ratio; CI = confidence interval. Total Māori and Total Pacific peoples are not mutually exclusive.

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Methodology

The Health and Lifestyles Survey (HLS) is a biennial face-to-face in-house survey of New Zealanders aged 15 years and over living in permanent private dwellings. It collects information on various health-related topics including tobacco use, alcohol, mental health, immunisation, gambling harm, skin cancer, health education, nutrition and physical activity.

The 2018 HLS contained a nationally representative sample of 2,725 New Zealanders aged 15 years and over. Ethics approval for the 2018 HLS was obtained from the New Zealand Ethics Committee (Application Number: 2018_15). To compare results over time, we also used data from the 2010, 2012, 2014 and 2016 HLS. For the HLS methodology reports, questionnaires and further publications, please visit <https://www.hpa.org.nz/our-work/research/publications>

Variables

Self-reported actual daily smoking prevalence (within the sample). All HLS participants were asked: “Have you ever smoked cigarettes or tobacco at all, even just a few puffs?” Participants who answered ‘yes’ were classified as ever smokers and those who answered ‘no’ were classified as never smokers. All ever smokers were asked: “How often they smoke tobacco now?”. Those who answered ‘at least once a day’ were classified as daily smokers and those who answered ‘at least once a week’ or ‘at least once a month’ or ‘less often than once a month’ were classified as non-daily smokers and those that reported not smoking now were classified as ex-smokers.

Perceived daily smoking prevalence. As the question on perceived smoking prevalence is open-ended and responses ranged from 0 to 100, firstly a measure of mean perceived smoking prevalence was reported. Second, in order to characterise respondents who had overestimated the smoking prevalence, we created a measure of difference using each participant's response to the question and the actual smoking prevalence within the sample. For our analyses, a perceived prevalence within the 5% range ($\pm 5\%$) of the actual daily smoking prevalence within the sample (8% to 18% in 2018, 9% to 19% in 2016, 11% to 21% in 2014, 10% to 20% in 2012 and 12% to 22% in 2010) was considered an accurate estimation of smoking prevalence. Given the daily smoking prevalence ranged from 16.8% (2010) to 12.8% (2018), a $\pm 5\%$ threshold was deemed appropriate because it represented about one-third change in the daily smoking prevalence. Responses were then grouped into three categories: underestimation (if perceived prevalence is less than actual smoking prevalence by more than 5%); about right (if perceived prevalence does not differ from actual smoking prevalence by more than 5%) and overestimation (if perceived smoking prevalence is greater than actual smoking prevalence by more than 5%).

Socio-demographic variables. The socio-demographic variables of interest were age, gender, ethnicity, and deprivation status. Prioritised ethnicity was used as an adjustment variable, which allocates individuals who identify with more than one ethnic group to a single ethnic group, based on whether or not they identified with the group, in a prioritised order of Māori, Pacific peoples, Asian and European/Other. For subgroup comparisons, total response ethnicity was used, which allocates respondents to all ethnic groups they identify with (Ministry of Health, 2017). All ethnic comparisons reported in the study used non-Māori non-Pacific as the reference group. New Zealand index of Socioeconomic Deprivation (NZDep), an area-based measure of socio-economic deprivation, was used as a proxy for individual socio-economic position.

Analysis

Statistical analyses were conducted using STATA version 15.0. As perceived smoking prevalence is a continuous variable, we reported mean values for subgroups of interest. When we used 'overestimation' (a derived variable) as an outcome variable, we calculated proportions using the delete-a-group jackknife method. Unadjusted and adjusted risk-ratios were calculated using multinomial logistic regression. Any difference between two groups was confirmed using *p* values that were calculated using Pearson's chi-square tests.

To evaluate the robustness of results, sensitivity analyses were performed with an assumption that perceived prevalence within the 10% range ($\pm 10\%$) of the actual prevalence within the sample was an accurate estimation of smoking prevalence. Results from the sensitivity analyses were consistent with the primary analyses.

One of the limitations of the study was the rounding of the actual daily smoking prevalence for our analyses. This could have caused some uncertainty related to the measurement of difference between perceived and actual smoking prevalence.